Woody Debris and Successional Development in the Anthropocene

Joe Nash

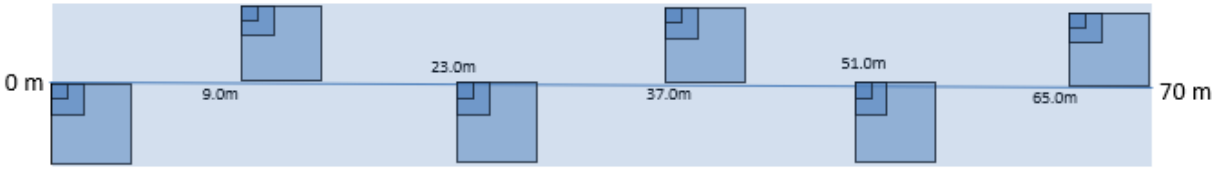
Study Overview/Justification

Theory suggests a transition phase from aggrading to stable-state old-growth northern hardwood forests where living biomass is reduced as large dominant trees succumb to mortality The reality of heterogeneous disturbances and anthropogenic influence, however, have resulted in a lack of evidence to support the transition phase theory. Data is sparse regarding how forest succession and recent disturbance regimes have influenced woody debris accumulation on a stand level.

The data acquired from this research will allow us to address whether size classes of woody debris may reach stable state conditions on different time scales, due to a shift during overstory succession to larger trees and shade-tolerant species. We also propose a classification that describes the contribution of certain species, size, and state of decomposition of woody debris at varying stages of northern hardwood succession. The goal of our study was to evaluate the potential influence of stand development and disturbances on the dynamics of dead wood and overstory succession in a northern hardwood forest.

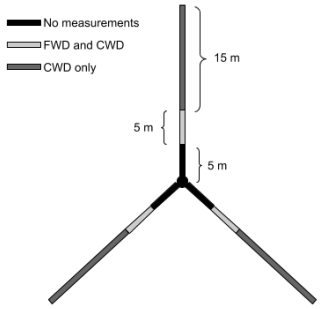
The objectives of our study were: 1) to quantify the distinct species, volume, state of decay, and nutrient concentrations within woody debris assemblages in stands at varying stages of overstory succession, 2) to quantify woody debris accumulation in mature stands to support evidence of a transition phase.

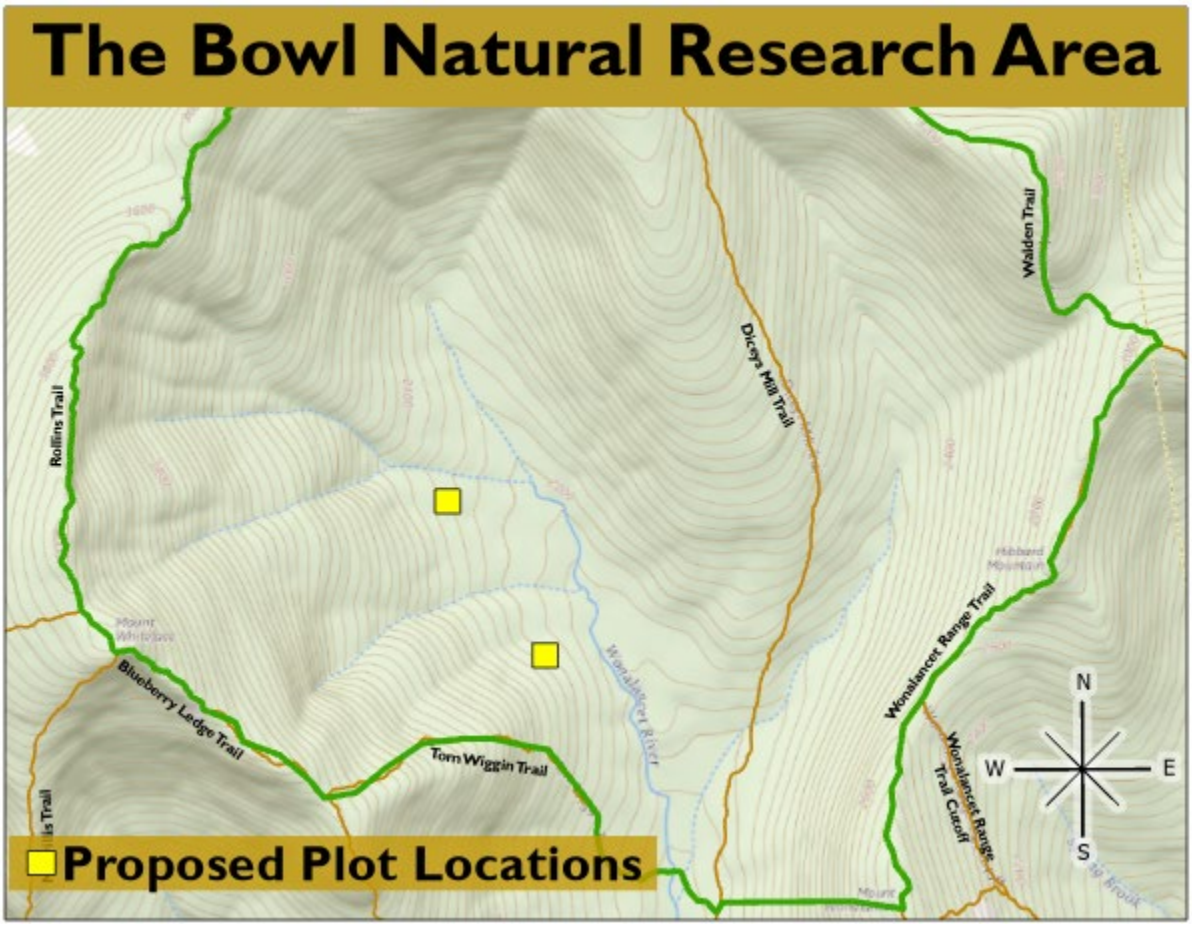
We intend to establish one - two 70.7-by-70.7 m (0.5 hectare) plot(s) in the northern hardwood portion of the RNA. Within the plots we will conduct an inventory of live and dead standing trees. Tree inventory will occur on five 70 m transects. Beech trees ≥ 10 cm dbh will be given a rating based on the prevalence and severity of beech bark disease. Downed wood will be inventoried using the line intersect sampling method. Three clusters will be installed in the proposed plots. Each cluster is composed of three 25 m transects that will be used for line intersect sampling.



Methods summary:

- All 10+cm trees *measured* within 5m of transect.
- All 2-10cm trees *measured* in five 5x5m plots (alternating sides, starting on right from 0m).
- All seedlings and shrubs <2cm DBH but >50cm height *counted* in five nested 2x2m subplots.
- All seedlings/shrubs <50cm height *counted* in five nested 1x1m subplots.
    - Count current-year germinants separately.


No measurements
FWD and CWD
CWD only
15 m
5 m
5 m


The Bowl Natural Research Area
Rollins Trail
Blueberry Ledge Trail
Tom Wiggin Trail
Dicey's Mill Trail
Walden Trail
Wonalancet Range Trail
Wonalancet Range Trail Cutoff
Wonalancet River
N
W
E
S
Proposed Plot Locations