

Recommendations for Modifications to the Recreational Use Attainability Analysis Protocol

ECOLOGICAL WATER RESOURCES ASSESSMENT PROJECT (EWRAP)

Submitted by - Environmental Resources Coalition (ERC)

On March 7, 2007 MDNR released a draft of the recreational use attainability analysis protocol updating the approved 2004 protocol. This draft included many of the changes we recommended in our comments on the 2004 protocol, as well as some suggestions from other stakeholders. It also included a modified stream morphological assessment approach that U.S. Geological Survey (USGS) uses to characterize stream habitat (Fitzpatrick, F.A. et al., 1998). The purpose of this white paper is to offer recommendations with the intent to build upon and further clarify the March 7th 2007 Recreational Use Attainability Analysis (UAA) Protocol Draft and to yield clearer, more consistent and defensible UAAs.

This white paper is organized using the same outline as the 2007 Recreational UAA Protocol Draft. Skipped sections indicate that we do not have a comment or recommendation on that particular section. Also, general or global comments about the protocol and its use are included at the end of this paper.

Department UAA Training

In the training section MDNR is strongly encouraging people who plan to conduct recreational UAAs to receive the Department's training and to review the instructional materials on their web site. We believe that it would be very helpful if the Department would include a contact phone number, web site references and possibly e-mail address (es) to help point individuals in the right direction. We believe that this is particularly important since the protocol was developed to be used by the general public.

Pre-Assessment Meeting

MDNR strongly encourages groups and individuals getting ready to conduct a recreational UAA to meet with the Department for a pre-assessment meeting and develop a detailed assessment plan before beginning data collection. The pre-assessment meeting is a great opportunity for clarification of the use of the protocol, transfer of materials (currently listed on page 15 of the Draft protocol, and transfer of previously conducted recreational UAAs – 'the active UAA'). (see "Evaluating Multiple UAAs for the Same Classified Stream Segment / Maintain Active UAA" below).

The assessment plan that MDNR recommends primarily entails a detailed map of proposed assessment locations and a statement of why the group or individual is interested in conducting a recreational UAA. The development and presentation of the assessment plan to MDNR during the pre-assessment meeting ensures that the correct stream will be assessed, correct methodology applied, and that a satisfactory number and interval between assessment locations will be selected.

I recommend the following changes to the pre-assessment section:

- List each of the elements of an assessment plan in a list or table. If some elements are only necessary for some UAAs, such as hydrologic characteristics or plans for sub-segmentation, these elements could be followed by parentheses indicating that they could be included ‘if needed’ or ‘when applicable’.
- Remove references in this section to UAA training since this information was covered in the previous section.
- Create a separate section or sub-section that lists the available materials and information.

This section could be substantially simplified, which could yield more frequent development and use of assessment plans by groups and individuals. More assessment teams understanding and following the Department’s recommendations helps “to ensure a complete and acceptable UAA final report”, which is the desired goal of the assessment plan and pre-assessment meeting.

Recreational Season

The MDNR recreational UAA protocol recommends that use assessments should be performed during the recreational season, which is defined as April 1st through October 31st. The 2004 protocol provided additional flexibility by conducting assessments during “any time of the year if sufficient evidence exists to confidently determine the existing and/or attainment of a use”. This level of flexibility is important to ensure that costly capital improvement projects are not delayed in obvious cases of recreational use, or lack there of or in cases with sufficient evidence. We are pleased that the 2007 draft protocol retains this level of flexibility.

Base Flow Conditions

Both Missouri and Kansas UAA protocols state that the UAAs are to be conducted under base flow conditions to acquire the best results. The Missouri UAA protocol defines base flow as the following.

Base flow is that portion of a stream’s flow contributed by sources other than precipitation runoff. This refers to a fair weather flow sustained primarily by springs or groundwater seepage, wastewater discharges, irrigation return flows, releases from reservoirs, or some combination of these factors.

This definition of base flow was taken directly from the *Kansas Surface Water Quality Standards* (K.A.R. 28-16-28b(f)).

The U.S. Geologic Survey defines base flow as the following.

Base flow as sustained flow of a stream in the absence of direct runoff. It includes natural and human-induced streamflows. Natural base flow is sustained largely by ground-water discharge (Cooney T.W. et .al. 2006).

These two definitions of base flow are very similar. This common terminology indicates to me that there is a wide spread and common understanding of what stream condition represents base flow and thus a wide spread understanding of what stream condition MDNR is referring to which would yield the best results for assessing recreational use. This common understanding of the base flow stream condition leads one to believe that conducting stream assessments outside of the desired condition would be fairly rare. However, in reviewing the UAAs conducted during the 2005 recreation season, I noticed that several surveys were conducted during or slightly after substantial

rainfall events clearly outside the base flow condition recommended in the protocol. Many of these assessments documented this above base flow stream condition both in field notes on the data sheets and in the site location pictures. It is believed that the primary reason many of these stream assessments were conducted outside the optimal stream condition (base flow) was tight deadlines for determining recreational stream use during the first half of 2005. We believe that UAAs conducted in the future will more likely be sampled at base flow conditions since time constraints will not be as tight.

Weather Conditions

The 2007 Recreational UAA Protocol Draft requested that all UAAs include weather conditions for 10 days preceding the stream assessment. This is important information in understanding the stream condition at time of data collection particularly since many of the waterbodies that recreational UAAs will be conducted on are typically relatively small and a precipitation event can have a significant effect on the waterbody condition.

I have found many excellent sources of rainfall data on the internet. The first two sources listed below are free and readily available on the internet. The third source list below (Midwestern Regional Climate Center) is an affordable weather data site with a very comprehensive list of weather stations throughout our state.

Weather Underground

<http://www.weatherunderground.com/>

Missouri Agriculture Weather – as part of the Agriculture Electronic Bulletin Board (University of Missouri)

<http://agebb.missouri.edu/weather/index.htm>

Midwestern Regional Climate Center

<http://mcc.sws.uiuc.edu/#>

In 2006 EPA reviewed the recreational UAAs that were submitted to MDNR during 2005. I noticed that EPA in their review included information about the drought condition (i.e. Phase I through IV) at time of data collection, which provides insight into overall climatic condition and can be helpful in evaluations. Drought information can be accessed from several sources throughout the internet. I have found the following web sites to be excellent sources of drought information.

U.S. Drought Monitor

www.drought.unl.edu/dm/monitor.html

State Drought Monitor for Missouri

http://www.drought.unl.edu/dm/DM_state.htm?MO,MW

Missouri Drought Conditions – MDNR Water Resources Center

<http://www.dnr.mo.gov/env/wrc/drought/MODroughtCond.htm>

Points of Observation

The 2007 Draft protocol calls for establishing three assessment sites per every five miles of stream length with a minimum of three sites per classified stream segment. To ensure adequate stream coverage, the protocol recommends that assessment sites be as well spaced as feasible and that large gaps between sites be filled in with interviews (Data Sheet D). The protocol also targets areas that are likely to be used for Whole Body Contact Recreation (WBCR) and areas below permitted Waste Water Treatment Facility (WWTF) outfalls for site selection.

Based on our experience conducting several recreational UAAs using the 2007 draft protocol, we believe that the recommended three assessment sites per every five miles of stream length is sufficient to provide a good physical characterization of the stream. However, for short classified stream segments (< five miles), three assessment sites is likely to be a bit excessive and will lead to difficulties obtaining sufficient landowner access. For example, the assessment sites of a one mile classified stream reach would cover between 28 to 56 percent of the entire classified stream segment length where as for a five mile reach the assessment sites would cover nine to 19 percent of the length. During the 2007 field season there seemed to be some confusion on determining the appropriate number of sites for classified stream segments of varying length. To avoid this, I recommend applying the following equation to establish the number of assessment sites needed per classified stream segment. This method would greatly simplify the approach and also address our concern about short stream segments.

$$\text{Assessment sites needed} = (\text{length of classified stream segment}) \times (0.6)$$

(Use stream length in tenths of a mile and round even to determine the number of assessment sites needed.)

Measuring Depth

Significant improvements have been made to the *Measuring Depth* section as presented in the 2007 protocol draft as indicated in a working document handed out during a recent UAA stakeholder meeting. My only remaining recommendations are the following:

- Develop a standard field methodology for assessing streams. This standard approach will provide additional definition to the stream assessment by providing more location specific data, where review teams or readers will be able to roughly determine where a particular transect or measurement is located. Also, following a single field methodology will create consistency among UAAs and likely speed their review.

Our standard approach that we applied during the 2007 field season for assessing stream depth is the following:

- All sites and transects were consistently numbered from upstream to downstream.
- GPS location was consistently taken at the first transect at each assessment site.
- All transects' depth measurements were measured from left descending bank to right descending bank.
- Pictures were taken at Transect 1 facing downstream and at Transect 11 facing upstream.

Modification (sub-segmentation)

Since the general public will likely be using the recreational UAA protocol, it is appropriate to provide some background information describing when sub-segmentation might be necessary, such as in cases when the use of the resource changes and/or when the physical characteristics of the stream change.

Photographic Record

We found that creating a standard naming convention simplified working with the photographic record. The following is an example of the photographic record naming convention that we applied during 2007. The first number is the waterbody id. The second number is the site number. The third number is the picture number.

- Photo ID = WBID_Site#_### (e.g., **1837_2_86**)

Interviews

We believe that the new interview forms are greatly improved based on our experience of conducting interviews following the 2005 and the draft 2007 protocol.

Weight of Evidence

The draft protocol states that whole body contact recreation will be considered attainable when either of the depth criteria is met (median or maximum depth criteria). However, this section needs to specify exactly what constitutes whole body and secondary contract recreation under the new protocol since the new methodology generates a lot of data (a minimum of 110 depth measurements per site) in which a median can be calculated (i.e. transect median, overall site median, waterbody median, or a majority of one of these medians, etc.).

Data Sheet B

This sheet needs to include a small section for field crews to note the location information and dimensions of the potential whole body contact site. Some of the necessary elements to be included in this section are the GPS location and the approximate dimensions (length, width, maximum depth, and possibly area >0.5 m or > 1.0 m) of the potential whole body contact site.

Data Sheet C

We have developed a new Data Sheet C that provides a single sheet for field crews to use while conducting a stream assessment on a site. This form removes the need to switch between sheets while conducting an assessment at a site. This data sheet was created in an Excel worksheet which can auto-calculate median transect depth and overall site median depth. (see our example of Data Sheet C attached)

Criterion One (Bacteria or Natural Occurring Pollutant Concentrations) Protocol Inclusion

The 2004 recreation UAA protocol also included bacteria UAA methodology, which has been through a stakeholder process and has been approved by the Clean Water Commission. I would like to see the Department once again include criterion one (naturally occurring pollution concentrations) into the UAA protocol after the Department has perfected the depth criteria and methodology for the 2007 protocol, which would provide an additional option and flexibility into the protocol.

Criterion Five (Physical Conditions) Protocol Development Recommendations

The federal regulations at 40 CFR 131.10(g) provide for factors other than depth to be considered when making a use determination. Criterion five of the federal regulations provides for the evaluation of physical conditions in the determination of waterbody use removal.

40 CFR 131.10(g) *States may remove a designated use which is not an existing use, as defined in section 131.3, or establish subcategories of a use if the State can demonstrate that attaining the use is not feasible because:*

5. *Physical conditions related to the natural features of the water body, such as lack of proper substrate, cover, flow, depth, pools, riffles and the like unrelated to water quality, preclude attainment of aquatic life protection uses.*

The 2004 protocol (on page 6) goes on to state that: *Physical features, as described in 40 CFR 131.10(g)5, must be associated with one or more of the other removal criteria [40 CFR 131.10(g)1-4&6] in order to remove recreational use.*

We believe that using physical factors (criterion five) of waterbodies along with the other evidence from the UAAs will improve the accuracy of recreational use determination. This will be particularly useful in the determination where UAAs are on the borderline with regard to stream depth. Stream depth is only one tool in the Department's toolbox for making an accurate use removal determination. Including criterion five or physical factors into the protocol will require staff to use their best professional judgment in determining whether evidence demonstrates that the likelihood of recreational use has been diminished to the point that it is no longer feasible or reasonable.

Physical features such as waterbody access, substrate, steep banks, remote location, inaccessibility and others factors can greatly reduce the likelihood that the resource will be used for recreational use. Therefore, we recommend that MDNR develop an approach to evaluate these physical features along with other evidence provided in the UAA. In doing so, various methods can be employed to factor or weight these physical feature variables along with depth. Another approach would be for the Department to simply apply best professional judgment to determine when recreational use is no longer feasible based on the number of factors that reduce the likelihood or feasibility of recreational use.

Evaluating Multiple UAAs for the Same Classified Stream Segment / Maintain Active UAA

During these past two years various groups have conducted somewhere around 600 to 700 UAAs throughout the state. Of these UAAs, MDNR has several waterbodies which have had multiple recreational UAAs submitted on the same stream segment. Currently, the Department does not have a clear process (at least to the public) in which to evaluate these UAAs conducted on the same stream segment relative to one another. Therefore, we recommend that MDNR include in their protocol, or include as a separate statement or policy, the details of the process that they will take

into consideration when evaluating two or more recreational UAAs (either submitted at the same time or over time) conducted on the same waterbody segment. We suggest that MDNR adopt an approach that would allow the most quantitative and complete UAA to have precedence over the less detailed and precise UAAs for either stream morphological or bacteriological assessments. For example, MDNR could develop a ranking or scoring system with which to evaluate among UAAs completed on the same classified stream segment. We envision UAA components such as the following being included in this system: waterbody sampled during correct stream condition, map accuracy and detail, weather data, properly spaced assessment sites, correct number of assessment sites, interviews, and other important UAA components. It would assist groups in conducting subsequent recreational UAAs by providing a guidepost as to how detailed and comprehensive the recreational UAA would need to be for consideration. This process would require the Department of Natural Resources to maintain an active or current file of recreational UAAs for each stream segment.

References

Cooney, T.W., P.A. Drewes, S.W. Ellisor, T.H. Lanier, and F. Melendez 2006. *USGS Water Resources of South Carolina, Annual Hydrologic Data Report of South Carolina for WY 2005*. U.S. Geological Survey. *USGS-WDR-SC-05-1*) U.S. Geological Survey, South Carolina Water Science Center.

Fitzpatrick, F.A., Waite, I.R., D'Arconte, P.J., Meador, M.R., Maupin M.A., and M.E. Gurtz 1998. *Revised Methods for Characterizing Stream Habitat in the National Water-Quality Assessment Program*. U.S. Geological Survey. Water Resources Investigations Report 98-4052.

Kansas Surface Water Quality Standards, Kansas Administrative Regulations (K.A.R. 28-16-28b through 28-16-28g (January 28, 2005).

Kansas Department of Health and Environment, Bureau of Environmental Field Services. 2006. Personal communication with Craig Thompson, Assessment Section Chief.

Kansas Department of Health and Environment 2001. *Guidance Document for Use Attainability Analysis (UAAs)*. December 1, 2001. Bureau of Environmental Field Services, Topeka, KS 66612.

Missouri Department of Natural Resources 2004. *Recreational Use Attainability Analysis Protocol*. September 29, 2004. Water Protection Program, Jefferson City, MO 65102.

Missouri Department of Natural Resources 2007. DRAFT - *Recreational Use Attainability Analysis Protocol*. February 8, 2007. Water Protection Program, Jefferson City, MO 65102.

Missouri Department of Natural Resources 2007. DRAFT - *Recreational Use Attainability Analysis Protocol*. March 7, 2007. Water Protection Program, Jefferson City, MO 65102.

ERC Recreational Use Attainability Analysis Field Survey Sheet

Waterbody ID: _____ Site #: _____ Weather Conditions: _____ GPS Location: UTM X: _____ UTM Y: _____ Horizontal Accuracy Estimate (GPS Data Quality): +/- _____ (feet) Average Stream Width: _____ (meters) Length of Survey Segment: _____ (meters) Field Staff: _____ Overall Site Median _____ (meters)	Water Quality Parameters
	Dissolved Oxygen: _____ (mg/L) Dissolved Oxygen: _____ (% sat) Specific Cond: _____ (µS/cm) Water Temperature: _____ (°C) Time: _____

Transect Cross-Section

01		02		03		04		05		06		07		08		09		10		11		
Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	Distance (m)	Depth (m)	
1																						
2																						
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						
Feature Type <small>(riffle, run, or pool)</small>																						

Notes: Transects will be measured beginning on left descending bank and finishing on right descending bank.
 GPS location corresponds to Transect 01. Transects ordered in upstream to downstream order.

Signed: _____ Date: _____