Using Rank-Ordering Results from the Recovery Potential Screening Tool

Rank-ordering, as used in Recovery Potential Screening (RPS) assessments, assigns a numerical sequence to the screened watersheds that are already arranged along a gradient based on a value or score that has been calculated for each of them. In RPS, all rank-ordering assigns the highest rank (#1) to the "best" condition ecologically. Along with bubble-plotting and mapping, rank-ordering offers a way to organize complex information about restorability, stimulate discussion and insights about differences, communicate about results and alternatives, or if desired and appropriate, prescribe a clear basis for assigning priorities or decisions. In brief, ranking a set of objects provides a simple and straightforward method for their comparison.

Below are techniques and a few brief examples of how rank-ordering can be used in Recovery Potential Screening. These are hypothetical examples that may use real data for demonstration purposes, but they do not constitute final analyses, policies, or decisions by the US EPA or its collaborators.

Scores for rank-ordering. Depending on the screening purpose, rank-ordering can be based on any of several different recovery potential metrics. The Recovery Potential Integrated Score (RPI Score), which integrates all three recovery potential indices, is one common basis for rank-ordering waters or watersheds, but it should be seen as just one of several options. The individual ecological index, stressor index, or social index scores also provide a basis for rank-ordering. Further, a single indicator may sometimes be the most suitable basis for rank-ordering for a specific purpose (e.g., percent of the watershed recognized as drinking water source protection area).

Simple rank-ordering in spreadsheets. Rank orders are automatically generated by the RPS Tool for all four indices with every screening run. The rank-ordered results are found on the SUMMARY SCORES tab along with the raw index scores from each index. Default results are based on the rank ordering of the RPI score. Copying the table to a clean spreadsheet (paste in as VALUES ONLY to avoid bringing along calculation codes unintentionally) allows the user to re-sort the lists on any of the indices and their rank orders.

Potential Applications of Rank-Ordering

Example 1: Four rank-ordered alternatives provided together (Figure 1). This approach doesn't make a single selection on the basis of rank-ordering watersheds by restorability, but instead offers the alternatives – the four summary index values for every watershed in a tabular layout that allows for comparison. This type of format makes an effective project summary of results for presenting to technical audiences, or presenting options for prioritizing to a workgroup or decision maker.

Figure 1: RP Screening table with four alternative rank-orderings of the same set of watersheds.

	A	B	C	D	E	F	G	H	I
1	WATERSHED NAME	RPI SCORE	RPI RANK	ECO INDEX	ECO RANK	STRESSOR INDEX	STR RANK	SOCIAL INDEX	SOC RANK
2	Broad Creek	7.28	1	61.45	11	19.33	2	79.31	1
3	Deer Creek	5.86	2	67.09	2	20.83	5	54.95	2
4	Furnace Bay	5.67	3	67.87	1	20.46	4	48.14	4
5	Octoraro Creek	5.31	4	63.50	8	20.32	3	44.40	7
6	Bush River	5.24	5	57.94	17	18.35	1	38.26	16
7	Little Gunpowder Fal	4.50	6	65.33	4	23.08	7	38.43	15
8	Rocky Gorge Dam	4.38	7	63.48	9	24.10	8	42.02	8
9	Prettyboy Reservoir	4.02	8	66.20	3	25.08	9	34.72	22
10	Brighton Dam	3.94	9	63.88	6	27.54	10	44.55	6
11	Lower Winters Run	3.44	10	58.99	15	32.21	15	51.68	3
12	Cabin John Creek	3.39	11	40.20	26	21.57	6	32.84	23
13	Northeast River	3.38	12	65.28	5	27.85	11	28.90	24
14	S Branch Patapsco	3.31	13	63.18	10	30.10	12	36.35	21
15	Middle Patuxent Rive	3.26	14	58.97	16	30.72	13	41.11	12
16	Swan Creek	3.22	15	61.45	12	31.92	14	41.32	11
17	Loch Raven Reservoi	3.03	16	61.32	13	32.74	17	38.02	18
18	Atkisson Reservoir	2.93	17	60.48	14	34.34	18	40.27	14
19	Liberty Reservoir	2.71	18	63.52	7	37.10	19	36.87	20
20	Lower Gunpowder Fa	2.64	19	48.27	22	32.40	16	37.29	19
21	Rock Creek	2.51	20	55.21	19	37.11	20	38.10	17
22	Bynum Run	2.38	21	50.59	20	39.99	22	44.67	5
23	L Susquehanna River	1.96	22	57.11	18	41.06	23	23.33	26
24	Jones Falls	1.87	23	47.97	23	39.68	21	26.39	25
25	Patapsco River L N E	1.87	24	48.77	21	47.90	26	40.71	13
26	Little Patuxent River	1.87	25	47.03	24	47.48	25	41.66	10
27	Gwynns Falls	1.84	26	44.50	25	46.78	24	41.70	9
28	Anacostia River	0.93	27	39.01	27	63.77	27	20.26	27

Example 2: Rank-ordering based on two key indicators (Figure 2). This example has ranked watersheds and chosen priority targets (shaded) based on just two of the recovery potential indicators: Percent Impervious Cover in stream corridors and Benthic Index of Biotic Integrity. A user might choose this approach for a specific targeting purpose and still use the rest of the screening results to gain insight on level of difficulty and related factors that might be encountered working on each priority watershed.

Figure 2: Rank-ordering based on two key indicators, benthic IBI and % impervious cover. ICBIBI is based on the sum of ranks for BIBI and IC.

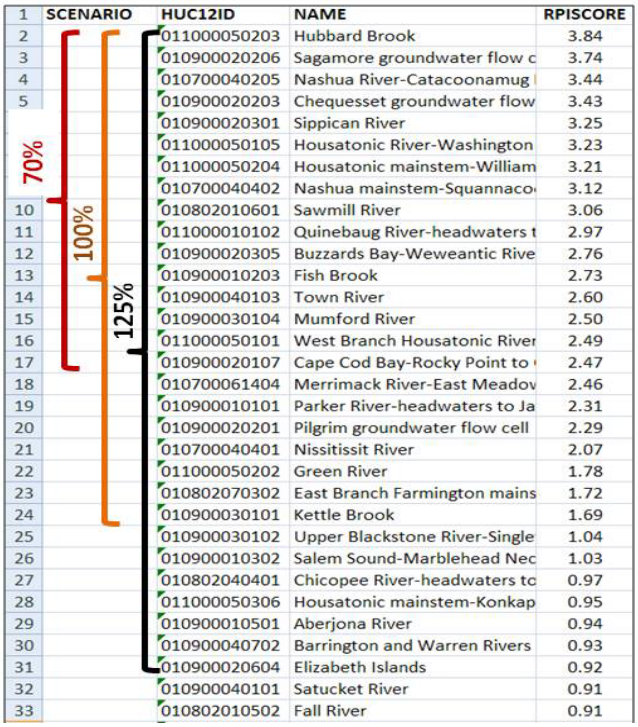
1	SITE ID	BENTHIC IBI	IMPCOVER% 120M CORR	BIBI RANK	IC RANK	ICBIBI RANK
2	STMA-110-R-2000	5.00	0.00	1	1	1
3	STMA-119-R-2003	3.86	0.00	5	1	2
4	STMA-107-R-2003	3.86	1.69	5	2	3
5	STMA-104-R-2003	4.14	2.06	4	3	3
6	STMA-208-R-2003	4.43	2.31	3	4	3
7	STMA-108-R-2000	2.71	0.00	8	1	4
8	STMA-111-R-2000	3.29	5.51	6	5	5
9	STMA-306-R-2000	4.71	17.56	2	9	5
10	STMA-218-R-2003	3.29	15.71	6	8	6
11	STMA-113-R-2003	1.86	6.49	9	6	7
12	STMA-106-R-2003	2.71	14.42	8	7	7
13	STMA-202-R-2000	3.86	18.96	5	10	7
14	STMA-112-R-2000	1.86	38.31	9	11	8
15	STMA-105-R-2003	2.71	50.10	8	12	8
16	STMA-101-R-2000	3.00	82.44	7	13	8

Example 3: Rank-ordering for budgeting contingencies (Figure 3). Program planning routinely involves developing yearly workplans for potentially major differences in funding. Restoration program managers might use rank-ordered impaired waters as an easy and transparent basis for explaining what projects different budgeting levels would support in a given work year. The figure estimates the different numbers of watersheds that might receive restoration work under three hypothetical budgeting scenarios, provided as percent of annual funding requested.

Example 4: Rank-ordering to plan collaboration with multiple partners (Figure 4). This application uses the same four alternatives from Figure 1 with a new twist – relating different rank-ordering results to co-funding and collaborating with different restoration partners. For example, this hypothetical user might manage a state nonpoint source control program with their own targeted set of priority watersheds while working with other state programs and agencies (represented by the color-highlighted zones) on common interest watersheds. In this case, the user has selected their program's overall priority watersheds (yellow), and may prioritize collaborating on shared priority areas with the TMDL program (light blue), the state natural resources agency (green), and an Environmental Justice program (orange).

This kind of approach enables the program to identify, target and work on its own priorities while offering a persuasive case that watersheds also prioritized by other programs are prime collaboration sites, thereby expanding the capacity of all programs involved when partnerships are developed.

Figure 3: Rank-ordering for budgeting contingencies.



	SCENARIO	HUC12ID	NAME	RPISCORE
2		011000050203	Hubbard Brook	3.84
3		010900020206	Sagamore groundwater flow c	3.74
4		010700040205	Nashua River-Catacoonamug	3.44
5		010900020203	Chequesset groundwater flow	3.43
		010900020301	Sippican River	3.25
		011000050105	Housatonic River-Washington	3.23
		011000050204	Housatonic mainstem-William	3.21
		010700040402	Nashua mainstem-Squannaco	3.12
10		010802010601	Sawmill River	3.06
11		011000010102	Quinebaug River-headwaters t	2.97
12		010900020305	Buzzards Bay-Weweantic Rive	2.76
13		010900010203	Fish Brook	2.73
14		010900040103	Town River	2.60
15		010900030104	Mumford River	2.50
16		011000050101	West Branch Housatonic River	2.49
17		010900020107	Cape Cod Bay-Rocky Point to	2.47
18		010700061404	Merrimack River-East Meadov	2.46
19		010900010101	Parker River-headwaters to Ja	2.31
20		010900020201	Pilgrim groundwater flow cell	2.29
21		010700040401	Nissitissit River	2.07
22		011000050202	Green River	1.78
23		010802070302	East Branch Farmington mains	1.72
24		010900030101	Kettle Brook	1.69
25		010900030102	Upper Blackstone River-Single	1.04
26		010900010302	Salem Sound-Marblehead Nec	1.03
27		010802040401	Chicopee River-headwaters to	0.97
28		011000050306	Housatonic mainstem-Konkap	0.95
29		010900010501	Aberjona River	0.94
30		010900040702	Barrington and Warren Rivers	0.93
31		010900020604	Elizabeth Islands	0.92
32		010900040101	Satucket River	0.91
33		010802010502	Fall River	0.91

Figure 4: Rank-ordering to plan collaboration with partners and expand restoration capacity.

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