

Diameter Growth Equations for CONUS Using L3 EcoRegion

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Data

We took the FIA diameter growth data subset for Douglas-fir, filtered out stray (likely key-punch errors) states (NY, PA, IL, and MI), FIA plot locations with missing EPA L3 Codes, and where the diameter at the end of the 5-year or greater measurement interval was less than the starting diameter. This left 177875 growth observations.

The observations are distributed among L3 Codes as follows:

NA_L3NAME	NA_L3CODE	n
Cascades	6.2.7	41961
Coast Range	7.1.8	27598
Klamath Mountains	6.2.11	19329
Columbia Mountains/Northern Rockies	6.2.3	19118
Middle Rockies	6.2.10	14340
Blue Mountains	6.2.9	9893
North Cascades	6.2.5	9571
Southern Rockies	6.2.14	7481
Idaho Batholith	6.2.15	6632
Eastern Cascades Slopes and Foothills	6.2.8	4791
Strait of Georgia/Puget Lowland	7.1.7	3347
Sierra Nevada	6.2.12	3072
Canadian Rockies	6.2.4	2421
Wasatch and Uinta Mountains	6.2.13	1715
Arizona/New Mexico Mountains	13.1.1	1668
Willamette Valley	7.1.9	1541
Northwestern Great Plains	9.3.3	901
Colorado Plateaus	10.1.6	714
Northern Basin and Range	10.1.3	550

NA_L3NAME	NA_L3CODE	n
California Coastal Sage, Chaparral, and Oak Woodlands	11.1.1	504
Columbia Plateau	10.1.2	414
Central Basin and Range	10.1.5	99
Wyoming Basin	10.1.4	78
Madrean Archipelago	12.1.1	70
Northwestern Glaciated Plains	9.3.1	42
Southwestern Tablelands	9.4.3	20
Arizona/New Mexico Plateau	10.1.7	4
Snake River Plain	10.1.8	1

Diameter Growth Prediction

We fit the equation:

$$\Delta dbh = e^{(\beta_0 + \beta_1 \log(\frac{(dbh+1)^2}{(cr*ht+1)^{\beta_4}}) + \beta_2 \frac{bal^{\beta_5}}{dbh+2.7})} \quad (1)$$

to the all 177875 growth observations, estimating β_0 through β_5 .

We then subsetted the data by each EPA L3 Ecoregion and re-estimated the β_0 parameter. The final parameter estimates are:

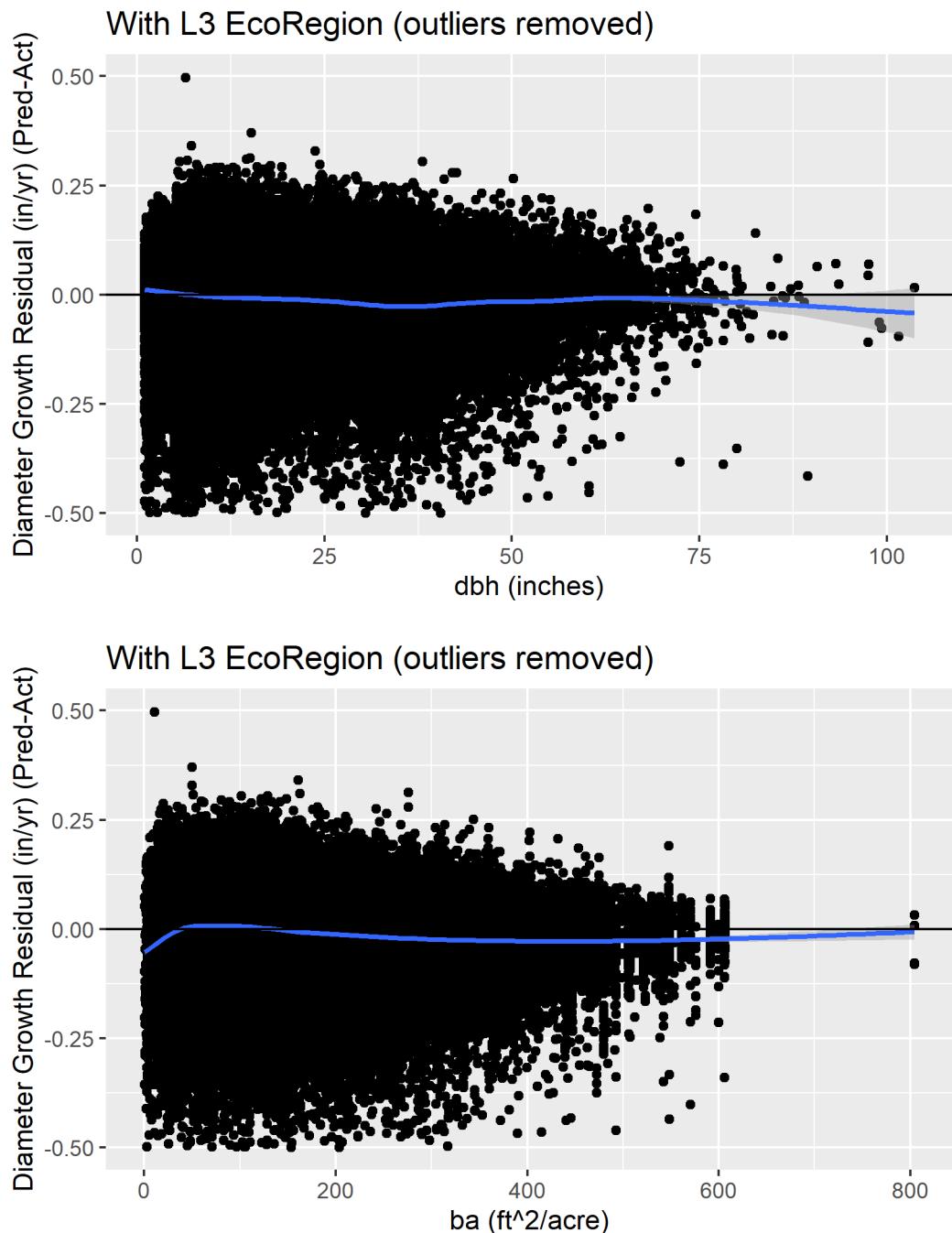
B0	B1	B2	B4	B5
-3.453464	-0.7036329	-0.0879337	2.215431	0.5638819

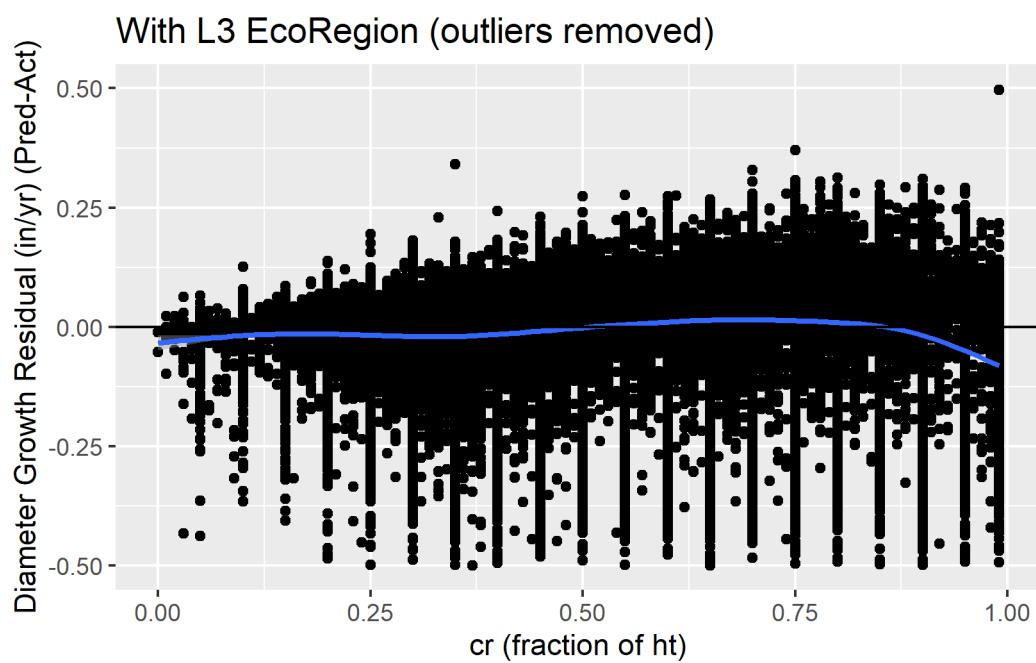
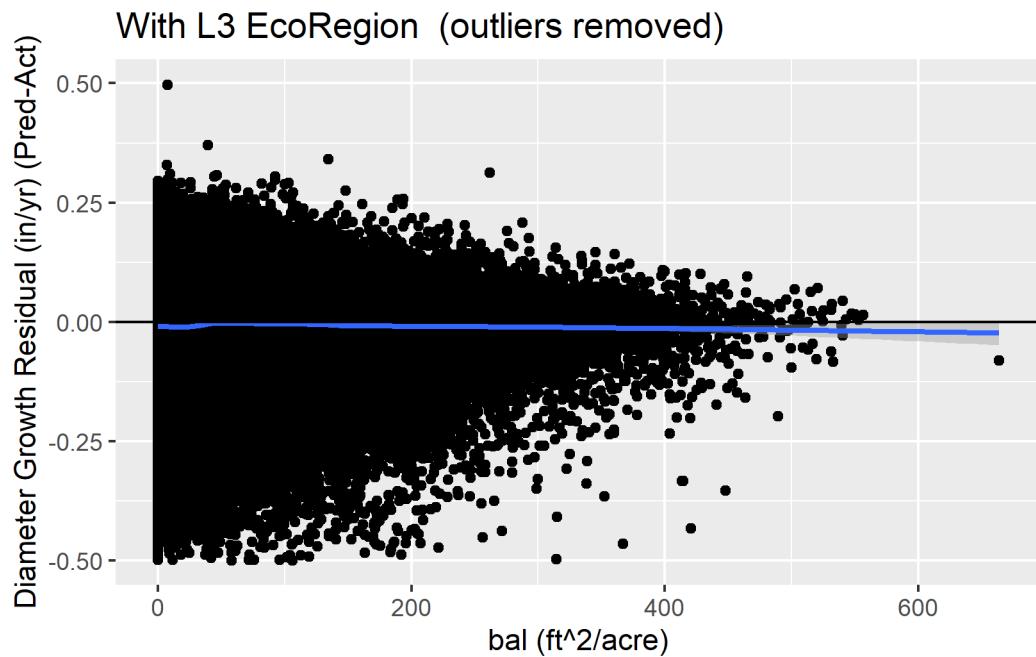
L3 Region	B0	n
Southern Rockies	-3.502357	7481
Arizona/New Mexico Mountains	-3.474510	1668
Middle Rockies	-3.494719	14340
Madrean Archipelago	-3.425343	70
Wyoming Basin	-3.457898	78
Wasatch and Uinta Mountains	-3.497445	1715
Arizona/New Mexico Plateau	-3.490310	4
Columbia Mountains/Northern Rockies	-3.470483	19118
Klamath Mountains	-3.447239	19329
Cascades	-3.446534	41961
Blue Mountains	-3.469651	9893
Coast Range	-3.426803	27598

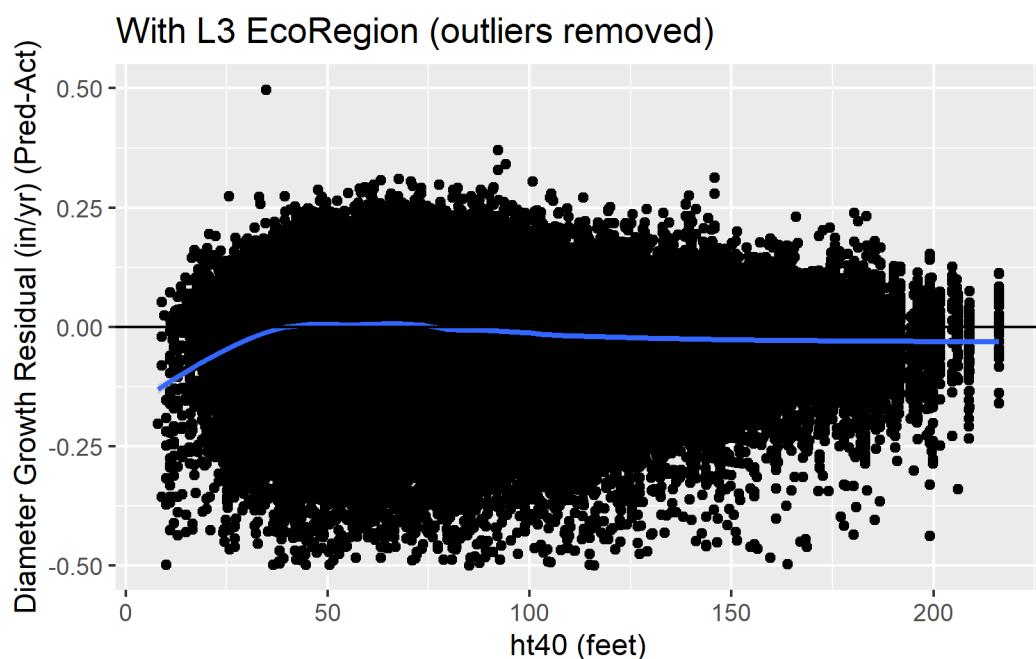
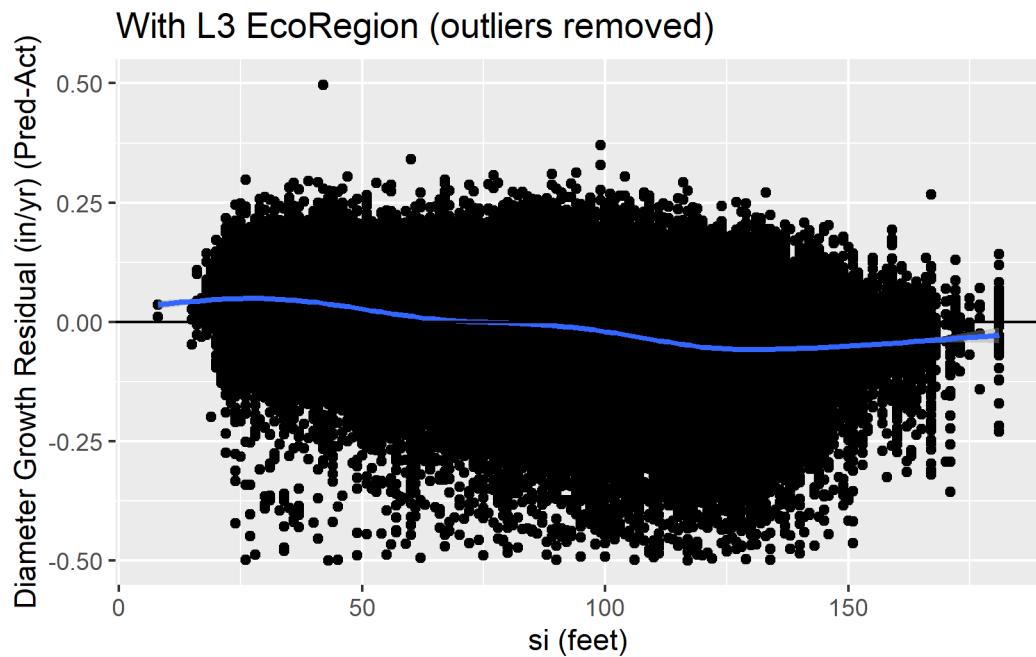
L3 Region	B0	n
Eastern Cascades Slopes and Foothills	-3.453887	4791
North Cascades	-3.459202	9571
Strait of Georgia/Puget Lowland	-3.423280	3347
Sierra Nevada	-3.436998	3072
Columbia Plateau	-3.466207	414
Willamette Valley	-3.400876	1541
California Coastal Sage, Chaparral, and Oak Woodlands	-3.430762	504
Idaho Batholith	-3.490273	6632
Canadian Rockies	-3.485772	2421
Central Basin and Range	-3.515825	99
Colorado Plateaus	-3.516518	714
Northwestern Great Plains	-3.487674	901
Northern Basin and Range	-3.480416	550
Northwestern Glaciated Plains	-3.470020	42
Southwestern Tablelands	-3.497479	20
Snake River Plain	-3.466986	1

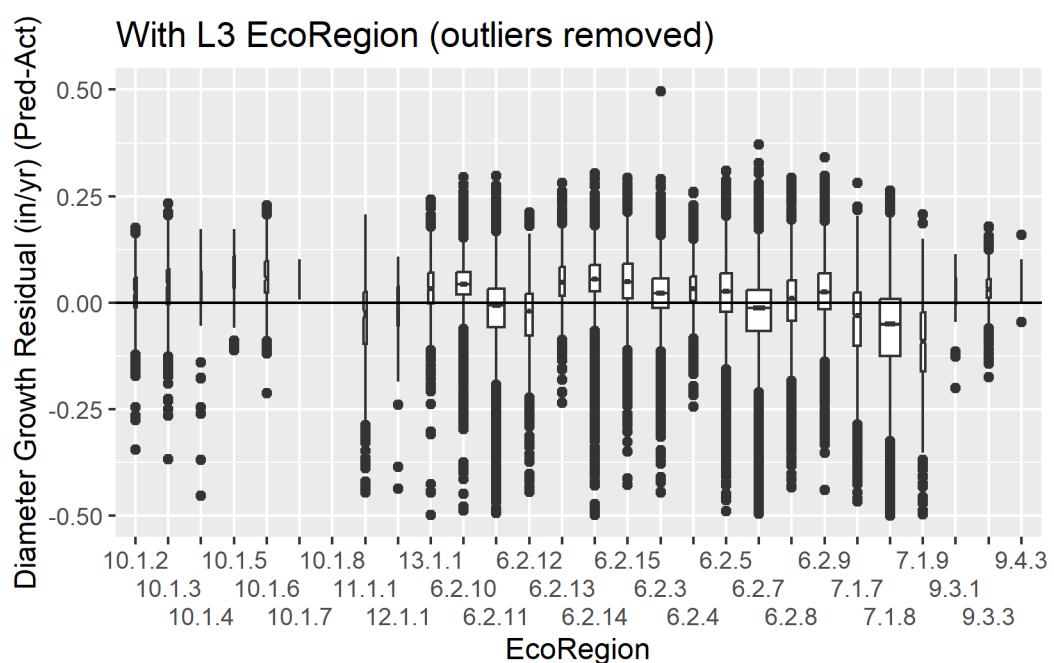
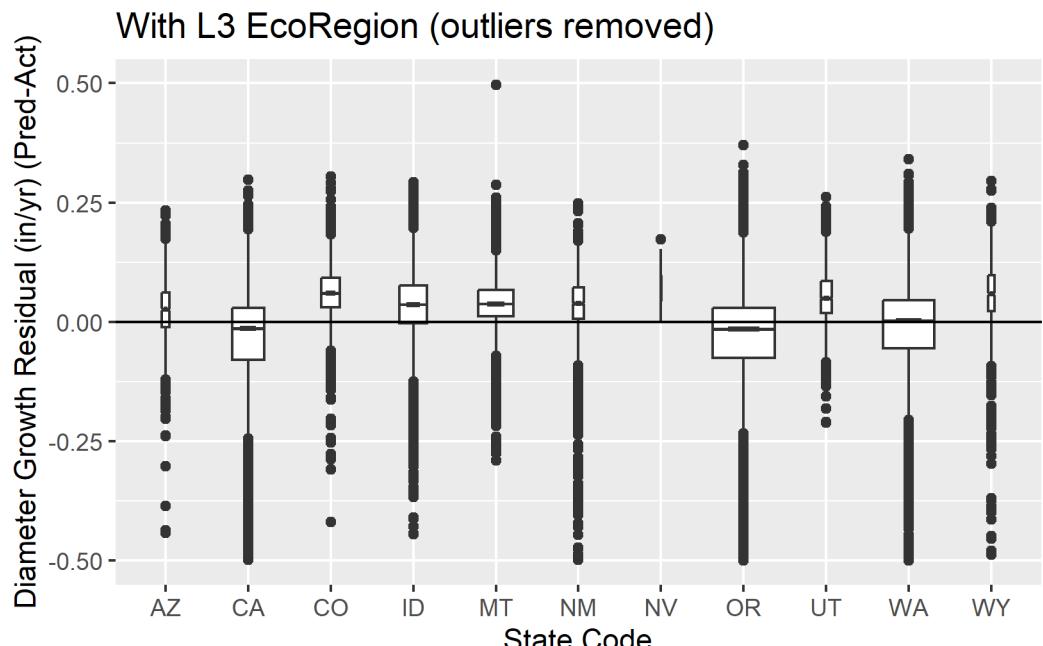
Residual Analysis for Equation 1

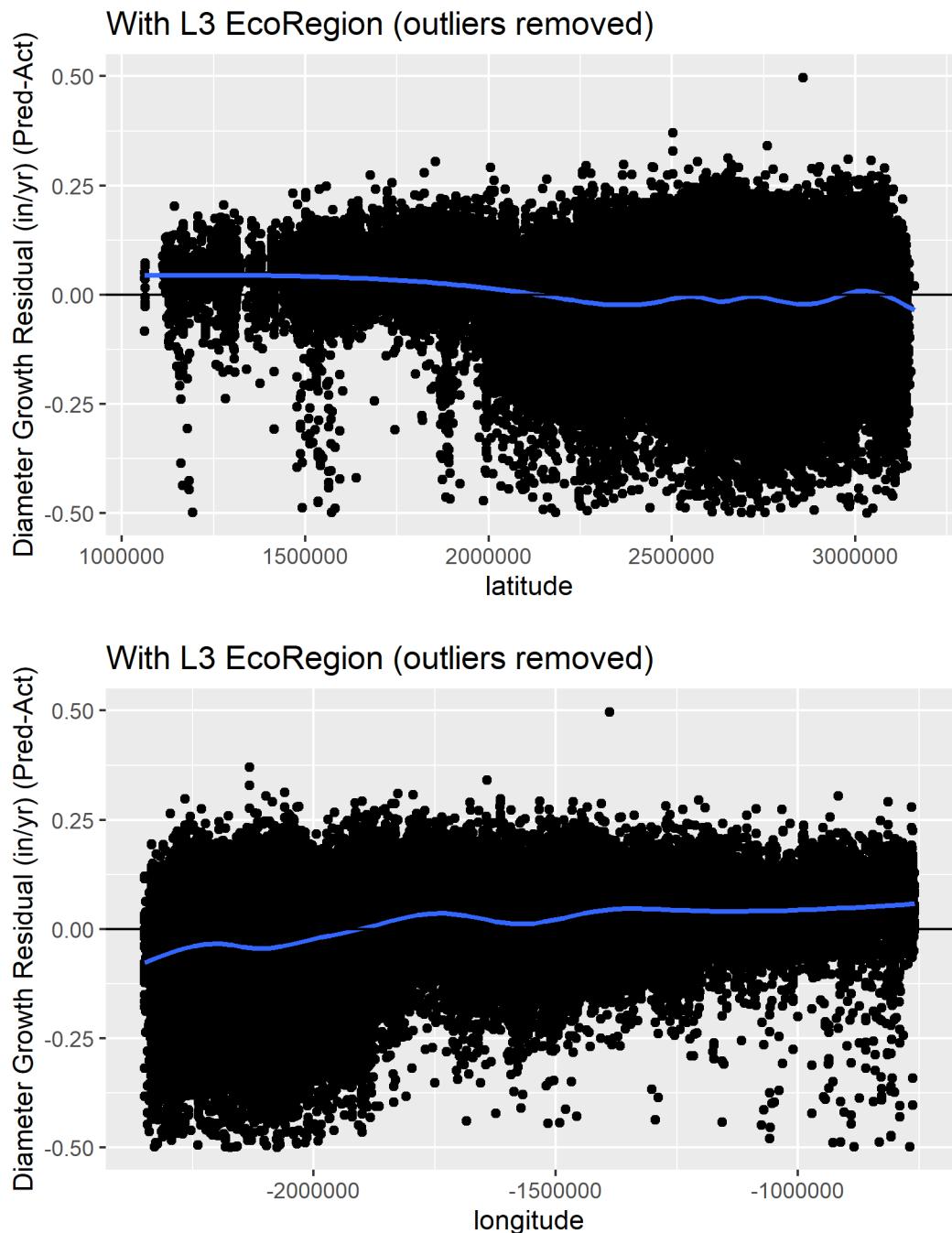
The residual analysis below shows that state and L3 Ecoregion bias has been mitigated but not eliminated. It also shows that the trends with the traditional site index estimates have been reduced.

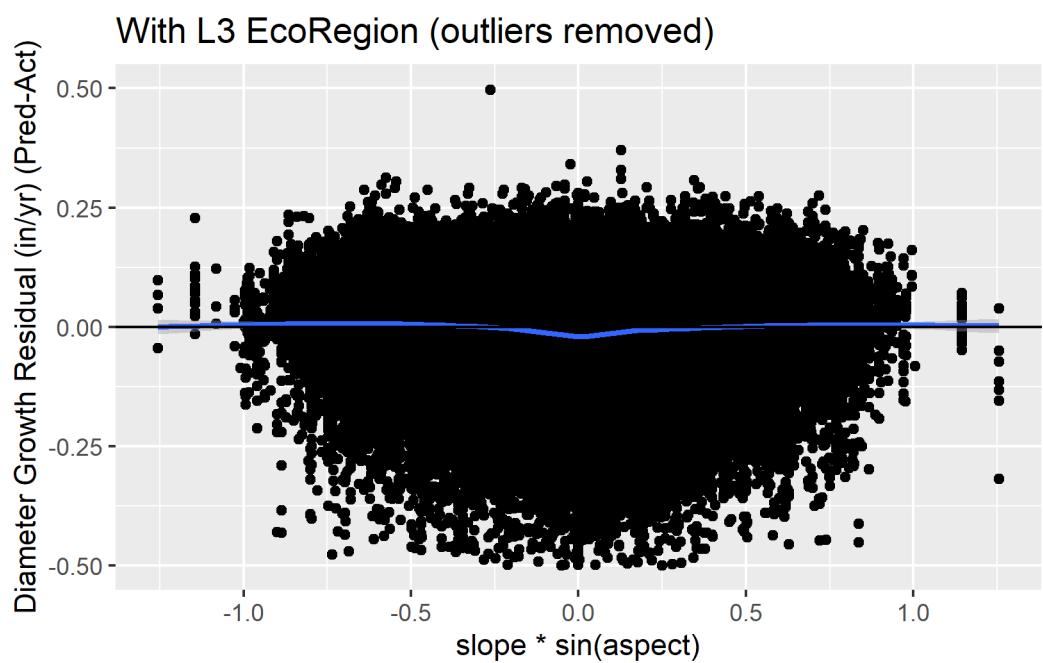
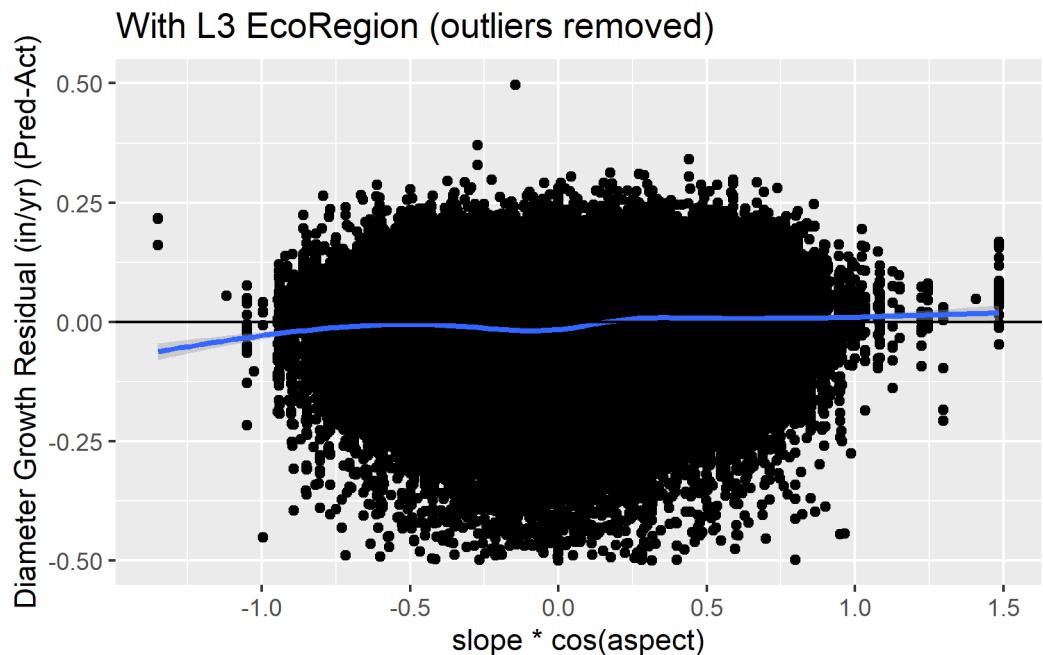












State - Unit - County Mean Diameter Growth Residuals

