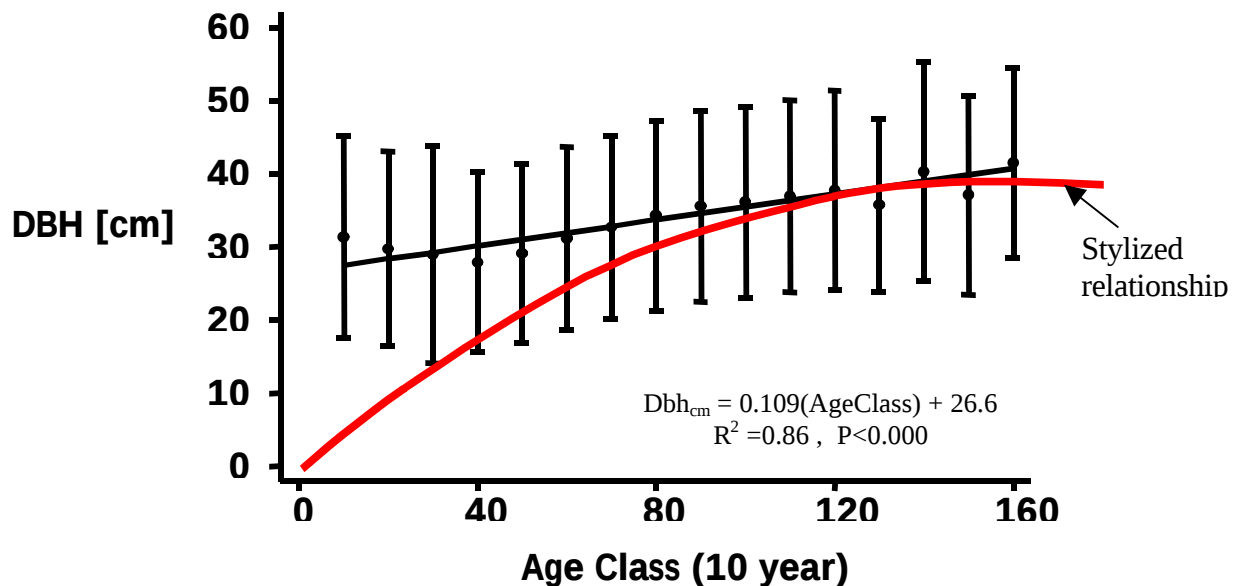


## MAST Model Formulation change (28 February 2002)

In the original formulation of the model, diameter was assigned to trees based on an age-diameter relationship derived from FIA data. Site index trees were used by fia to estimate stand age. This relationship produced mast estimates that were inflated at lower ages due to high variability. As a consequence of this variability, the model would predict mast production at a stand age of 0. Based on FIA, MOFEP and other data sources a stochastic stylized age-diameter relationship was substituted.

The original function used in the model:



Was replaced with the following stylized model:

```
. regress dbh agec age2 age3, nocons
```

| Source   | SS         | df | MS         | Number of obs = 21     |  |  |
|----------|------------|----|------------|------------------------|--|--|
| Model    | 19708.7122 | 3  | 6569.57074 | F( 3, 18) = 11923.16   |  |  |
| Residual | 9.91786231 | 18 | .55099235  | Prob > F = 0.0000      |  |  |
| Total    | 19718.6301 | 21 | 938.982385 | R-squared = 0.9995     |  |  |
|          |            |    |            | Adj R-squared = 0.9994 |  |  |
|          |            |    |            | Root MSE = .74229      |  |  |

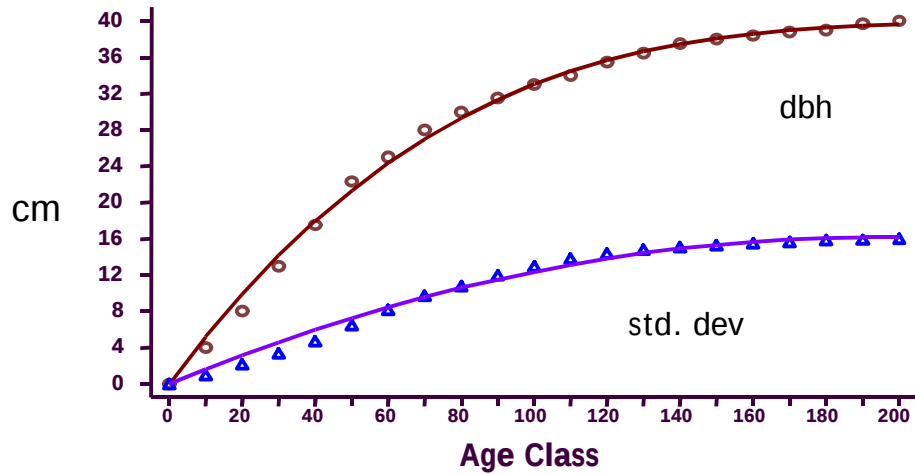
| dbh      | Coef.     | Std. Err. | t       | P> t  | [95% Conf. Interval] |           |
|----------|-----------|-----------|---------|-------|----------------------|-----------|
| ageclass | .5443953  | .0139062  | 39.148  | 0.000 | .5151794             | .5736112  |
| age2     | -.0025517 | .0002106  | -12.115 | 0.000 | -.0029942            | -.0021092 |
| age3     | 4.11e-06  | 7.61e-07  | 5.398   | 0.000 | 2.51e-06             | 5.71e-06  |

Variability (standard deviation) increases with age according to the following function:

```
. regress sd agec age2 , nocons
```

| Source   | SS         | df | MS         | Number of obs | = | 21      |
|----------|------------|----|------------|---------------|---|---------|
| Model    | 2991.10584 | 2  | 1495.55292 | F( 2, 19)     | = | 4032.71 |
| Residual | 7.04626155 | 19 | .370855871 | Prob > F      | = | 0.0000  |
|          |            |    |            | R-squared     | = | 0.9976  |
|          |            |    |            | Adj R-squared | = | 0.9974  |
| Total    | 2998.15211 | 21 | 142.769148 | Root MSE      | = | .60898  |

| sd       | Coef.    | Std. Err. | t       | P> t  | [95% Conf. Interval] |           |
|----------|----------|-----------|---------|-------|----------------------|-----------|
| ageclass | .1670191 | .0045538  | 36.677  | 0.000 | .157488              | .1765502  |
| age2     | -.000432 | .0000287  | -15.052 | 0.000 | -.000492             | -.0003719 |



The expression of the rate and variability relationship in the model is depicted below with noise added to separate points.

