

Group 3: Breakout Sessions on concrete next steps

Group members: Frank McCormick, Lisa Fong, Keith Reynolds, Dave Cleland, Dave Levinson, John Rothlisberger, Andy Jones, Lawrence Buja

Given the charge from the Deputy Chief for National Forests and Grasslands to “review the WCC to see if there are new approaches for collecting consistent watershed condition information and determine how these new approaches can be implemented”, please address all the questions below:

- 1. What are the existing/cutting edge approaches (tools/processes/techniques) available now or within the next year to respond to the charge?**
 - a. TCA is an obvious choice. EMDS is the framework under which TCA is implemented, it would not be hard to feed WCC indicator data through EMDS. WCF has a wide range of data types and EMDS can handle diverse data types (i.e., can handle continuous and binary data). Original WCA team thought EMDS was too complicated of an approach, but strategic decision models are not that difficult to build. The logic models are the toughest part, but just need a few people who know how to work up the logic and most of the models are graphically based. Check the GTAC website to see what the online implementation/visualization of TCA looks like. If using EMDS, don't lump data together into bins (i.e., 1,2,3), use the underlying data in its raw form. TCA data could be directly useful to WCC. Watersheds are how we track water flow – water flow is a response to terrestrial condition
 - b. Key recommendation: Use hydrologic models like WRF-HYDRO to assess watershed function – hindcast data to achieve baseline information for priority watersheds – does VIC not already have that ability. NOAA is already funding operational instance of WRF. This would need to be a FS-NOAA collaboration. Of WRF-HYDRO and VIC which one is better for modeling stream gauge data? Climatologists would suggest running them all and look at ensemble to understand probabilistic distribution. Be sure to invest in calibration and validation.
 - c. The more condition assessment that can be done in the landscape context the better – move towards a wedded TCA/WCA approach – look for linkages as appropriate – seek to use consistent datasets and approaches – current pragmatic approach may be to wait for TCA and refreshed WCA to become more mature and then link them together.
 - d. GRAIP-Lite – roads coverage and analysis – indicator under roads and trails indicator coarse tool that allows for assessment of road impacts to watershed – what we care about is sedimentation – not roads themselves – gets around issue about road density not being the most important feature – national coverage is possible. A lot of new good data is coming out on roads, trails, and soils.
 - e. Apply terrestrial hierarchy approach – Land Type Association-Subsections-Sections – based on physiographic relief – consider how different systems respond differently – if we could get a handle on general patterns of relief, water infiltration – look at ecological units at a broader scale – allows for evaluation at multiple scales

- 2. a) What WCC variables lend themselves to new approaches and which do not?**

- a. Issue: Analysis of Watershed Condition Classes shows condition classes are highly insensitive to changes in indicators (Ashley Steel's analysis)
- b. Consider a multi-tiered approach – need to be realistic about what can we do and in what time frame we can do it – what is it essential that we do? – if we find that some indicators are incredibly important and they are also highly uncertain then we need to invest effort in collecting better empirical data on those indicators
- c. Variable information needs and availability depending on where you are geographically. Incorporate via conditional processing in the logic model.
- d. Water quality through water sample analysis – N and P and maybe Hg – partner with EPA National Aquatic Resource Survey to intensify water quality sampling on NFS lands using a nationally consistent protocol and sampling framework – would likely emphasize the high quality of water on National Forests relative to other locations
- e. Increase use of EPA 303d impaired waters listings – in previous iteration 303d listings were used as a rough information source for water quality indicator.
- f. Fragmentation indicator – Could be modeled as a function of flow reductions, temperature, remotely sensed high-resolution DEMs – Could PNW's NetMap be applied nationally to assess aquatic habitat fragmentation?

b) What WCC attributes and indicators should be considered for addition/replacement?

- a. TCA has 10 indicators with a total of 40-50 variables. Need to step through each of the TCA indicators and see how it relates to WCC needs. Need to put more time into this – develop teams to work on this on calls – rational for indicators, relevance, feasibility
- b. 8th indicator Fire regime condition class – big problem, doesn't have anything to do with fire – remove this as an indicator
- c. Add Wildfire effects – both uncharacteristic severity and uncharacteristic frequency
- d. Add Wildfire Hazard from TCA
- e. Also add Current Tree Mortality data from TCA
- f. 12th indicator – Change to insect and disease risk
- g. Add Climate Shift data from TCA – temperature and precipitation
- h. Add critical loads for nitrogen and phosphorus
- i. National Atmospheric Deposition Program data as hotspot detection for watersheds that are having problems – a problem will be scale – NADP is 12km², which is similar in size to 12-digit HUCs. Need to get a hold of air program's deposition samples
- j. Aquatic habitat may be difficult to obtain layers for – either remove or could be a grand challenge

3. What are some game-changing or grand-challenges here?

- a. How do we remotely assess aquatic habitat condition?
- b. Are there critical indicator species to survey for to use as biological endpoints of watershed condition?
- c. Can we obtain information from state agencies about aquatic species distributions? NatureServe datasets could be informative.
- d. To what extent is condition of riparian vegetation measurable through remote sensing?

- e. Change analysis is important – recognize we are dealing with dynamic system and assess it at multiple points in time to understand variability – are differences we observe natural variation or do they suggest a trend
- 4. Who (individuals/entities) should be at the next meeting to address the charge?**
- a. People that would be knowledgeable about key datasets – EPA, NOAA, NatureServe, state fish and wildlife agency employees
 - b. Begin forming technical advisory committee for WCC/WCF
 - c. Establish working teams for various key indicators. Gather team leads for next meeting.
 - d. More USFS Resource Planning Act staff