Coweeta LTER 2014 Winter Meeting Agenda

Friday January 31

8:00 – Coffee and light breakfast

8:30 – Welcome and meeting logistics (Gragson/Love, Conference Room)

8:40 – Steps taken since the last meeting in developing the renewal proposal (Gragson):

Developing the draft, SAC members & responsibilities, LPI transition

What we need to accomplish during this meeting

Budgetary guidelines to be aware of

10:15 – Break

10:30 – Overview of thematic areas - strengths, weaknesses, & needs:

2.3.1 - Regional-to-Local Processes in Hydroclimatic & SocioEcological Domains (Heynen)

2.3.2 - Ecosystem Processes & Organismic Interactions (Wurzburger)

2.3.3 - Taxonomic Effects of Hydroclimate Variability (Maerz)

2.3.4 - Riparian Zone Vegetation and Management (Jackson)

2.3.5 - Regional Vulnerability Modeling of Hydroclimate Variability & Development (Bolstad)

Summary and instructions for after lunch activities (Miniat/Gragson) & instructions

12:00 – Lunch (chicken/veggie wraps)

1:00 – Evaluation, triage and prioritizing activities by thematic area related to the hydroclimate variability framework (SAC-led groups, Breakout Rooms)

2:30 – Debrief findings to group-at-large (Miniat, Conference Room)

3:00 – Writing charge for activities to SAC-led groups (Gragson/Miniat, Conference Room followed by Breakout Rooms)

5:30 – Meeting adjourns for the day

6:00 – Dinner-social Coweeta Residence (pork loin & veggie parmesan)

7:00 - Coweeta SAC (closed) meeting in Calloway Room

Saturday February 1

8:00 – Coffee and light breakfast

8:30 – Status on writing by SAC-led groups (Gragson, Conference Room)

8:45 – Finalize writing of activities by thematic area (Breakout Rooms)

10:30 – Charge to groups on budgeting, figures and tables (Gragson/Miniat, Conference Rooms followed by Breakout Rooms)

12:00 – Lunch (sandwich platter)

2:30 – Activities up through March 15 & Open Discussion (Gragson/Miniat, Conference Room)

4:00 – Meeting adjourns

Coweeta LTER 2014 Winter Meeting Notes - DRAFT
January 31st – February 1st 2014

Prepared and submitted by Jason Love
Coweeta LTER Site Manager

January 31st, 2014
Meeting started at 8:30 am

Overview of Proposal (Gragson)

- Proposal due March 14 at 5pm – only about 6 weeks out
- We have a 2nd draft that is currently out
- SAC has taken the lead responsibility in drafting the proposal
- SAC has met once face-to-face, but have been meeting regularly using GoToMeeting
- Synopsis of LTER research: to address ecological questions that cannot be resolved with short-term observations or experiments
- Unique to LTER:
    - Located at sites representative of major ecosystems or natural biomes
    - Study phenomena over long periods of time based on data collection in 5 core areas; examples include CS01, terrestrial gradient continuous soil moisture readings, flood records, and census data
    - Include significant integrative, cross-site, network-wide research
- Renewal proposal must:
    - Test major ecological theories or concepts
    - Should be organized around a suite of integrated questions that arise from the analysis of long-term data
    - Should have goal of achieving a mechanistic understanding of biological responses to past and present environmental change at multiple scales
    - Should use this understanding to predict ecological, evolutionary and social responses to future environmental change
    - Cleary define questions that demand study on decadal time scales
    - Thoroughly justify the need for long-term support to understand ecological systems and processes; LTER is the longest continually funded program at NSF
- Data collected in 5 core areas:
    - Primary production
    - Population dynamics and trophic structures
    - Organic matter accumulation
    - Inorganic inputs and movements of nutrients through the ecosystems
    - Patterns and frequency of disturbances
- CWT VII Framing Question: *How do hydro-climate variability and the human-modified landscape separately and in interaction alter ecosystem processes and biotic communities that, in turn, affect the vulnerabilities of socio-ecological systems?*
- NSF is considering, under pressure of Congress, to blacklist PIs who fail to submit an annual report
- NSF won't be giving us a second chance, unlike the last proposal which NSF permitted us to improve and clarify proposal after the proposal was submitted

- Activities in the proposal must feedback to the overarching framing question

SAC Role (Gragson)

- Coweeta Science Advisory Council (SAC): Larry Band, Paul Bolstad, Carolyn Dehring, Nik Heynen, Rhett Jackson, John Maerz, Catherine Pringle, Jack Webster, Nina Wurzburger, John Chamblee (Ex-Officio), Jason Love (Ex-Officio), Ted Gragson, Chelcy Miniat
- The SAC is responsible for recommending and recruiting PIs to participate in CWT-LTER research, and to actively mentor new and early career scientists into future leadership roles in the project. They shall have the power to assign areas of responsibility within the SAC, delegate tasks to PIs, plan and oversee CWT-LTER research, recommend allocation of funds, recommend removal of PIs when appropriate, and otherwise administer the affairs of the CWT-LTER. (Language taken directly from the SAC Charter)

Budget (Gragson)

- Budget is capped (and flat): **$1,280,000/yr; $7,680,000/6 yr**
- **Overhead = 26%** (~$330,000/yr); sub-awards have double overhead
- **Project Management = 40%**
    - REU & Schoolyard = 3.1%
    - Field Vehicles = 1.2%
    - Dorm = 1.2%
    - Field Personnel (2 + Site Manager) = 10.9%
    - Lab Personnel (3) = 8.7%
    - IM Personnel (3) = 12.4%
    - Diverse Fixed M&S = 2.7%
- **Research = 34% (432,856/yr; $2,597,136/6 yr**
    - Right now research from the proposal is $4,367,101, or a bit less than twice of what is budgeted

Working guidelines for developing budgets: (see attached handout)

Why join a "Coalition of the willing?" (Gragson)
Ancillary benefits:

- Leverage long-term data, infrastructure and personnel to obtain additional funding
- Supplements – can provide additional funding to support REU students, international travel, ROAs, equipment, etc.
- LTER Network – All Scientists Meeting every 3 years, cross-site proposals, working groups, etc.
- There is unfortunately not enough funding to support every activity of every PI, so priorities must be set by SAC

Transition to Lead-PI (Gragson)

- Ted will be stepping down at the midterm
- It is important at NSF to make sure there are systems in place to perpetuate lead-PI

- Is it more important to identify process or the person to take the lead PI; SAC decided that Rhett Jackson would be nominated as lead-PI and he has agreed
- Lead PI crafts management of project to meet both UGA and NSFs requirements

Overview of Thematic Areas

2.3.1 – Regional-to-Local Processes in Hydrolclimate and Socioecological Domains (Heynen)

How do human modifications of the landscape change regional temperature, precipitation, and hydrologic processes, inherent vulnerability, and the knowledge, values, and governance systems to respond to vulnerability in southern Appalachian Mountains?

- 2.3.1.A – Flood magnitude and frequency across the Holocene (Leigh)
- 2.3.1.B – Soil evolution under management (Leigh, Gragson)
- 2.3.1.C – Migration, exurbanization, regional political ecology (Welch-Devine, Holloway, Burke, Rice, Heynen, Gragson)
- 2.3.1.D – SoApp historical/contemporary governance regimes (Rice, Burke, Holloway, Welch-Devine, Heynen)
- 2.3.1.E – Landslide risk and real estate pricing (Dehring, Depken, Chamblee)

Critical needs

  - Missing activities – No
  - Integration between activities
    - Yes, integrate 2.3.1.B – 2.3.1.D
    - Foreshadow connections between 2.3.1.C, 2.3.1.D to 2.3.4.D ("Exploration of landowner attitudes toward riparian conditions/management")
  - Generate hypotheses for the activities?
    - Yes, 2.3.1.D and 2.3.1.E and fine tune others for sake of better integration
- Regional vulnerability modeling group will do some scaling for flood hazards, landslide hazard – would be a good connection with socioecological group
- Section 2.3.1.E is actually 2 studies and includes flood risk, as well as landslide risk
- TDE will look at root structure, which will feed back into modelling, which will help inform social vulnerability

Discussion

- Clark – Is it possible to do all these measurements? Ted – We looked at existing equipment and tried to distill or infer all the data sets that will be collected or implied will be collected.
- Leigh – soil survey maps don't capture changes in soil that have been converted to pasture; relates directly to flooding, hydrologic modelling, etc.

2.3.2 Ecosystem Processes & Organismic Interactions (Wurzburger)

How does hydroclimate variability affect ecosystem processes and interactions among organisms and among landscape patches, thus affecting the vulnerability of biodiversity and ecosystem function in forest watersheds?

- Propose 3 plots that remove 2/3 of the throughfall, from ridge-shoulder to cove
  2.3.2.A – Hydrology (Band, Emanuel, Bolstad, Miniat)

- Subsurface flow
- Tree response relative to landscape position
- Landslide hazard

2.3.2.B – Biogeochemistry (Wurzburger, Knoepp, Novick, Strahm, and Bolstad)

- Stand level C assimilation (Novick, Bolstad)
- Soil microbial dynamics, tree-microbe feedbacks (Wurzburger)
- Re-wetting and elemental fluxes (Knoepp, Strahm)

2.3.2.C – Biodiversity impacts (Clark, Maerz, Warren, Fratterigo)

- Tree physiology and species demography
- Plant nutrient acquisition
- Salamanders or ants?

Critical needs

- Cohesion among sections. . .vulnerability theme and biodiversity group
- Missing components from October version
  - Remote sensing?, modeling?, Landslides and roots?
- Refinement of text
  - Remain concise while broadening scope of each section
  - Major word-smithing is needed (with citations!)

Discussion

- Turner – Can we take what we learn from this mechanistic study and draw inference from a more heterogenous landscape?
- Band – From scaling standpoint, this mechanistic study should feed the scaling section
- Bolstad – Everyone needs to think about scaling and include it in the piece you write up
- Fraterrigo – Interested in evolution and how these systems change; TDE provides a template based on landscape positions
- Barrett – good TDE studies coming out of the western US that should be cited

<u>2.3.3 – Organismal and Ecosystem Responses to Altered Hydroclimates</u> (Maerz)
Spatial hydroclimate variation shapes patterns of species abundance, community composition, and ecosystem processes across southern Appalachia; however, land use may overwhelm the local effects of hydroclimate in shaping regional biodiversity and ecosystem function.

Premise
The steep montane topography of southern Appalachia creates a regionally and locally heterogeneous hydroclimate landscape from xeric ridges to moist coves.

Predictions
1. The functional traits of organisms reflect **adaptations** to natural variation in the physical and biotic environment, and **evolutionary** or ecophysiological trade-offs determine responses by organisms and ecosystems to climate change.
2. At local extents, **population and community dynamics** across this hydroclimate gradient are determined by aggregate individual responses and interactions to environmental conditions.

3. At larger extents, **biogeographic processes of isolation and fragmentation** related to land use will overwhelm the aggregate effects of hydroclimate to determine regional patterns of diversity and abundance.
4. A warmer/drier future will lead to changes in overstory vegetation structure and function, in turn altering globally-unique and diverse vertebrate and understory plant communities, **soil microbial activity, nutrient cycling, stream flow and chemistry, the quality and quantity of ecosystem services**.

Knowledge Outcomes:

Develop mechanistic scaling of local and biogeographic effects on individual performance, interactions to forecast changes in regional biodiversity and identify **interventions at scales relevant to management**.

Activities

2.3.2 - Throughfall Displacement Experiment (TDE)

- TDE: Root Biomass, Tree Growth, and Carbohydrate Storage
- TDE: Organismal [Microbes, Trees, Herbaceous, Trees, Invertebrate, Vertebrate] Responses to Altered Soil Hydrology

2.3.3 - Road Effects on Throughfall Displacement, Soil Hydroclimates, and Biodiversity

- Road effects on soil moisture, nutrient cycling, microbes, tree growth and demography, vertebrate demography

2.3.3 - Interactive Effects of Hydroclimate and Landuse on Demography and Regional Patterns of Biodiversity and Ecosystem Processes

-Biodiversity [Microbes,Trees, Herbs, Invertebrates, Vertebrates] Responses to Climate Change and Land Use

2.3.4 - LAI Trajectory Through Space and Time

2.3.3 - Keystone Interactions and Processes of Southern Appalachian Ecosystems

Critical Needs

1. Reorganization of activities currently segregated among draft sections.
2. Detailed Project X Activity X PI map consider spatial and temporal scales, core LTER areas, and relationship to core questions.
3. Attention to the underdeveloped areas of keystone interactions and processes.
4. We have no cross-site or partner initiatives!!!!

… lower priorities

5 Integrations with TDE, Rhodondendron removal and Riparian Vegetation management sections.

-Synoptic data and continuation on Rhododendron and gaps

- Miniat – We have spent some time talking about TDE and how we'll tie in cross-site activities. There is a separate section for Cross-site Activities.
- Maerz – We need to make bolder predictions (not just things will go up, down, or stay the same). Change responses to vulnerabilities.
- Band – Agreed that we need be more specific about predictions, not just that things will "change" based on "changes that are happening"; need to say these major manipulations are providing key information for other sections

2.3.4 - Riparian Zone Vegetation and Management (Jackson)

How do riparian management decisions mitigate or exacerbate effects of hydroclimate variability on riparian and in-stream ecosystem properties and processes?

- Jackson showed several diagrams and schematics illustrating riparian gaps and rhododendron removal
- Propose to look at old gaps, not new gaps. Looking at using power-line right-of-ways, but these may not mimic gaps that people produce in streams that run through their property.
- Stream scientists want some gaps with minimal disturbance (utility right of ways), but this may not satisfy social scientists
- Interested in the following questions: How far downstream does temp higher relative to shaded reaches? What about stream channel width?
- Still need to figure out how are we going to pick gaps as well as how many gaps?
- In addition, what should be done to try and control site selection?
- Rhododendron removal – piggybacking on USFS project
    - 4 streams – 1 for each treatment (copy table)
    - Pre-treatment monitoring must be done this summer/fall before we get $$
- Stream-dewatering project was cut. Right now riparian gaps don't relate to TDE, but do relate to landscape patterns and processes, as well as organisms

Discussion

- Turner – don't have figures, but Rhett's figures are a really good start to help pull everything together
- Fratterigo – It would be a good idea to include a figure of what we've already learned to help summarize all the pieces of previous work

2.3.2.5 - Regional Analysis (Bolstad)

What are the vulnerabilities of key taxa (including humans) currently, and under future scenarios of hydroclimate variability and development over the region?

- We gain new knowledge about a small number of ecosystems process on an underwhelming number of different, tiny plots
- A tiny number of people care about any individual plot
- We abstract the process knowledge to caricatures of some system functions, we call models, driven by key environmental parameters, and use these to expand our knowledge to geographies people care about in aggregate
- Humans are primary drivers of many (most?) of these key environmental parameters
- What processes, interactions, and range of key parameters, over what geographies?

LTER Proposal Musts

- Should be organized around a suite of integrated questions that arise from the analysis of long-term data
- Should have a goal of achieving a mechanistic understanding of biological responses to past and present environmental change at multiple scales
- Should use this understanding to predict ecological, evolutionary, and social response to future environmental change

Synopsis

- Scale process knowledge
- Synthesizes observations across scales (plot through regional watershed).
- Coupled statistical and model based approaches
- Integrated, progressively nested estimates of socioecological system behavior connected by the flow of water, carbon, nutrients, people, information, and capital.

Proposed Activities

- Shepherd: Characterize historical HC variability, recent changes, and regional urbanization teleconnections
- Band/Bolstad: Expanded network of soil moisture, microclimate, and canopy measurements, in un- and disturbed environments; integrated regional modeling
- Turner/Pearson: Herb, invert., & vert. response to HC variability and land use; measurements & models
- Nelson/Shepherd: Place-based human vulnerability to future climate extremes; regional climate/social synthesis & modeling

Critical Needs

- Incoherence: in focus on primary drivers (precipitation, temperature, light, soil moisture, wealth, background, communities). How do we translate our findings from plot to region? Should we re-organize around drivers? Processes? Geographies? Some combination?
- Inconsistent/nonexistant/redundant scenarios: many here and elsewhere (e.g. Clark, Dehring) same source data (e.g., PRISM, downscaled GCM, "future development"). Any interaction, synergies?
- How can we change our measurement and modeling for a more synthetic approach, one that truly merits LTER support because it demands long-term, interdisciplinary, broader-scale science?

Discussion

Band – Need elevator speech for each section. 1-2 sentences. Segregate methods out.
Nelson – Need to think about vulnerabilities of systems, not species – this would help with scaling the project up to region
Heynen – Need thematic figure
Turner – Whether, why, where, and when climatic changes and vulnerabilities – where are vulnerabilities?

<u>Group Break Out-session (1pm – 2:30pm)</u>

<u>Debriefing after group break-out</u>

2.3.1 (Heynen)

- Realized they lack Shepherds precipitation reconstruction
- Left meeting with a clear sense of how to flesh out section and write in a more unified way

2.3.2 (Wurzburger)

- Miniat and Wurzburger reorganized section prior to the meeting.
- Need to reorganize to make sure have clearly written "topic" sentences and hypotheses

2.3.3 (Maerz)
- Showed a spreadsheet that filled in the PIs for each activity
- Some activities didn't have PIs, so can probably be dropped unless folks think they are integral to the project
- Some projects were stand-alone (e.g., Maerz's salamander removal work) and can probably be dropped

2.3.4 (Jackson)
- Landowners want to be able to recreate on parts of the stream – is there a size that is smaller (10-20 m) that would work? It is hard to find the size of gaps. We have experimental design questions about the gap plots.
- Rhodo-removal – Needs to make clear that this is an existing USFS project that we are leveraging
- Need to make a better connection to the overall project
- No LTER money for pre-treatment work on rhodo project
- Summer of 2016 is when we could start on riparian removal based on budget

2.3.5 (Bolstad)
- Decided that whole section needed to be re-structured.
- Need uniform set of data in order to scale up and project future scenarios
- Need to downscale some sets of data (e.g., IPCC 5th assessment)
- What do the different groups need for their projects to make them scalable – what do you need? *These need to be identified.*
- Geography is 10-20 counties (southern Blue Ridge of the Southern Appalachians)
- Don't need regional canopy coverage for this proposal
- Land use have data to 30 m; soil moisture have data to 30 m

February 1, 2014
Meeting started at 8:30 am

<u>Summary of group activities/needs thus far</u>
Social (Heynen)
- On verge of integrating two of the activities (governance question)
- Intends to try and talk to biodiversity group to try and make a linkage
- Also intend to talk to riparian gap group to find connections

TDE (Wurzburger)
- Spent most of the afternoon coming up with stronger and better articulated questions/hypotheses

Biodiversity (Maerz)
- Productive session linking to TDE and the larger modelling efforts

- Centered around using existing gradient plots and soil moisture plots for additional work on target taxa
- Mechanistic data will provide base for modelling to see how these taxa map to the landscape; we can then go out in the landscape and capture a snapshot to test the model
- Need to learn to better articulate link of TDE to biodiversity

Riparian Gap (Jackson)

- Realized that the questions and hypotheses don't tie back in to hydroclimate variability
- Text doesn't mentioned that LTER is leveraging the USFS rhodo removal project – need to make this clear
- Gap removal can probably be performed with another proposal; logical reason to take it out of the proposal
- Need to have more discussion whether to leave it in or take it out or to just reduce the scope of the project
- Cross-site collaborations haven't been brought up
- Need to make sure there is communication among the groups
- Turner – Might be able to link with another LTER site that is doing riparian manipulation; Baltimore LTER might be another place to look

Regional Scaling/Modelling (Bolstad)

- Need to figure out where the process-modelling go in the proposal (e.g., Clark's work in TDE or regional section)

Charge to group (Gragson)
Groups will send emissaries to find out what is happening in the other groups. Continue writing and editing. Need to reconvene at 11am

Summary of Group Accomplishments
2.3.1 – Regional-to-Local Processes in Hydrolclimate and Socioecological Domains (Heynen)

How do human modifications of the landscape change regional temperature, precipitation, and hydrologic processes, inherent vulnerability, and the knowledge, values, and governance systems to respond to vulnerability in southern Appalachian Mountains? **– old question**

New question: *What socioecological drivers and responses characterized the effect of human modified landscapes and hydroclimate variability on social vulnerability.*

Updated Member Activities
2.3.1.A – Flood magnitude and frequency across the Holocene (Leigh, Jackson)
2.3.1.B – Soilscape hydrologic properties along a management gradient (Leigh, Gragson, Jackson)
2.3.1.C – Modeling historical social-economic vulnerability to climate change and extreme hydrologic events (Shepherd, Nelson)
2.3.1.D – Multi-scale human population drivers of land management values and practices(Welch-Devine, Holloway, Burke, Rice, Heynen, Gragson)

2.3.1.E Environmental Governance: Market, State, and Community Responses to Vulnerability(Dehring, Depken, Chamblee, Rice, Burke, Holloway, Welch-Devine, Heynen)

Hypotheses for 2.3.1

- 2.3.1.A - We hypothesize that flood magnitude and frequency has changed significantly over centennial to millennial timescales in the Blue Ridge Mountains in relation to land-use and climate change. (Leigh, Jackson)
- 2.3.1.B - We hypothesize that land management activities have greater predictive power than land cover composition and pattern in accounting for the hydrological and chemical properties of soils. (Leigh, Gragson, Jackson)
- 2.3.1.C – We hypothesize that the change in exposure to climate change and extreme events during the last 50 years has been more significant in determining social vulnerability than the change in adaptive capacities. (Shepherd, Nelson, Holloway)
- 2.3.1.D – We hypothesize that people with stronger extralocal linkages will manage land in ways that are less tied to the historical practices and values that characterize this region. We futher hypothesize that over time, increasing hydroclimate variability will become relatively more important in land management. (Welch-Devine, Holloway, Burke, Rice, Heynen, Gragson)
- 2.3.1 E --We hypothesize that complex systems of environmental governance in southern Appalachia simultaneously exacerbate and mitigate socio-ecological vulnerability, creating new interactions between ecosystem processes and development. (Dehring, Depken, Chamblee, Rice, Burke, Holloway, Welch-Devine, Heynen)

<u>2.3.2 Ecosystem Processes & Organismic Interactions</u>

New question – *Does landscape position mediate/affect the vulnerability of ecosystem properties/function to hydroclimate extremes?*

- This new questions stresses both the drought and wetting experiments. Also highlights the importance of landscape position.

Hypotheses

- Should have 3 competing hypotheses for the vulnerability of the three slope positions. Needs to be put in the main introduction.
- Hydrology – We expect that upslope subsidies will mitigate exposure to soil drying at downslope positions, such that throughfall displacement will reduce soil moisture progressively from cove to midslope to ridge sites. (Sentence structure can be improved)
- Biogeochemistry – Hydroclimate variability and plant water use will shift spatio-temporal distribution of soil moisture along the hill slope that will cause a redistribution of soil C and N which will then influence microbial, root, and species distributions and compositions ultimately reorganizing ecosystem structure.
- Biodiversity – placeholder – still need to work on this section

<u>2.3.3 – Organismal and Ecosystem Responses to Altered Hydroclimates</u> (Maerz)

New question - *How sensitive are biota to hydroclimate variability and land use*?

- Pearson, Fraterrigo, Warren, Hepinstall, and Maerz have been making good progress.
- Will take advantage of natural gradients and manipulated gradients.
- Will have additional sites to both refine model and validate model. Can produce a table showing that we are using existing long-term data and sites.

- Opportunity to map biological processes as how ecoloigists see versus how the public may view changes (e.g., an increase in weeds in people's yards). Social scientists could use same spots in landscape to look at landowner perceptions of patterns shaping biodiversity vs science behind these patterns. We will pick a piece of land that is owned by landowners and interview them – would be a follow-up of Paige Barlow's dissertation work.

2.3.4 - Riparian Zone Vegetation and Management (Jackson)

New question – *How do riparian management decisions mitigate or exacerbate effects of hydroclimate variability on riparian and in-stream ecosystem properties and processes?*

- Rhodo removal will happen next year. Need to get in now to do pre-treatment measurements, but currently there is no funding for that type of work
- Also, residents concerning about what to do about dying hemlock stands. May have an interaction between riparian and social.
- Need to include schematics: stream temp on Shope Fork, USFS schematic for rhodo removal study, recent disturbance time series, etc.

Regional Analysis (Band/Bolstad)

Question is the same as yesterday: *What are the regional vulnerabilities of key taxa (including humans) under future scenarios of hydroclimate variability and land use?*

Hypotheses

1. Hydroclimate change will reduce annual water yield from catchments, but will be offset by development
2. The impacts of increased frequency of hydroclimate extremes will be exacerbated by development and will produce
    a. increases in low and high stream flow frequencies
    b. increased heterogeneity of spatial and temporal soil moisture patterns,
    c. increased flooding and landslide frequency,
3. Hydroclimatic variability will be most important for species local distributions and the abundance of native forest understory herbs, but land-use change will be most important for species richness and abundance of birds and nonnative plants.
4. Land-use change will amplify the effects of climatic change on occupancy patterns.
5. Mid-slope positions will be most vulnerable to changes in species composition due to hydroclimatic variability, whereas valleys and toe-slope positions will be most vulnerable to land-use change.
6. (from Clark) will the moist coves or the dry ridgetops experience the largest impacts from hydroclimate variation, and how will this change regional biodiversity?

Activities

Calibration/validation measurements (only), and modeling focused on a set of nested watersheds in the French Broad & Little Tennessee watersheds

- Assemble and spatially downscale present to future predictions of climate and land use from CMIP5 and ICLUS, decadal, through 2080
- Compile local planning information in available counties (Buncombe), development scenarios

- Map current road distribution in focal catchments, develop specific road generation algorithms for future scenario state space
- Soil moisture regional network: nine soil moisture/climate stations along ridge to reach gradients
- Periodic regional soil moisture manual sample on expanded gradient
- Regional LAI estimation for RHESSys validation
- RHESSys model past through current conditions for model calibration, improvement, & validation (landscape-scale soil moisture distributions, canopy LAI, productivity, ET, runoff)
- RHESSys runs across a nested catchments to cover broad state-space of future conditions, both climate and land use (same variables)
- Develop models of native herbaceous understory herbs, non-native plants, & birds based on re-analysis of long-term data (1990s to present), and current measurements, integrating RHESSys estimates of soil moisture (may go into biodiversity section)
- Regional modeling and validation on focal taxa (trees species, herbaceous plant, salamander and avian ?) response variables.
- Regional scenarios of climate and landuse for focal taxa across future state space, including Clark's work integrating FIA data to construct predictive distributions of change at the individual scale and the stand scale across the region.
- Regional frequencies (via RHESSys) of flood and landslide occurrence/vulnerability for past to present (period?) and across future state space
- Regional stream temperature from canopy/flow simulations
- We need to clarify interaction with human populations and vulnerability…integrate Dehring, Nelson, Shepherd proposed work…other people work regionalization?
- We have 5-10 m resolution in TDE and Coweeta watersheds and 30-m resolution in Little T and French Broad watersheds
- In 50 years, might see Asheville's climate here, so good to include Buncombe County
- RHESSys model will be run at 30 m resolution for 30 years in Little T and French Broad watersheds
- Other taxa need still need to be included in modelling work, like salamanders and ants (Maerz)

<u>To be accomplished</u> (Gragson)

- Revised thematic question
- Revised activities + hypotheses
- Detailed description of methods, analysis, & modeling
- Citations
- Data sets to generate, and estimates of instrument, effort, and resource needs
- Graphics, figures, tables that could be used

<u>Proposal edits</u> (Gragson)

1) Text length is finite: +/- 3 pages per activity set
2) Text must be detailed & integrated – failure in the former is forgivable, wheras failure in the latter is unforgivable
3) SAC group leader is the repository of effort

4) Due date: NOW! (All groups appear to still be working toward obejective: coordinate with your group leader, but Mon/Tue should be fine given SAC will likely conference/reintegrate Thurs/Fri

- Data sets to generate, and estimates of instrument, effort, and resource needs
    - Helps prioritize activities, but also material to estimating up-front purchases, make preliminary inquiries on matching funds, ensuring instruments meet workflow requirements
- Graphics and figures

Next steps. . . (Gragson)

- SAC will conference and develop a new draft within the next 2 weeks; evaluate resource needs and make determinations on funding, etc.
- Pieces of information will be asked of individuals in accordance to these determinations – biosketches, etc.
- Rhett Jackson as LPI starting 2017 was discussed in SAC – we will now solicit anonymous comment from you via on-line survey
- Submit March 14, 2014 at 5pm and keep our fingers crossed! Will know something early to mid-summer.

Meeting adjourned at 3:15 pm.