**Vegetation Risk Profile Index (VRPI**): This is a tool that is designed to help a system operator or Emergency Manager determine the risk of vegetation-related outages along a given distribution circuit segment during wind events based on the number of trees, species of trees, height of the trees, and outage history along that given circuit segment.

Equation: *VRPI = T+2(Oh)*

T = Tree Component

**Tt = Total number of trees in the database monitored for a given circuit segment**

**Th = Tree height component**

Tree height component is developed by creating three “buckets” which represents the heights of the trees in a given area. Below are the buckets being used:

* Th bucket 1 (H1) = Percentage of total trees < 20ft
* Th bucket 2 (H2) = Percentage of total trees 20 – 40ft
* Th bucket 3 (H3) = Percentage of total trees > 40ft

Example: If along Circuit XYZ, 55% of the trees were in bucket 1, 35% were in bucket 2 and 10% were in bucket 3, then… Th = 1(.55)+2(.35)+3(.10) = 1.55

**Ts = Tree Species Component**

Tree species component is developed by creating four “buckets” which represent the presence of a tree species in a given area that has a history of causing outages. To do this, we first had to rank each tree species with respect to outages. To rank each species, we took the total number of outages attributed to each species (excluding tree trimming) and divided by the total number of trees of that species. For example, there were 11,007 Palm-Fan trees in our database and 260 outages attributed to Palm-Fan trees. 260/11,007 = 2.36%. Based on the entire results of all species, we then placed each tree species into one of the four buckets based on where their final calculation fell in the entire range of data… < 30th percentile (S1), 30th - 75th percentile (S2), 75th – 95th percentile (S3), and > 95th percentile (S4). ADS has a more complete list of tree species, so the numbers below may need to be adjusted after ADS has re-calculated the percent of trees in a given species that is responsible for outages. Below are the buckets currently being used:

* Ts bucket 1 (S1) = Percentage of low risk trees (Species outage percent < 0.12%)
* Ts bucket 2 (S2) = Percentage of medium risk trees (Species outage percent 0.12% - 0.47%)
* Ts bucket 3 (S3) = Percentage of high risk trees (Species outage percent 0.47% - 2.29%)
* Ts Bucket 4 (S4) = Percentage of extreme risk trees (Species outage percent > 2.29%)

Example: If along Circuit XYZ, 20% of the trees were in bucket 1, 50% were in bucket 2, 30% were in bucket 3, and 0% were in bucket 4, then…

Ts = 1(.20)+2(.50)+3(.30)+4(.00) = 2.10

**Oh = Outage History Component**

Oh = Total number of tree-related outages (excluding tree trimming) along a circuit segment since 2000

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Example calculation

C520 / De Luz (DLZ):

Tt = 17,677 -- H1 = 0.62 -- H2 = 0.28 -- H3 = 0.08 -- S1 = 0.40 -- S2 = 0.49 -- S3 = 0.72 -- S4 = 0.09 -- Oh = 7

Th = 1(0.62) + 2(0.28) + 3(0.08) = 0.99

Ts = 1(0.40) + 2(0.49) + 3(0.72) + 4(0.09) = 1.62

T = Tt x (Th x Ts) x 10-3

T = 17,677 x (0.99 x 1.62) x 10-3

T = 28.29

VRPI = T + 2(Oh)

VRPI = 28.29 + 2(7)

**VRPI = 42.29**