LTER ASM Working Group Report
Quantification of structural legacy effects via synthesis of long-term records and eco-hydrologic modeling
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Description:
Structural legacy effects impose fundamental controls on the function and evolution of ecosystems. However, many events imparting structural legacy effects occurred long before routine monitoring of environmental conditions began. Long-term ecological research sites provide some of our best opportunities to reconstruct quantitative estimates of these effects, given the extended and comprehensive data collection.

This workshop was organized around an interactive modeling session, using the hillslope-scale eco-hydrological model, tRIBS-VEGGIE and scenarios generated from known, prominent legacy effects at LTER network sites. Participants were solicited for input before the ASM and several renderings of relevant scenarios from their suggestions were generated for discussion during the workshop.

Session Structure:
Introduction definition of structural legacies – Dan Bain
Discussion of legacies across LTER sites – Group
Goals of working group session – Mark Green
Presentation of preliminary results – Gaj Sivandran
Interactive modeling exercise – Gaj Sivandran
Formulation of science questions and identification of future funding sources – Group

Attendance:
~25 for the first session
~15 for the second session
LTER sites represented in discussion:
  Baltimore Ecosystem Study
  Bonanza Creek
  Florida Coastal Everglades
  Hubbard Brook Experimental Watershed
  Jornada Basin
  Coweeta
  Kellogg Biological Station
  Konza Prairie
  Niwot Ridge
  Fernow Experimental Forrest
  Walnut Gulch Experimental Watershed

Group Identified Legacies Effects:
American Chestnut Blight
Rot resistant wood source for rivers creating log dams
Legacy effect – faster more incised river networks
Conversion of natural vegetation to row crops
Extreme fire events
Extreme storm events
Abandoned roads
Everglades canal system
Earthworm invasions
Ground squirrels
Compaction of soils through grazing activities
Mill dams

Organizing Legacy Effects:
Potential themes around which to focus future proposals were discussed.
The legacy effect of losing big trees
American Chestnut (Fernow); White Pine (Harvard); Douglas Fir (HJ Andrews)
The discussion focused on the potential changes to energy and hydrologic partitioning as a result of species change at these sites. Examination of whether the change in age distribution of the stand has impacted the carbon cycling of these forests (old forests tend to be carbon neutral – younger forests carbon sink).

Geomorphic legacy effects
HBR/Fernow – Changes in spruce cover leading to stream bed changes.
Jornada – shrub encroachment has altered the flow paths of water to playas.
KBS – ditching and tiling influences
Soil compaction across most sites could be addressed

Illuminating Dark Data
There was discussion on how the proposed modeling framework could be used to translate historical 'qualitative' data into model derived 'quantitative' data.

Science Questions and Proposals
Questions:
Do legacy effects simplify or add complexity to landscapes?
Have legacy effects amplified or dampened the impact of climate changes?

Key response variables of interest in these studies will be:
Changes in the partitioning of the water balance
Changes to the carbon balance
Changes in biogeochemical cycling (nitrogen, phosphorous, calcium)

Target Calls
CNH – Nov 20th
EAR – Hydrology Dec 5th
RCN to SEES
Ecosystem Science – Jan 9th
Geomorphology and Land Use Dynamics Jan 16th