

CCISS tool ruleset documentation

Alignment of Site Series: Edatopic overlap.

Description: The script compares overlap in edatopic space between a current focal site series to all site series in future predicted BGC units. Any shared edatopic grid cell, flags the future site series as a possible related concept.

The degree of agreement between the focal and a future possible site series is calculated as:

$$\text{Edatopic similarity} = \frac{\# \text{ shared cells}}{\# \text{ focal cells}} \times \frac{\# \text{ shared cells}}{\# \text{ future cells}}$$

The edatopic similarity of all overlapping site series from a future BGC are summed and then each overlap of individual site series is divided by this total to turn the overlap into a ratio of concept agreement. This site series ratio value is multiplied by the BGC ratio (future likelihood of subzone) to create the total site series probability.

Certain site series are considered “extra-edatopic” and driven strongly by a different environmental factor. These “Special” ecosystems are coded and where the focal ecosystem has a special factor in current and future edatopic grids, this future special unit is selected by default, as long as edatopic overlap is > the a specified value (see below).

Overlap for each future unit is adjusted to represent a proportion of all possible futures within each current unit, and

Variable Rules.

- Special edatopic overlap proportion above which other units are discarded: currently = 10%. (if there is a least this amount of edatopic overlap between common special ecosystems then use only the special ecosystem).
- Option to discard units with low overlap: currently = 0%

Species Suitability

The suitability tables are derived from the regional reference guide tables. As some BGC occur in more than one Region, the script checks for duplicate species suitability entries. If such exist, the entry with most conservative suitability is kept. If the subzone/variant doesn't exist in the reference guide, information from a specified equivalent subzone/variant is used from a crosswalk table (e.g there is only CWHxm in the reference guide but CWHxm1 and xm2 variants are mapped. The Reference Guide for CWHxm will be used for both variants).

Detailed Species Suitability output:

The detailed/raw output presents the sum of site series probabilities for models with the same species suitability rating, by each time period. (Note: S1 = Primary, S2 = Secondary, S3 = Tertiary, X = unsuitable).

The detailed output presents these summed ranking probabilities for each future time period. For each future time period the % votes for each suitability rank is followed by three classified values:

Calculated Suitability: Calculated by weighted average of percent models predicting each suitability rating.

- $= S1\% + (2 \times S2\%) + (3 \times S3\%) + (5 \times \text{NotSuit}\%)$.

Inter-period Trajectory: Based on changes in calculated suitability from the preceding time period.

- Between -0.5 and 0.5 difference = “No Change”,
- > 0.5 = “Improving”, > 1.5 = Strongly improving
- < -0.5 = “Declining”, < -1.5 = Strongly declining

Mortality Risk: Based on $(\% \text{ votes for Not suitable} + [0.3 \times \% \text{ votes for S3}])$

- ≤ 0.20 ; mortality risk is considered “Low”,
- $> 0.20 - 0.40$; mortality risk is considered “Moderate”,
- $> 0.40 - 0.50$; mortality risk is considered “High”,
- > 0.50 ; mortality risk is considered “Very High”,
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Model Agreement Class: Based on maximum value of the suitability classes. If any future suitability classes is:

- > 0.8 ; model agreement is considered “High”,
- 0.8 to 0.6 ; model agreement is considered “Moderate”,
- < 0.6 ; model agreement is considered “Low”.

Unsuitable: If $> 50\%$ of votes are unsuitable the species is flagged as “Unsuitable”. Could be renamed with “risk” term.

Summary Future Suitability

The Summary output is based on the 2025 period for feasibility of establishment and the 2055 period for mid-rotation trend. This is intended to give an overall recommendation on suitability for all species with current or future suitability in selected site series of the assessment area.

Current Suitability: The suitability value for the species from the Reference Guide. Where a site series occurs in more than one Region and the suitability rankings differ, the more conservative suitability is presented by default. A more favorable suitability ranking is used where a comparative review determines that is the more appropriate ranking.

New Establishment Period Suitability: Reported as a suitability rating.

- Calculated as a weighted average calculation (same as Calculated Suitability in Details Report) but with the raw calculated suitability adjusted based on current suitability rating:

Current Suitability	Adjustment value
S1	Improve by 0.5
S2	Improve by 0.3
S3	Decrease by 0.3
Unsuitable	Decrease by 0.6

The adjusted value is rounded to nearest full whole value.

= Rounded (S1% + (2 X S2%) + (3 X S3%) + (5 X NotSuit%) + Current suitability adjustment value).

- Any species with >3.5 calculate suitability is rounded to a rating of 4 and displayed as an 'X'

Establishment values are flagged with a coloured dot where rating values have changed between current and new suitability ranks:

- Becoming unsuitable: ●
- Declining : ●
- Improving : ●
- Newly suitable: ●

Establishment Risk: Reported as a class descriptor based % models with feasibility in the 2025 period. Species are considered feasible if they have a S1, S2, or S3 suitability. Tertiary species are considered to have reduced feasibility and %S3 values are reduced by 25%;

- Feasibility Sum = S1% + S2% + (0.75 X S3%).

Classes are then applied the Feasibility Sum:

- ≥ 0.8 = "Low Risk, high likelihood of successful establishment"
- $0.8 - 0.65$ = "Moderate Risk"
- 0.65 and 0.5 = "Considerable Risk"

- < 0.5 = “High Risk”

Continuing Trend at mid-rotation: Based on difference between the calculated suitability for the 2010 – 2040 period with the current period adjustment and the calculated suitability for the 2040-2070 time period.

Symbology for Trend.

No Change: (—) $\text{AdjustCalcSuit 2025} - \text{CalcSuit 2055} > -0.5$ and < 0.5

Declining: (↘) $\text{AdjustCalcSuit 2025} - \text{CalcSuit 2055} < -0.4$ and > -1.5

Strongly Declining: (↓) $\text{AdjustCalcSuit 2025} - \text{CalcSuit 2055} < -1.5$

Becoming Unsuitable: (X) Suitability of 2055 falls below 3.5

Improving: (↗) $\text{AdjustCalcSuit 2025} - \text{CalcSuit 2055} > 0.4$ and < 1.5

Strongly Improving: (↑) $\text{AdjustCalcSuit 2025} - \text{CalcSuit 2055} > 1.5$

Bifurcating: (↔) $> 25\%$ of models predict improving and $> 25\%$ declining

Reference Table Output

Full Stocking Standards information from the Chief Forester’s Reference Guide with the Climate change suitability values from the above section aligned adjacent and colour themed to show where there are suitability differences between the reference guide and the estimated new suitability.

A Forest Region layer has been added to the CCISS 2.0 so that the proper regional StockingID is displayed for the area in question. Because each table has some sections with incomplete data, the script does multiple checks. If a BGC unit isn’t found in the Preferred/Acceptable table, information from an equivalent BGC unit is used (from the Crosswalk table), and if no data is available, a blank entry is created.