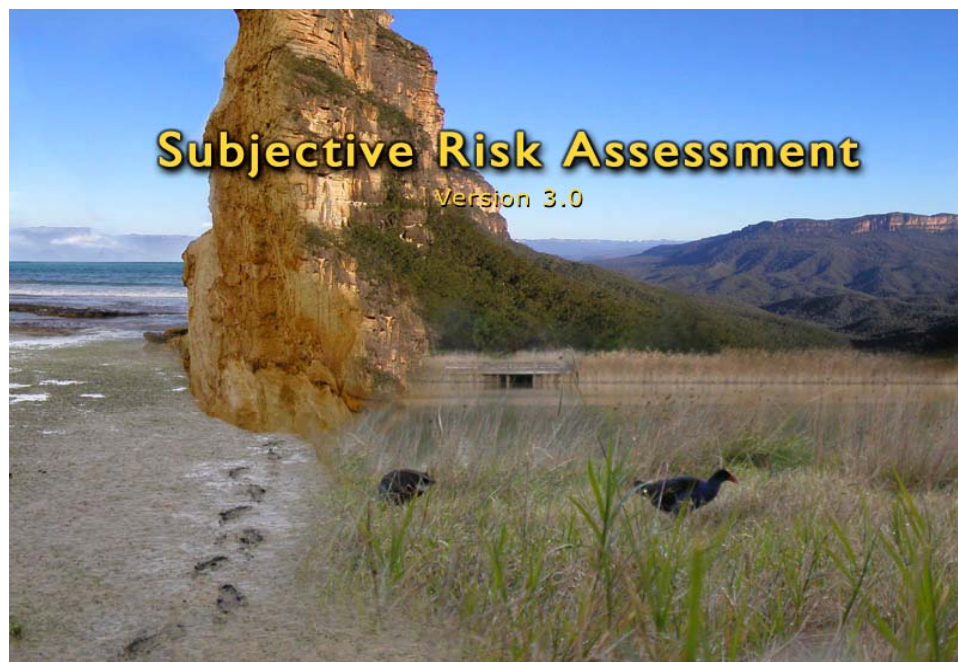


Using

Subjective Risk Assessment

Version 3



Subjective Risk Assessment is a software tool to facilitate qualitative risk assessment in a workshop setting. It can do the following:

page no.

- record and display scores for likelihood and consequence assigned by a number of groups or individuals to a set of hazards 1-3
- calculate risk scores as the product of likelihood and consequence for each hazard 3
- rank the hazards in priority order for each individual or group on the basis of the risk scores 3
- identify pairs of individuals or groups where disagreement over ranks is the greatest 5
- facilitate identification of hazards where disagreement over ranks is greatest, and the sources of that disagreement (likelihood or consequence) 7
- display summary graphs of a priority order for hazards and the level of uncertainty surrounding each hazard 8, 9
- save scores and export raw data for use by other software 10

Project Directors

Mark Burgman - The University of Melbourne
Jan Carey - The University of Melbourne

Version 1.0 Developer

Hugh Campbell - Highbrow Interactive

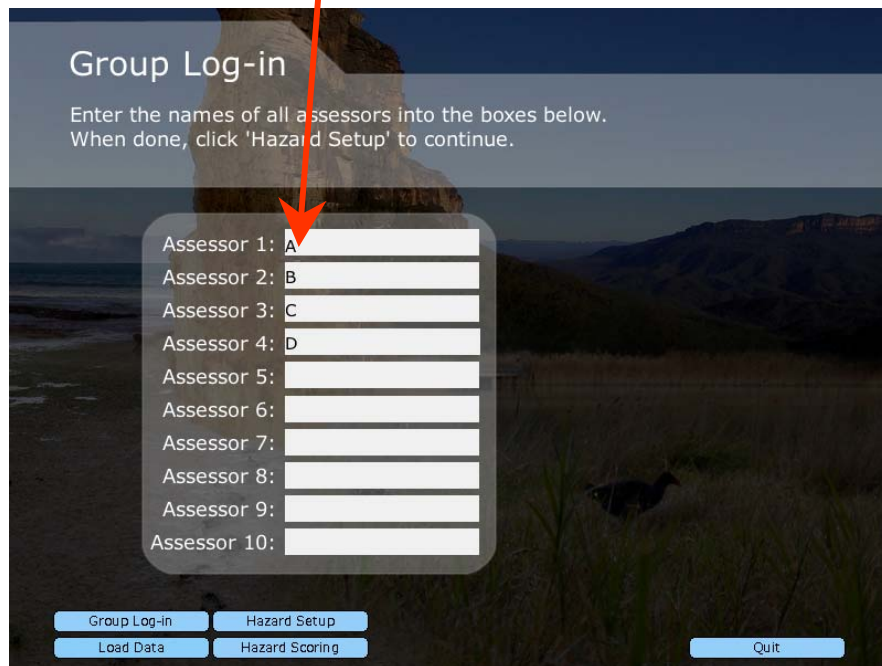
Version 2.0/3.0 Developer

Ryan Chisholm - The University of Melbourne

Scoring likelihood and consequence - 1

Group Log-in

Individual assessors or groups of assessors can be assigned distinguishing names or abbreviations.



The screenshot shows a 'Group Log-in' window with a dark background image of a landscape. The title 'Group Log-in' is at the top. Below it, instructions read: 'Enter the names of all assessors into the boxes below. When done, click 'Hazard Setup' to continue.' There is a list of ten assessors, each with a text input field. An orange arrow points to the first input field, which contains the letter 'A'. The other input fields contain 'B', 'C', 'D', and are empty for assessors 5 through 10. At the bottom, there are five buttons: 'Group Log-in', 'Hazard Setup', 'Load Data', 'Hazard Scoring', and 'Quit'.

Assessor	Name
Assessor 1:	A
Assessor 2:	B
Assessor 3:	C
Assessor 4:	D
Assessor 5:	
Assessor 6:	
Assessor 7:	
Assessor 8:	
Assessor 9:	
Assessor 10:	

Buttons: Group Log-in, Hazard Setup, Load Data, Hazard Scoring, Quit

Scoring likelihood and consequence - 2

List Hazards

Hazards can be grouped by topic to allow separate ranking within topic.
e.g. ecological hazards, hazards to visitors
or Park A, Park B, Park C.

Note that if you chose to do this, the scores for each distinct group of hazards will need to be saved separately.
(see page 10)

List Hazards

List up to 20 hazards, and optionally specify a hazard topic. When done, click 'Hazard Scoring' to continue.

Enter the topic that will group these hazards (e.g. environmental, economic):

Hazard 1: walking disturbing birds

Hazard 2: dogs disturbing birds

Hazard 3: feral animals & birds

Hazard 4: nutrients & macroalgae

Hazard 5: poaching & abalone

Hazard 6: collecting & biota

Hazard 7: invasive species

Hazard 8: trampling in IT

Hazard 9: sea level & habitats

Hazard 10: seaward boundary mark

Hazard 11: failure to document

Hazard 12: spills from comm shippi

Group Log-in Hazard Setup

Load Data Hazard Scoring

Quit

Enter the hazard names here.

Truncation will occur on some later screens (e.g. the graphs), so make sure that the first ten characters of each hazard are distinctive.

e.g. use "urban litter" and "marine litter" rather than "litter from urban areas" and "litter from marine sources"

Scoring likelihood and consequence - 3

Score Hazards

Scores may be entered as point estimates, a range of values, or a range with a best estimate.

Name:	likelihood	consequence	risk	rank
A walking disturbing birds	5	3	15	2.5
B dogs disturbing birds	4	2	8	10.5
C feral animals & birds	4	2	8	10.5
D nutrients & macroalgae	3	3	9	7
poaching & abalone	5	3	15	2.5
collecting & biota	2	2	6	13.5
invasive species	4	4	20	1
trampling in IT	5	2	10	6
sea level & habitats	2	4	8	10.5
seaward boundary mark	2	1-2	2-4	15
failure to document	4	1-2-5	4-8-20	8
spills from comm shippi	2	4	8	10


Risk scores will be calculated using interval arithmetic, then ranked.

Note: the scoring system used should be such that the maximum possible risk score is less than 65,535. The program will crash at this score!

Scoring likelihood and consequence - 4

Standards

Three sets of standard definitions of likelihood and consequence are provided for reference, but it's perfectly acceptable to use alternative scores and/or definitions.

Australian Standards

Qualitative measures of likelihood

Level	Descriptor	Description
1	Rare	May occur only in exceptional circumstances
2	Unlikely	Could occur at some time
3	Possible	Might occur at some time
4	Likely	Will probably occur in most circumstances
5	Almost certain	Is expected to occur in most circumstances

Qualitative measures of consequence or impact

Level	Descriptor	Example detail description
1	Insignificant	No injuries, low financial loss
2	Minor	First aid treatment, on-site release immediately contained, medium financial loss
3	Moderate	Medical treatment required, on-site release contained with outside assistance, high financial loss
4	Major	Extensive injuries, loss of production capability, off-site release with no detrimental effects, major financial loss
5	Catastrophic	Death, toxic release off-site with detrimental effects, huge financial loss

After AS/NZS 4360, 2004. Australian / New Zealand Standard 4360. Risk Management. Standards Australia International Ltd., GPO Box 5420, Sydney, NSW, 2001.

Group Log-in

Hazard Setup

Number Line

Paired Comparisons

Hazard Rank Graph


Load/Save/Export Data

Hazard Scoring

Correlation Matrix

Hazard Score Graphs

Quit

US Standards

Qualitative measures of likelihood

Level	Descriptor
1	Improbable
2	Remote
3	Occasional
4	Probable
5	Frequent

Qualitative measures of consequence or impact

Level	Descriptor
1	Negligible
2	Marginal
3	Critical
4	Catastrophic

Based on Wiggins 1985, Oxford: Oxford University Press

Group Log-in

Hazard Setup

Number Line

Paired Comparisons

Hazard Rank Graph


Load/Save/Export Data

Hazard Scoring

Correlation Matrix

Hazard Score Graphs

Quit

British Standards

Qualitative measures of likelihood

Level	Descriptions	Scenario / Details	Probability
1	Extremely unlikely	Just possible but very surprising	<0.01%
2	Very unlikely	Not expected to happen	<1%
4	Unlikely	Could occur at some time	1-20%
8	Fairly likely	Might occur at some time, quite often	21-49%
12	Likely	Will probably occur in most circumstances	50-85%
16	Highly likely	Expected to occur in most circumstances	Over 85%

Qualitative measures of consequence or impact

Level	Description	Scenario / Details
1	Negligible / insignificant	No injuries, no important environmental effect, trivial effect on profit
3	Marginal / minor	First-aid treatment, on-site release immediately contained, small effect on profit
20	Substantial / moderate	Medical treatment required, toxic release on-site contained with outside assistance, or off-site release with no detrimental effects, significant reduction in profit
100	Severe / major	Extensive injuries, release off-site with detrimental effects, serious threat to business
1000	Disastrous / catastrophic	Deaths, toxic release off-site with substantial detrimental environmental effects, bankruptcy

After ICE/FIA, 1998. RAMP: Risk Analysis and Management for Projects. Institution of Civil Engineers and the Faculty and Institute of Actuaries. London: Thomas Telford.

Group Log-in

Hazard Setup

Number Line

Paired Comparisons

Hazard Rank Graph

Load/Save/Export Data

Hazard Scoring

Correlation Matrix

Hazard Score Graphs

Quit

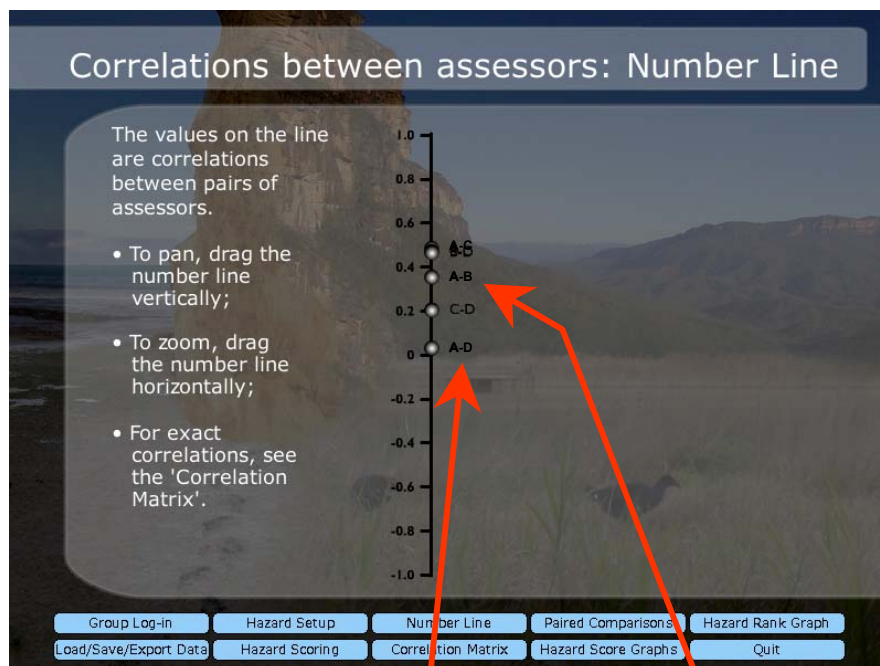
Group Comparisons - 1

Number Line

The number line quickly identifies pairs of individuals/groups where the overall level of disagreement was highest.

A value of +1 indicates that the assessors in question ranked the hazards in exactly the same order (although the risk scores may have differed). A value of -1 means the assessors ranked the hazards in exactly opposite orders.

Values around zero indicate no real pattern in the two sets of ranks.



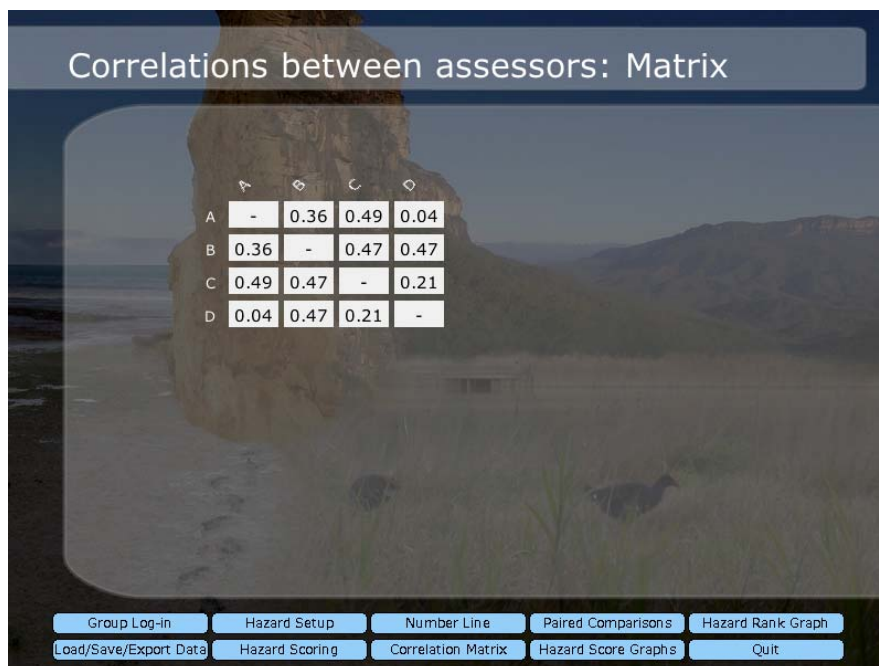
In this example, A and D disagree more than A and B.

The values shown on the line are Spearman's rank correlations. Details of their calculation can be found in most standard statistical texts.

Group Comparisons - 2

Matrix

The correlations presented on the number line can also be accessed in matrix form.



Group Comparisons - 3

Paired Comparisons

Having noted, for example, that A and C have the greatest level of disagreement, you can use the Paired Comparisons to quickly identify the major sources of that disagreement.

Paired Comparisons
Select names from the two lists to compare the likelihoods and consequences assigned by different assessors.

Name:		Likelihoods		Consequences		Compared to:
		A	C	A	C	
A	walking disturbing birds	5	5	2	3	A
B	dogs disturbing birds	3	4	3	2	B
C	feral animals & birds	4	4	2	2	C
D	nutrients & macroalgae	3	3	3	3	D
	poaching & abalone	5	5	4	3	
	collecting & biota	3	3	2	2	
	invasive species	5	5	3-4	4	
	trampling in IT	5	5	3	2	
	sea level & habitats	1	2	4	4	
	seaward boundary mark	5	2	3-4	1-2	
	failure to document	3	4	4	1-5	
	spills from comm shippi	1	2	5	4	

Group Log-in Hazard Setup Number Line Paired Comparisons Hazard Rank Graph
Load/Save/Export Data Hazard Scoring Correlation Matrix Hazard Score Graphs Quit

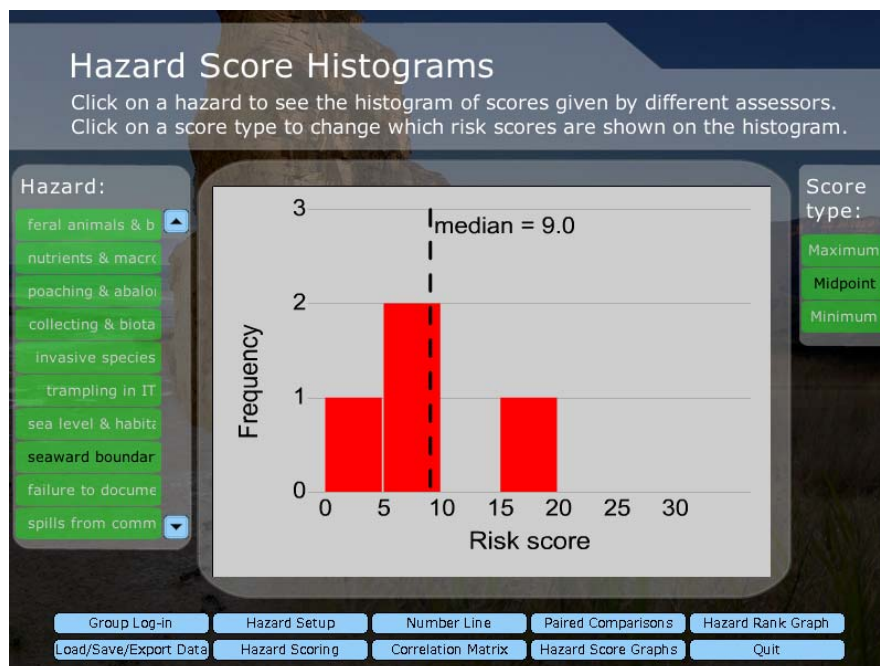
i.e. which hazards?

for likelihood or consequence or both?

Summary Graphs - 1

Hazard Score Histograms

The distribution of scores for a selected hazard can be displayed in a histogram.

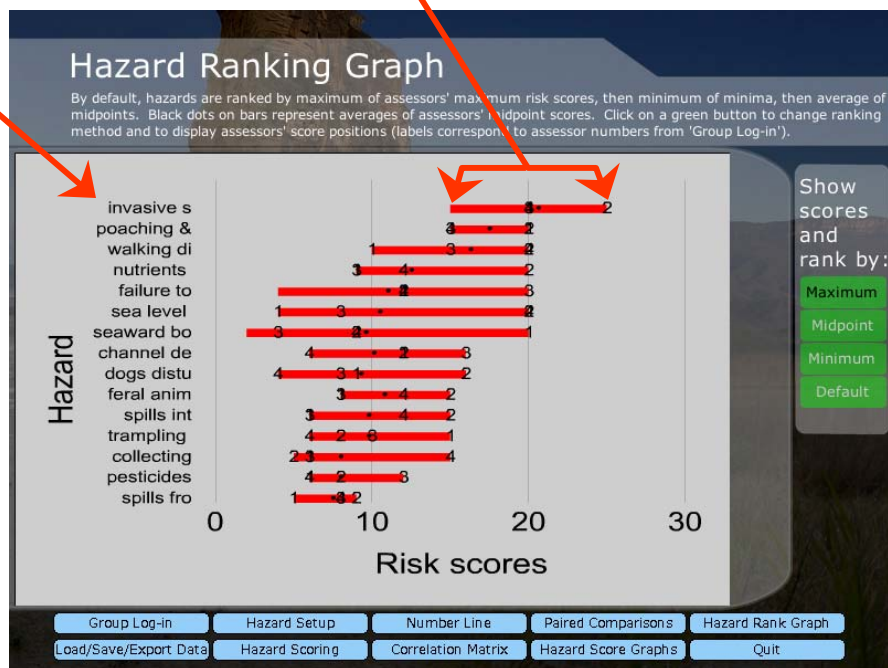


Summary Graphs - 2

Hazard Ranking Graph

The Hazard Ranking Graph

- presents the hazards in a priority order
- indicates the level of uncertainty associated with the risk score of each



Saving, Exporting or Loading Data

Data from a risk assessment can be saved for later reloading, or exported in a format suitable for most spreadsheets or word processors.

