Great Plains fish BCG rules - DRAFT

Workshop

May 30, 2024

How does the BCG model work? *Like a cascade…*

Start with the narrative of Level 2 → **Minimal changes in structure of the biotic community and minimal changes in ecosystem function**—*Most native taxa are maintained with some changes in biomass and/or abundance; ecosystem functions are fully maintained within the range of natural variability.*

Apply the numeric rules

Does the sample meet ALL BCG Level 2 criteria?

% Attribute I+II+IIIa taxa	> 22.5 (20-25)
% Attribute I+II+III individuals	> 20 (15-25)
% Attribute I+II+III+IVa taxa	> 80 (75-85)
% native individuals	> 99 (98-100)
Total # of individuals	> 500 (400-600)
% lithophil taxa	> 55 (50-60)
Average of taxa BCG attributes	< 3.9 (4-3.8)
% fluvial individuals	> 70 (60-80)
% darter taxa	> 17.5 (15-20)

YES → **Assigned to BCG Level 2**

NO

Continue the cascade at the next BCG Level …

Start with the narrative of Level 3

Evident changes in structure of the biotic community and minimal changes in ecosystem function—*Evident changes in structure due to loss of some highly sensitive native taxa; shifts in relative abundance of taxa, but sensitive-ubiquitous taxa are common and relatively abundant; ecosystem functions are fully maintained through redundant attributes of the system.*

Apply the numeric rules

Does the sample meet ALL BCG Level 3 criteria?

	Not 47c	Iowan Surface
# Attribute I+II+III taxa (Small<100)	> 1 (0-2)	> 1 (0-2)
# Attribute I+II+III taxa (Large>100)	> 2 (1-3)	> 4 (3-5)
% Attribute I+II+III+IVa taxa	> 55 (50-60)	> 65 (60-70)
Average of taxa BCG attributes	< 4.2 (4.3-4.1)	< 4.1 (4.2-4)
# fluvial taxa	> 4 (3-5)	> 5 (4-6)
% benthic invertivore taxa	> 17.5 (15-20)	> 17.5 (15-20)
Shannon-Wiener Index	> 2.5 (2.25-2.75)	> 2.5 (2.25-2.75)

YES → **Assigned to BCG Level 3**

NO ↓

Continue the cascade at the next BCG Level …

Start with the narrative of Level 4

Moderate changes in structure of the biotic community with minimal changes in ecosystem function—*Moderate changes in structure due to replacement of some intermediate sensitive taxa by tolerant taxa; reproducing populations of some sensitive taxa are maintained; balanced distribution of all expected major groups; ecosystem functions largely maintained through redundant attributes.*

Apply the numeric rules

Does the sample meet MOST BCG Level 4 criteria?

(best 7 of 9, or 6 of 7 in the Iowan Surface)

	Not 47c	Iowan Surface
% native individuals	> 90 (80-100)	> 90 (80-100)
% Attribute V individuals	< 50 (55-45)	< 50 (55-45)
% Attribute V taxa	< 30 (35-25)	< 30 (35-25)
Average of taxa BCG attributes	< 4.5 (4.6-4.4)	< 4.5 (4.6-4.4)
# fluvial taxa	> 1 (0-2)	> 1 (0-2)
# native cyprinid taxa (Small<100)	> 3 (2-4)	> 3 (2-4)
# native cyprinid taxa (Large>100)	> 4 (3-5)	> 4 (3-5)
# BCG non-tolerant taxa	> 3 (2-4)	> 3 (2-4)
% Lepomis (sunfish) individuals	< 12.5 (20-5)	NA
% benthic invertivore individuals	> 2.5 (0-5)	NA

YES → **Assigned to BCG Level 4**

NO

Continue the cascade at the next BCG Level …

Start with the narrative of Level 5

Major changes in structure of the biotic community and moderate changes in ecosystem function—*Sensitive taxa are markedly diminished or missing; conspicuously unbalanced distribution of major groups from those expected; organism condition shows signs of physiological stress; ecosystem function shows reduced complexity and redundancy; increased build-up or export of unused materials*

Apply the numeric rules

Does the sample meet MOST BCG Level 5 criteria? (best 3 of 4)

Percent native individuals	> 70 (60-80)
Percent BCG tolerant individuals	< 90 (100-80)
Average of taxa BCG attributes	< 4.7 (4.8-4.6)
Number BCG non-tolerant taxa	> 1 (0-2)

YES → **Assigned to BCG Level 5**

NO

Default to Level 6

Level 6: Severe changes in structure of the biotic community and major loss of ecosystem function – *Extreme changes in structure; wholesale changes in taxonomic composition; extreme alterations from normal densities and distributions; organism condition is often poor; ecosystem functions are severely altered.*