

Detail on the Plot-Level Index for the Ozone Indicator.

Note: The formulation of the ozone indicator plot-level index was completed with the assistance of David Randall, Statistician for the NE Area, Washington Office

Notes on the formulation:

There are 3 components to the formulation: 1) the amount of in#ur\$, 2) the severity of in#ur\$, and 3) the incidence of in#ur\$ on the site. The formulation selected associates these three components at the individual plant level. This suggests that the ozone in#ur\$ response of each individual plant is important. This is a logical reality (better than lumping all species together). The calculation is intuitive. A mean value is calculated that truly represents a proportion of the population at both the plant level and the species level. An arithmetic mean is then taken for the n species on the plot.

Notes on method:

Each plant observed in the field cre. is rated for the percent of the plant that is injured i.e. in#ur\$ amount and the average severity of in#ur\$ i.e. in#ur\$ severity using a modified Horsfall-Beare scale with (re)points at 1% & 2% 23% 42% and 53 percent. This information is used to calculate an in#ur\$ value for each plant, a mean value for each species, and an overall plot mean. The incidence of in#ur\$ on the plot is also considered. The formulation is based on the fact that each individual plant has a unique response to ozone that is dependent on the genotype and micro-habitat at the time of exposure.

For each plant:

1) T_i = in#ur\$ amount
2) S_i = in#ur\$ severity

For each species:

N_i = the number of injured plants
 N_k = the number of evaluated plants
3) N_i / N_k
4) $(T_i \cdot S_i) / N_i$

Species Index = $\sum (N_i / N_k) \cdot (T_i \cdot S_i) / N_i$

For each /exa'on or 0iosite":

N_3 = the number of evaluated species

Plot Index = $\sum (\text{Species Index}) / N_3$

Notes on transformin' cre. values from the nominal scale to the percent scale:

Maximum Amount of Injury (amount_maximum)

The maximum amount of in_{ur} for a given (iolo)ical species at a hexagon equals the maximum value of all the in_{ur} amounts for that species. If there are no injured plants within the species, the maximum amount of in_{ur} for the species equals zero.

amount; maximum & maximum in_{ur} amounts for a given species at a hexagon "

Minimum Amount of Injury (amount_minimum)

The minimum amount of in_{ur} for a given (iolo)ical species at a hexagon equals the minimum value of all the in_{ur} amounts for that species. If there are no injured plants within the species, the minimum amount of in_{ur} for the species equals zero.

amount; minimum & minimum in_{ur} amounts for a given species at a hexagon "

Number of Damaged Plants

The number of damaged plants in a given (iolo)ical species at a hexagon equals the number of plants that have in_{ur} amounts greater than zero and non-null in_{ur} severity amounts.

number of damaged plants & count plants within a given species at a hexagon that have an in_{ur} amount greater than zero and a non-null in_{ur} severity amount "

Mean Amount of Injury (amount_mean)

The mean amount of in_{ur} for a given (iolo)ical species at a hexagon equals the arithmetic mean of all the in_{ur} amounts greater than zero. If there are no injured plants within the species, the mean amount of in_{ur} for the species equals zero.

amount; mean & summation in_{ur} amounts for a given species at a hexagon that are greater than zero " / number of damaged plants

Maximum Amount of Severity (severity_maximum)

The maximum amount of in_{ur} severity for a given (iolo)ical species at a hexagon equals the maximum value of all the in_{ur} severity amounts for that species. If there are no injured plants within the species, the maximum amount of in_{ur} severity for the species equals zero.

severity; maximum & maximum in_{ur} severity amounts for a given species at a hexagon "

Minimum Amount of Severity (severity_minimum)

The minimum amount of in_{ur} severity for a given (iolo)ical species at a hexagon equals the minimum value of all the in_{ur} severity amounts for that species. If there are no injured plants within the species, the minimum amount of in_{ur} severity for the species equals zero.

severity; minimum & minimum in_{ur} severity amounts for a given species at a hexagon "

Number of Injured Plants (plants_inj_count)

The number of injured plants for a given (iolo)ical species at a hexagon equals the number of plants that have in_{ur} severity amounts greater than zero.

plants; in#; cnt 8 count plants . ithin a 'iven species at a hexa'on