Progress Report STP 2020-017 (FY 2019-2020)

The dynamic demography of water ages our trees are using

Ecosystem Science

Project Core Team

Supervising Scientist	Gavan McGrath
Data Custodian	Gavan McGrath
Site Custodian	

Project status as of Oct. 26, 2020, 12:13 p.m.

Approved and active

Document endorsements and approvals as of Oct. 26, 2020, 12:13 p.m.

Project Team	granted
Program Leader	granted
Directorate	granted

The dynamic demography of water ages our trees are using

G McGrath

Progress Report

This project will conduct an experiment to test whether measurement of water isotopes in conjunction with the application of a numerical hydrological model can determine the distribution of ages (time since rainfall) of water transpired by plants. If successful, the method can be applied to better understand eco-hydrological functioning of plants. Potential applications include quantifying ecosystem-scale water use dynamics in eddy-covariance experiments, assessing effects of forest thinning or identifying dominant sources of water used by plants in threatened ecosystems like Ashfield Flats Reserve.

Seedlings were selected and grown in experimental pots, soil physical and hydraulic properties have been measured, and experimental design and design modelling of the pot hydrology was completed. A trial run of the gas exchange equipment and its interconnectivity with a water isotope analyzer was undertaken. Development of modelling software is underway and collation of a database of rainfall isotope data has been made from the scientific literature.