

# RESILIENCE INDEX (RI)

Dan Wismer

Conservation Data Specialist

# RI OVERVIEW

The **goal** of the RI is to:

1. Capture National Conservation data into a **single** metric
2. Enhance Where To Work site selection outputs
3. Drive What To Do management action optimizations
4. Guide Project Management Plans and Securement

RI provides a “catch-all” **Landscape Level** metric that aids in comparing the relationship between location and conservation impact.



# RI INPUT DATA

Conservation data has been captured into 8 broad **Themes**.

A. Biodiversity

B. Carbon

C. Climate

D. Connectivity

E. Environmental Services

F. Habitat

G. Protection

H. Threats

**Features** (layers) that make up each theme have been **weighted** by importance.



# RI FEATURES & RELATIVE WEIGHTS

POSITIVE FEATURES				
THEMES	FEATURES	SIGN	WEIGHTS	RANKS
Biodiversity	Key Biodiversity Areas	+	15	1
Connectivity	Connectivity	+	13	2
Protection	Existing Conservation	+	12	3
Biodiversity	Critical Habitat	+	9	4
Biodiversity	Endangered	+	8	5
Biodiversity	Threatened	+	7	6
Biodiversity	Special Concern	+	6	7
Climate	Refugia	+	6	7
Climate	Velocity	+	6	7
Carbon	Potential	+	5	8
Carbon	Storage	+	5	8
Habitat	Forest Landcover	+	2	9
Habitat	Grassland	+	2	9
Habitat	Wetland	+	2	9
eServices	Freshwater Provision	+	1	10
eServices	Recreation	+	1	10

NEGATIVE FEATURES				
THEMES	FEATURES	SIGN	WEIGHTS	RANKS
Threats	Human Footprint Index	-	38	1
Climate	Extremes	-	12	2

Ranks are rationalized using the **Connectivity. Adequacy. Representativeness. Efficiency** principle.

- Positive weights tally up to **100**
- Negative weights tally up to **-50**



# RI PREP DETAILS

Each feature is **scaled** between **0** and **1** before the RI equation is executed. This step is required in order to combine features that have different units of measurement.

## Scaling equation:

Normalized feature = (feature – min value) / ( max value – min value)



# RI EQUATION

RI = (feature \* weight) + (feature \* weight) - (feature \* weight) etc.

CP&P has provided an RI **recommendation** for review.

Resilience Index Equation:

$$\begin{aligned} & (\text{key biodiversity areas} * 15) + (\text{connectivity} * 13) + (\text{existing conservation} * 12) + (\text{critical habitat} * 9) + (\text{endangered species} * 8) \\ & + (\text{threatened species} * 7) + (\text{special concern species} * 6) + (\text{climate refugia} * 6) + (\text{climate velocity} * 6) + (\text{carbon potential} * 5) + \\ & (\text{carbon storage} * 5) + (\text{forest landcover} * 2) + (\text{grassland} * 2) + (\text{wetland} * 2) + (\text{freshwater provision} * 1) + (\text{recreation} * 1) - \\ & (\text{human footprint} * 38) - (\text{climate extremes} * 12) \end{aligned}$$



# RI BUILDER

- Designed as an **engagement** tool that shows transparency in the make-up of the index.
- Users can **change** weights and update the RI in real time. This provides a means to reason with the relative importance of layers that comprise the index

## Main App Features:

- RI map display
- RI equation display
- RI point extractions and pop-up
- RI download



# RI BUILDER

## RESILIENCE INDEX BUILDER

Biodiversity

Key Biodiversity Areas

15

Critical Habitat

9

Endangered

8

Special Concern

6

Threatened

7

Carbon

Potential

5

Storage

5

Climate

Extremes

12

Refugia

6

Velocity

6

Connectivity

Connectivity

13

eServices

Freshwater Provision

1

Recreation

1

Habitat

Forest Landcover

2

Grassland

2

Wetland

2

Protection

Existing Conservation

12

Threats

Human Footprint Index

38

Positive Weight tally: 100

Negative Weight tally: -50

RESET RI

UPDATE RI

Download updated RI raster (.tif) and weights (.xlsx)

View PowerPoint

Update weights

Reset weights to CP&P Recommendation

Tally of total weights

RI Equation

View layers

Resilience Index

☐ Critical Habitat
 ☐ Range Map: Endangered
 ☐ Range Map: Special Concern
 ☐ Range Map: Threatened
 ☐ Carbon Potential
 ☐ Carbon Storage
 ☐ Climate Extremes
 ☐ Climate Refugia
 ☐ Climate Velocity
 ☐ Connectivity
 ☐ Freshwater Provision
 ☐ Recreation
 ☐ Forest Landcover
 ☐ Grassland
 ☐ Wetland
 ☐ Human Footprint Index
 ☐ Off
 ☐ Protected
 ☐ KBA
 ☐ Points

values

1.0

0.8

0.6

0.4

0.2

0.0

Resilience Index Equation:

$$\begin{aligned}
 & (\text{key biodiversity areas} * 15) + (\text{connectivity} * 13) + (\text{existing conservation} * 12) + (\text{critical habitat} * 9) + (\text{endangered species} * 8) + (\text{threatened species} * 7) + (\text{special concern species} * 6) + (\text{climate refugia} * 6) + (\text{climate velocity} * 6) + (\text{carbon potential} * 5) + (\text{carbon storage} * 5) + (\text{forest landcover} * 2) + (\text{grassland} * 2) + (\text{wetland} * 2) + \\
 & (\text{freshwater provision} * 1) + (\text{recreation} * 1) - (\text{human footprint} * 38) - (\text{climate extremes} * 12)
 \end{aligned}$$