Breakout Sessions (3) on concrete next steps
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Is everyone happy with the current WCC? AS a first round, it does its intent. Sets up a system that allows us to identify where to do work. Wasn't consistent, helped identify our priority watersheds. This is an opportunity to see if there is a data layer available. General architecture is good, FS should applaud this. Which of these WCC metrics can be measured with empirical data?

What are critical datasets? Barriers.

These are the output variables we are most interested in: Q, WQ, habitat. Then list out the stressors that influence those.

Two things were underweighted in this WCC: climate change and invasive species. Game changer where watersheds are going to be completely taken over by CC or invasive species. Are there national products to model impacts of invasive species. If we were to redesign WCC, get characterization bsed on today's baseline, what are the impacts of CC and invasive species to characterize the resilience component (change in stream flow or temp) that is not currently embedded in this? Are there data sets for resiliency that we could use?

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. Ichthymaps could populate all of those things listed under #4. It gives you species distributions. Developed probably species distributions for the CONUS.
    b. Water quality could be obtained using the NADP:stream monitoring. The impaired waters list varies by state and by use and is driven by the intensity of monitoring. Could we use USGS national nutrient measures and if so, how would we identify which water was high quality or low quality? Determined by states…
    c. Water quantity – WRF hydro could be used, VIC by Charlie Luce – 20 year old model. Tom Brown, other available products that are empirical. We could get a measure of water yield. USGS DC/MD/DE water center. Pulling up data from gages, channel cross sect area, channel width, etc. to measure flood heights. Are there data layers that say there was departure from norm. WRU (Water rights and uses database) FS DB. RPA also do recreation analyses.
    d. Aquatic habitat – Gary Weiland NFHP could provide information
        i. Habitat fragmentation – need a national inventory for this. NHD needs to be improved.
        ii. Large wood –
    e. Roads and trails – we do not currently have a national data set that quantifies the impacts of roads or sediment inputs. Would need to run GRAIP or GRAIP lite or other watershed

analyses. Sediment inputs have been done at a smaller scale and we could scale up. We could do any of these approaches within a year. Need a better roads layer.

  i. Road density?
  ii. Mass wasting?
  iii. Road maintenance?
  iv. Proximity to water?
  v. Number of road crossings should be included

f. Soils –GSSURGO has soil attributes and drainage classes and flood frequency. Think it has soil erosion. Could use something like USLE to model erosion. Need mine layer.

g. Riparian/wetland vegetation – measure is functioning properly. How do you assess that? Can see if there is a departure from veg type/land cover. Sinan Abood is building a riparian area based on 50 yr flood heights, also adding wetlands, riparian. hydrological soil, flood frequency, produce riparian land cover or we use veg map from Nat Forests.

h. Terrestrial biological (need fewer veg measures and they need to be tied to flow, or other stream characteristics.

  i. Fire – we think there is fire data

We have a lot of the data/data bases that are not being fully used.

Where do you measure water quantity and quality? The pour point? Or do you integrate it so that you can document where areas might be dewatered or have poor conditions. What ecosystesm services are we providing and where are they occurring in the watershed?

Resiliency – are there data sets out there? How do we measure/monitor resiliency? Ability to resist and rebound from disturbance. Who rebounds?

WQ – who are the constituents?

2. a) What WCC variables lend themselves to new approaches and which do not?
  b) What WCC attributes and indicators should be considered for addition/replacement?
   a.

3. What are some game-changing or grand-challenges here? For example
- How to assess watershed condition at much higher spatial/temporal resolutions (daily at 1m)?
- Can/should we fully automated some/all WCC collection?
- How might/could/should we take the current condition assessment and project future conditions to help inform management decisions today?

  What data sets do we have and what do we need? If we knew where all of the fish passages were, that would be game changing.

  What is a watershed to us?

Quality, quantity, and timing of flows, quality of habitat, and the things that influence those things. What can we measure and what do we need to measure?

Baseline of total yield,

We should be modelling what is the change that results from management actions.

Long term monitoring vs long term monitoring.

What existing data layers can you pull from.

Identify what data is available and where the gaps are and how we can fill those gaps (models, monitoring). Need WASI at a national scale. We could get basic information for not much money.

If you could boil down to a few characteristics, water quantity is one. Critical component of WCA. Perhaps that one needs to be reevaluated for its weight in the WCA. Q is a an important factor in quantifying WC.

Flow characteristics – how do we tease out impacts of climate change. Do a MC analysis?

The distribution of seasonality flows matter. , road stream crossings,

What can we do to influence management?

Can we get at basic flows using various tools and look at departure from baseline from CC, other things. Missing the management side. How is mgmt impacting that change. Are all barriers mapped? No.

What about water quality and habitat? Habitat fragmentation and fish distribution is something that we need to figure out how to measure.

4. Who (individuals/entities) should be at the next meeting to address the charge?
   a. Emmanuel Frimpong, Tom Brown, Charlie Luce, Dan Isaac (or his data base manager), Andy Dolloff (Craig Roghair), Chris Oswald, Hobie Perri, Keith Reynolds, Brian Staab, Sinan Abood, Mike Eberle, Linda Spencer

Have subgroups at each meeting. Why/how did they come up with current indicators, how can we improve no that or identify other empirical data sets.