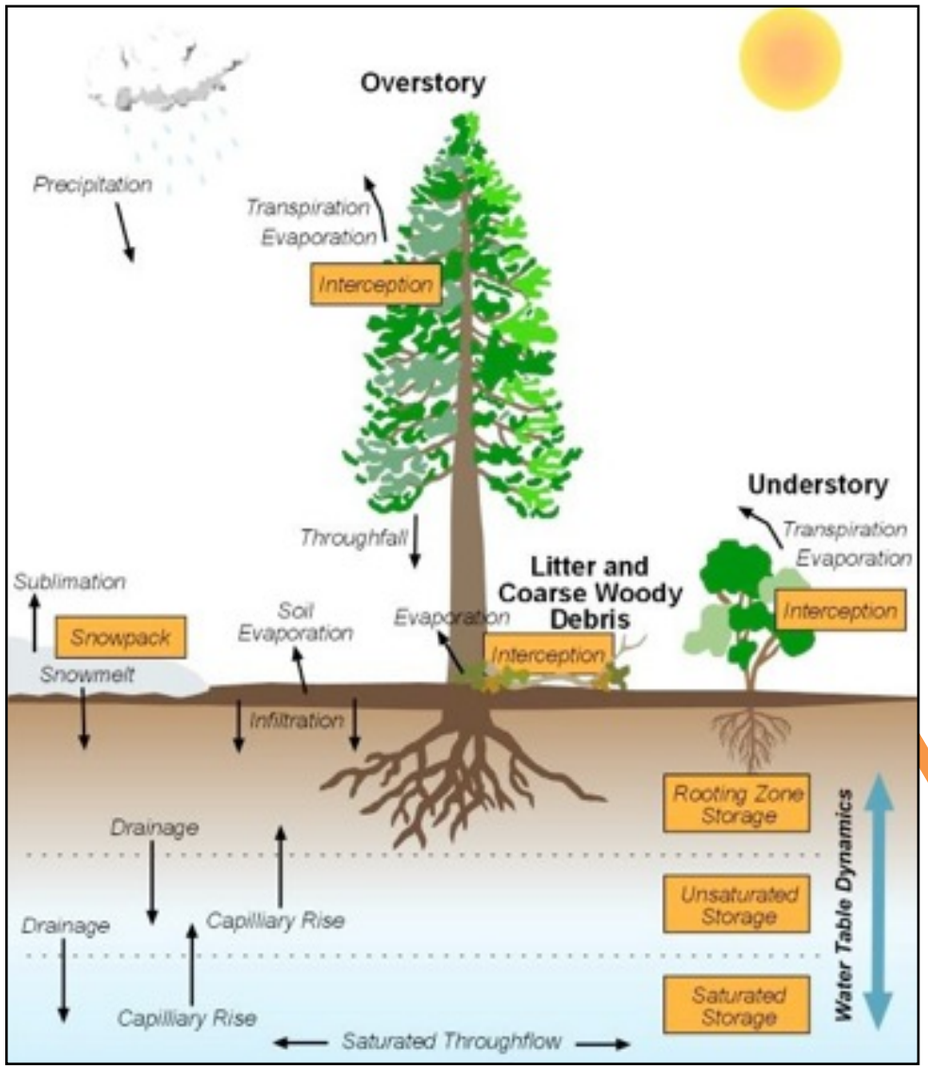
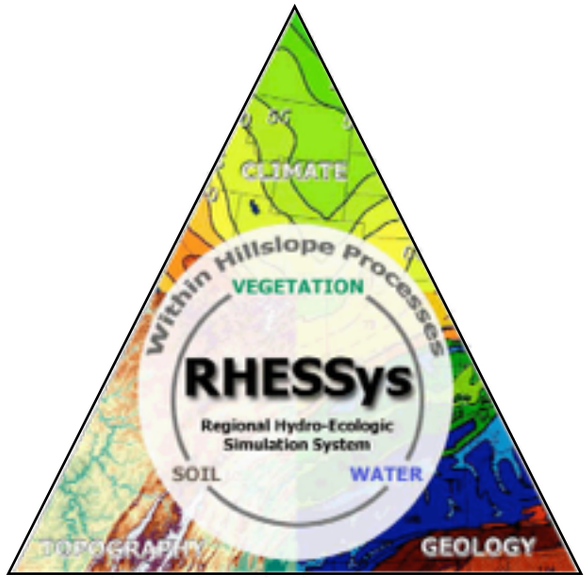
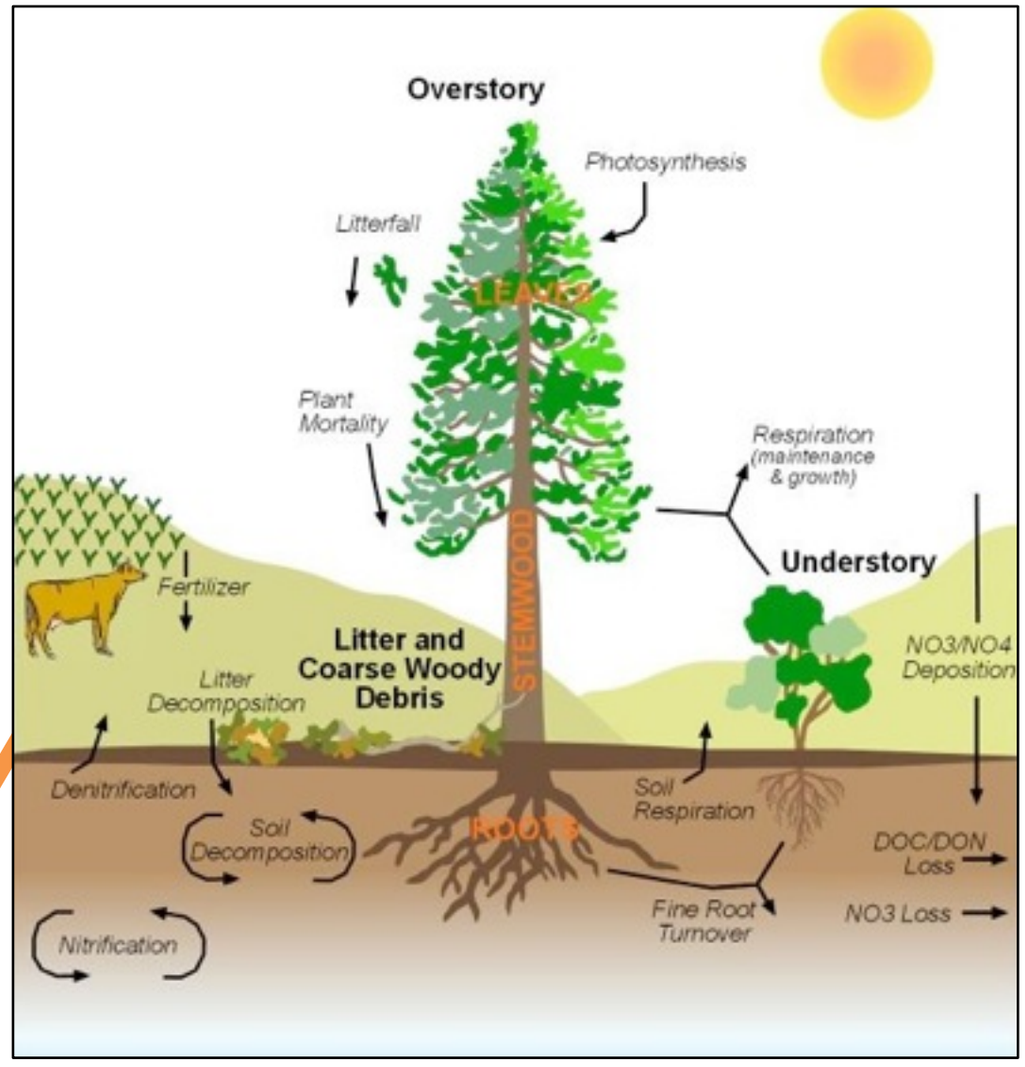
Identify and evaluate effective policy for wildfire management

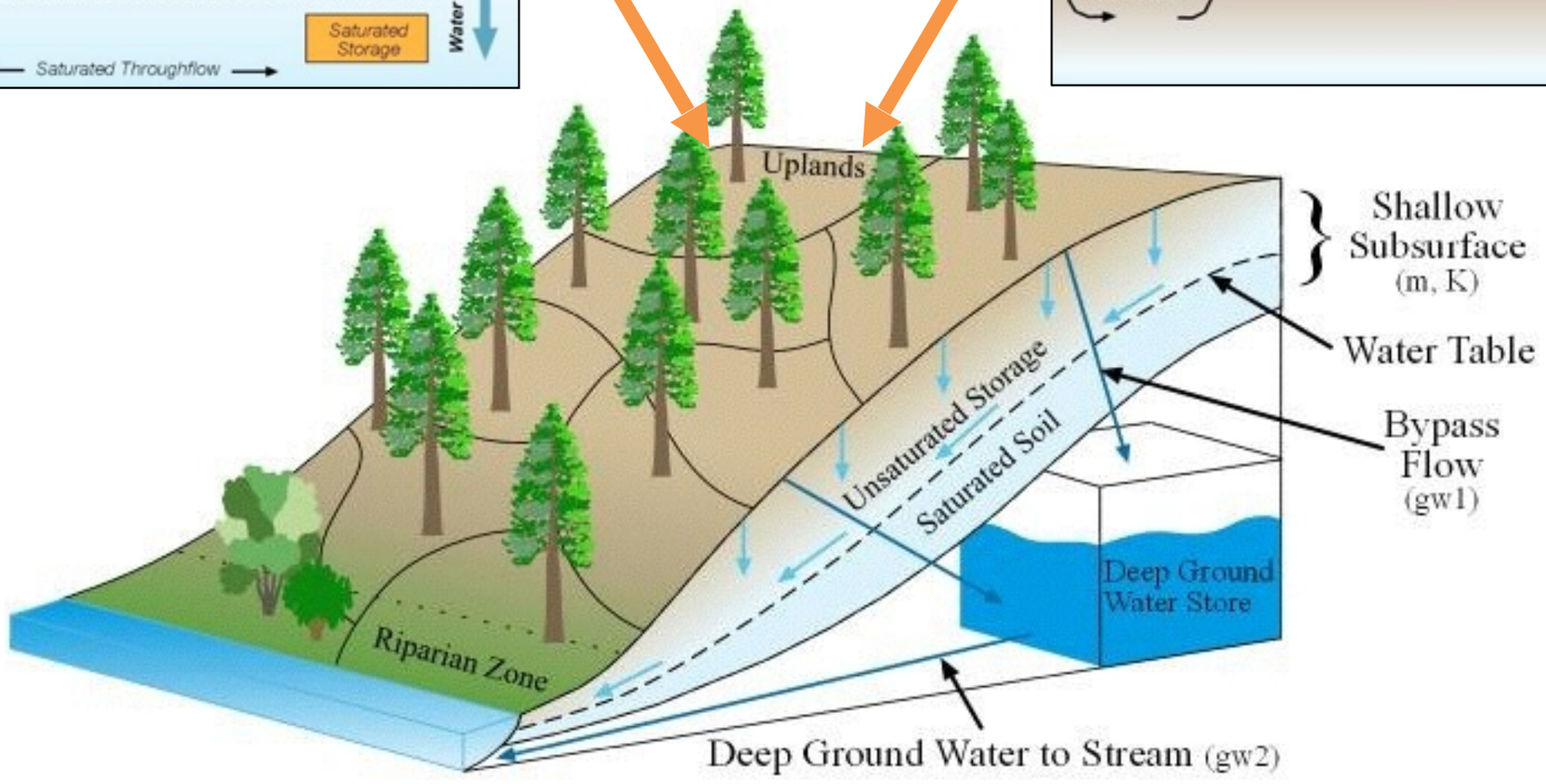
Prescribed Burns

Thinning

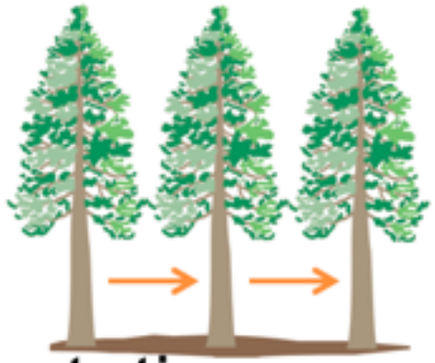

Overstory
Precipitation
Transpiration
Evaporation
Interception
Throughfall
Understory
Transpiration
Evaporation
Interception
Litter and
Coarse Woody
Debris
Sublimation
Snowpack
Snowmelt
Soil
Evaporation
Evaporation
Interception
Infiltration
Rooting Zone
Storage
Drainage
Unsaturated
Storage
Drainage
Capillary Rise
Water Table Dynamics
Saturated
Storage
Capillary Rise
Saturated Throughflow


CLIMATE
Within Hillslope Processes
VEGETATION
RHESSys
Regional Hydro-Ecologic
Simulation System
SOIL
WATER
TOPOGRAPHY
GEOLOGY


Overstory
Photosynthesis
Litterfall
LEAVES
Plant
Mortality
Respiration
(maintenance
& growth)
STEMWOOD
Understory
Fertilizer
Litter and
Coarse Woody
Debris
NO3/NO4
Deposition
Litter
Decomposition
Denitrification
Soil
Respiration
ROOTS
Soil
Decomposition
DOC/DON
Loss
Fine Root
Turnover
NO3 Loss
Nitrification


Uplands
Shallow
Subsurface
(m, K)
Water Table
Unsaturated Storage
Saturated Soil
Bypass
Flow
(gw1)
Deep Ground
Water Store
Riparian Zone
Deep Ground Water to Stream (gw2)

Climate



Given Vegetation Structure/Composition

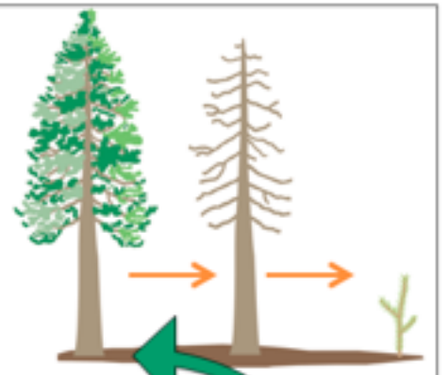
Hydrology

Climate

Dynamic Growth

Hydrology

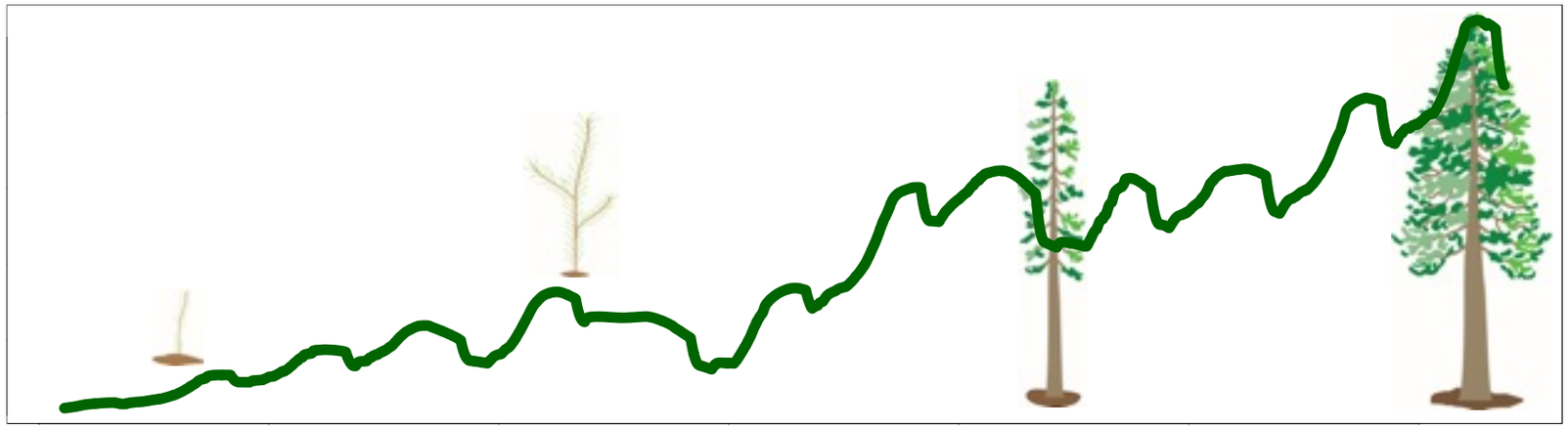
Climate



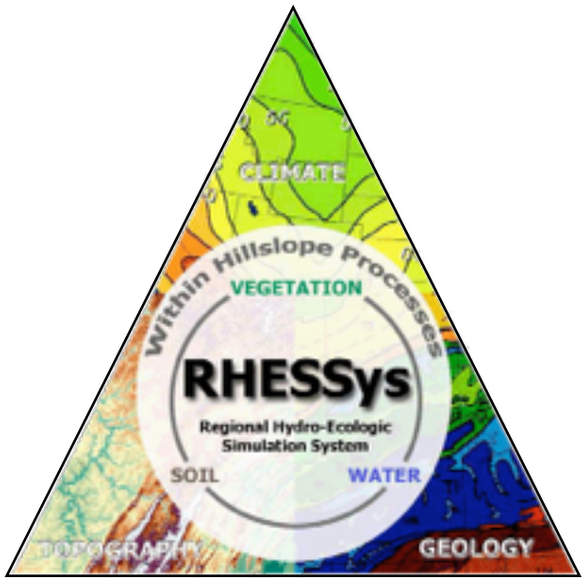
Disturbance + Dynamic Growth

Hydrology

Plant Carbon kgC/m²

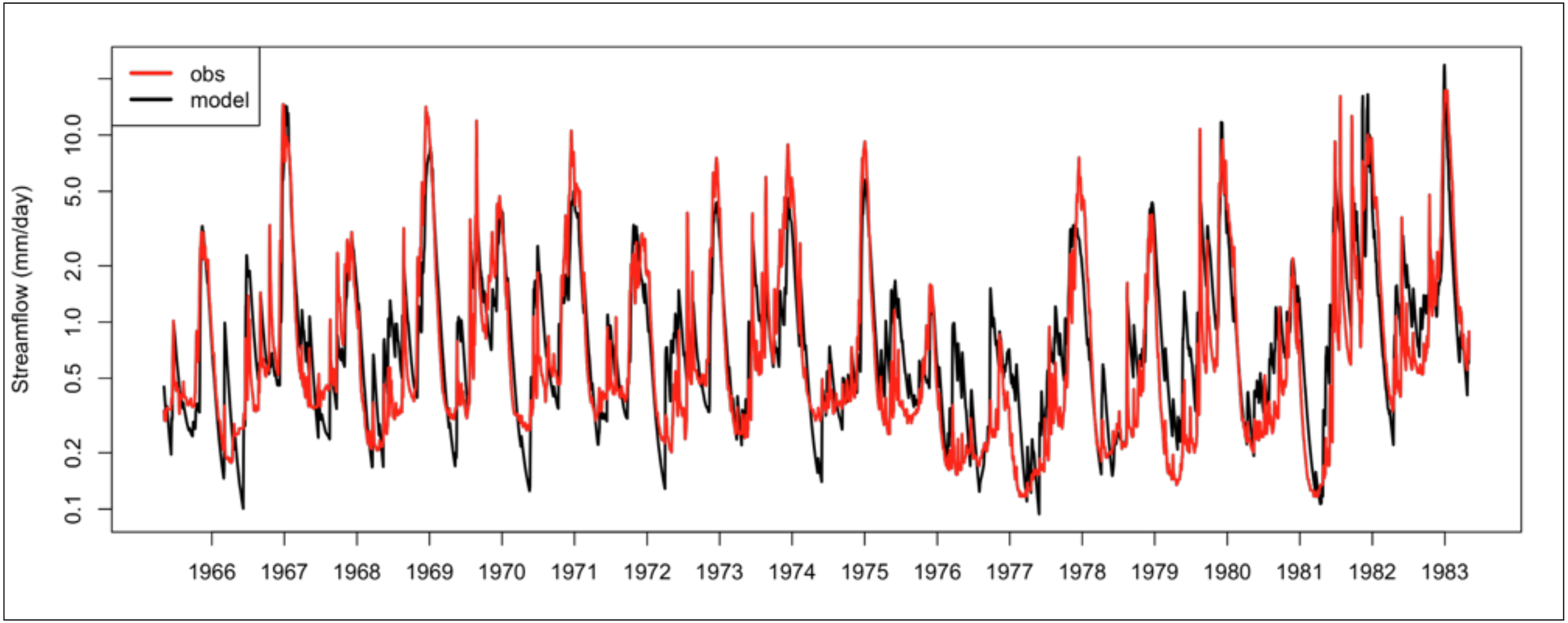


Year

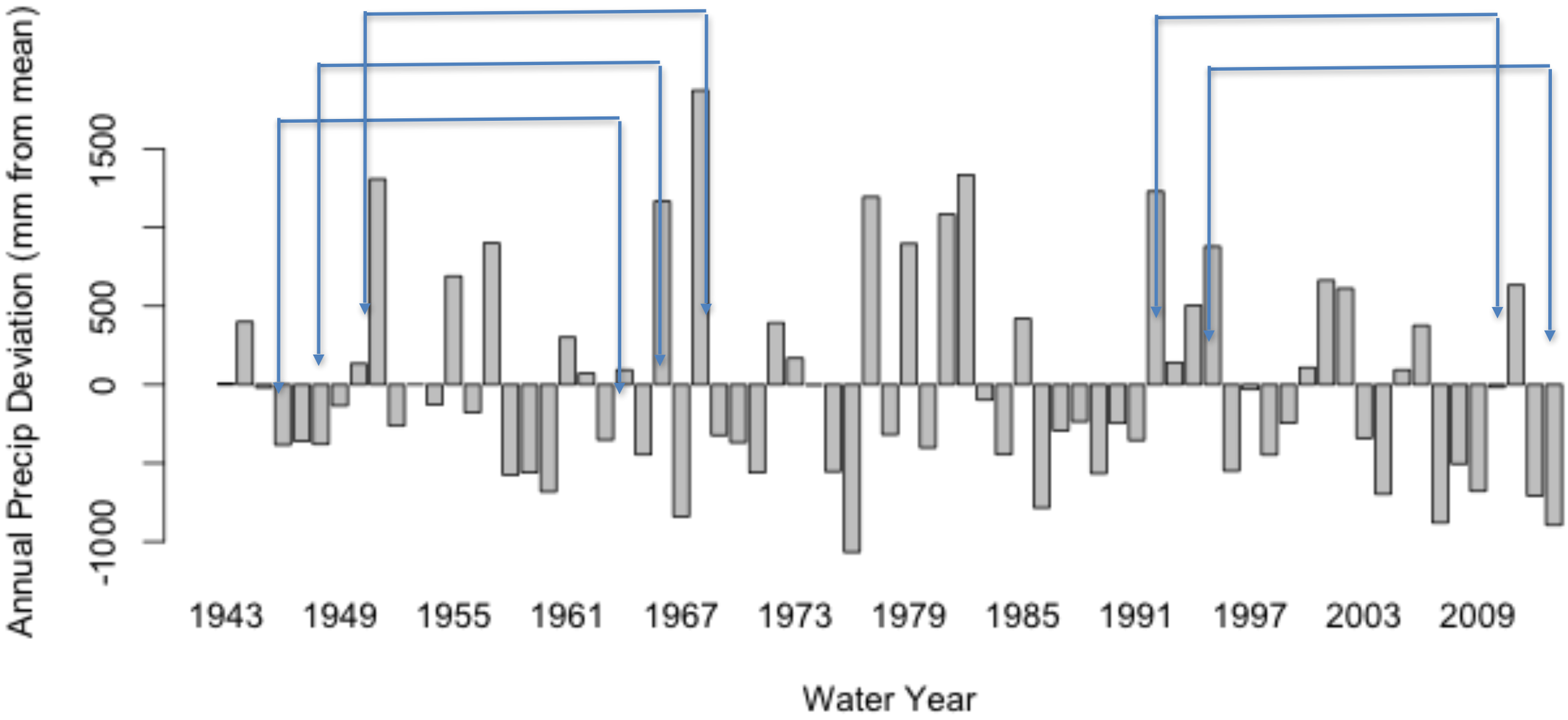


RHESSys hydrologic model performance – post calibration Streamflow (1960-2000)

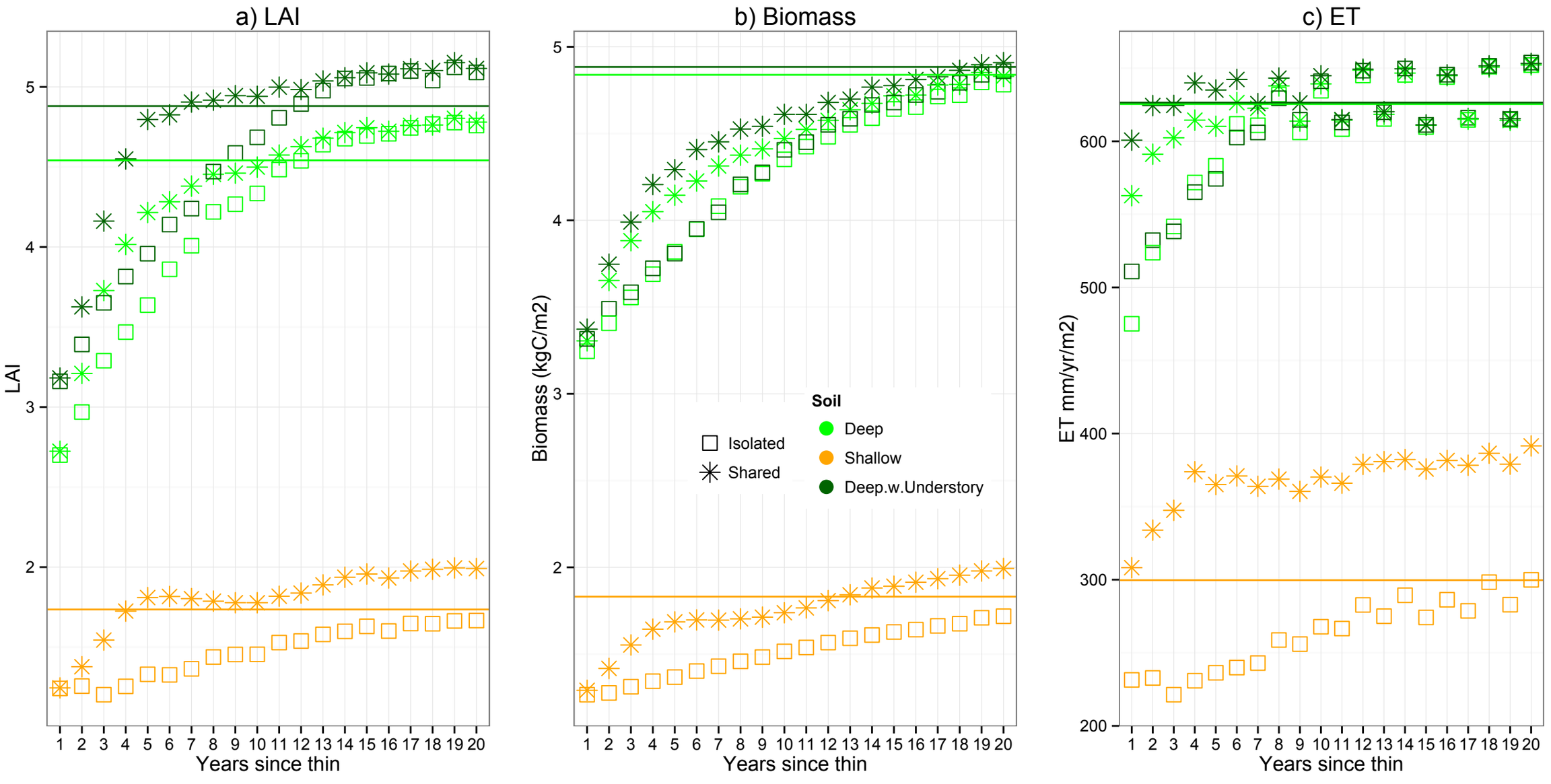
NSE (daily) 0.6
NSE (log transformed daily) 0.6
Bias < 10%
Monthly R2 > 0.9

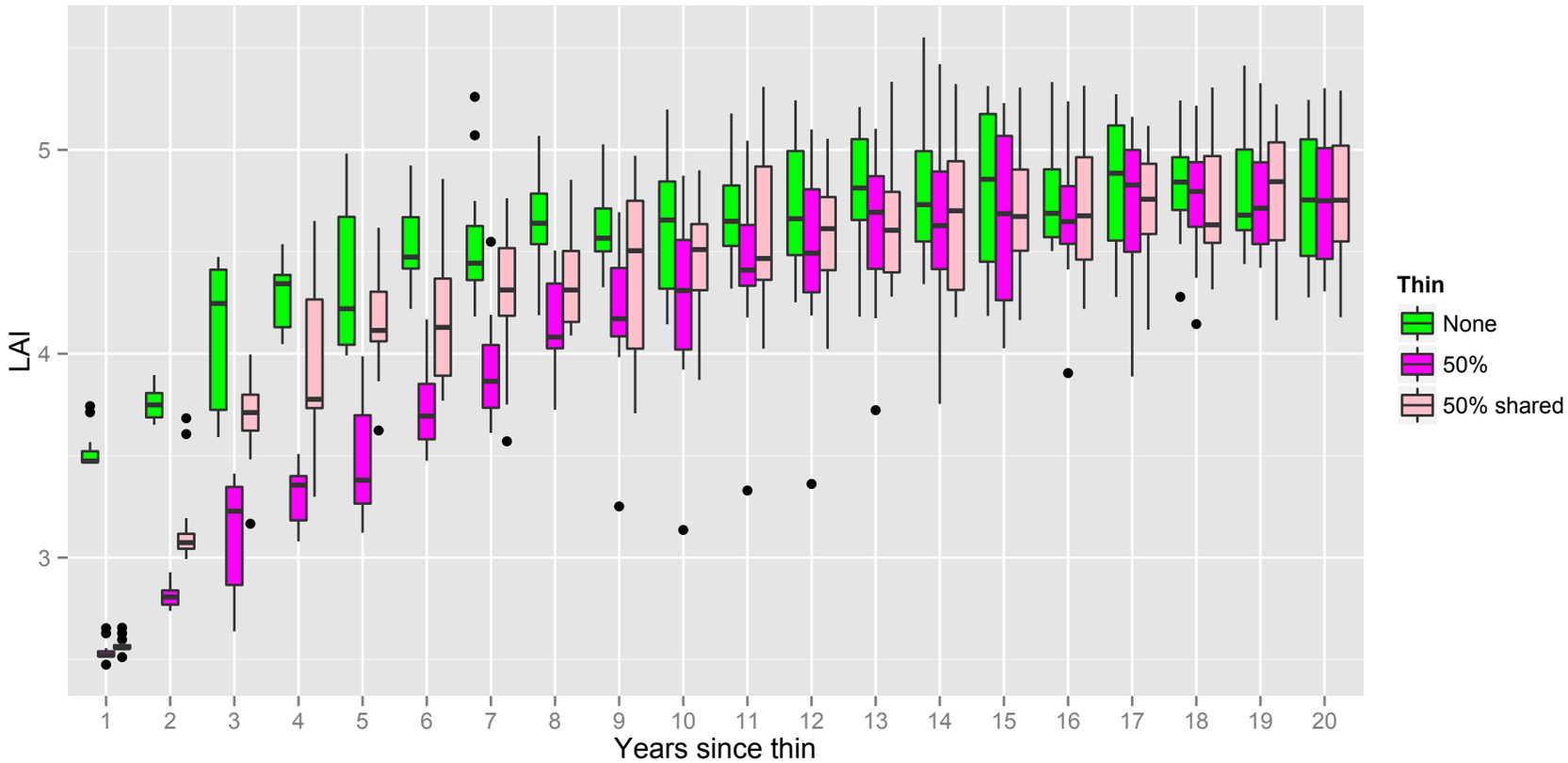


Treatment Scenarios: Sierra CZO



- Fuel treatment: 50 scenarios (across climate)
- 0 to 50% thinning – 20 year post-thinning recovery
- Repeated for assumption that trees share water
- Repeated for Deep (4m) and Shallow (0.75m) Soil Depths


a) LAI
b) Biomass
c) ET
LAI
Biomass (kgC/m2)
ET mm/yr/m2
Years since thin
Soil
Deep
Shallow
Deep.w.Understory
Isolated
Shared


LAI
5
4
3
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Years since thin
Thin
None
50%
50% shared