

Supplement S2. Trait information for fish and macroinvertebrates used to calculate functional diversity

Organism C	Trait Cate	Trait	Trait Description
Fish	Trophic	NONFEED	Adults do not feed.
		BENTHIC	Benthic feeder.
		SURWCOL	Surface or water column feeder.
		ALGPHYTO	Algae or phytoplankton, including filamentous algae.
		MACVASCL	Any part of macrophytes and vascular plants.
		DETRITUS	Detritus or unidentifiable vegetative matter.
		INVLVFSH	Aquatic and terrestrial invertebrates including zooplankton, insects, n
		FSHCRCRB	Larger fishes, crayfishes, crabs, frogs, etc.
		BLOOD	For parasitic lampreys that feed mainly on blood.
		EGGS	Eggs of fishes, frogs, etc.
		OTHER	Other diet components distinct from the preceding classes.
Body Size, I	A_1_1		Nonguarders; Open substratum spawners; Pelagophils.
	A_1_2		Nonguarders; Open substratum spawners; Litho-pelagophils.
	A_1_3A		Nonguarders; Open substratum spawners; Lithophils (rock-gravel).
	A_1_3B		Nonguarders; Open substratum spawners; Lithophils (gravel-sand).
	A_1_3C		Nonguarders; Open substratum spawners; Lithophils (silt-mud).
	A_1_4		Nonguarders; Open substratum spawners; Phyto-lithophils.
	A_1_5		Nonguarders; Open substratum spawners; Phytophils.
	A_1_6		Nonguarders; Open substratum spawners; Psammophils.
	A_2_3A		Nonguarders; Brood hiders; Lithophils (rock-gravel).
	A_2_3B		Nonguarders; Brood hiders; Lithophils (gravel-sand).
	A_2_3C		Nonguarders; Brood hiders; Lithophils (mud).
	A_2_4A		Nonguarders; Brood hiders; Speleophils (rock cavity).
	A_2_4C		Brood hiders; Speleophils (cavity generalist rock crevices, and also uni
	B_1_3A		Guarders; Substratum choosers; Lithophils
	B_1_4		Guarders; Substratum choosers; Phytophils.
	B_2_2		Guarders; Nest spawners; Polyphils.
	B_2_3A		Guarders; Nest spawners; Lithophils (rock-gravel).
	B_2_3B		Guarders; Nest spawners; Lithophils (rock-gravel).
	B_2_4		Guarders; Nest spawners; Lithophils (gravel-sand).
	B_2_5		Guarders; Nest spawners; Ariadnophils.
	B_2_6		Guarders; Nest spawners; Psammophils.
	B_2_7A		Guarders; Nest spawners; Speleophils (rock cavity/roof).
	B_2_7B		Guarders; Nest spawners; Speleophils (bottom burrows or natural hol
	B_2_7C		Guarders; Nest spawners; Speleophils (cavity generalist).
	C1_3_4_C2		A lumping of all bearers. May also be regarded as substrate-indifferer
Habitat Pre	MUCK		Muck substrate.
	CLAYSILT		Clay or silt substrate.
	SAND		Sand substrate.
	GRAVEL		Gravel substrate.
	COBBLE		Cobble or pebble substrate.
	BOULDER		Boulder substrate.
	BEDROCK		Bedrock substrate.
	VEGETAT		Aquatic vegetation.
	DEBRDETR		Organic debris or detrital substrate.

LWD Large woody debris.
 PELAGIC Open water.
 PREFLOT Lotic and lentic systems but more often in lotic.
 PREFLEN Lotic and lentic systems but more often in lentic.
 POTANADR Potamodromous or anadromous. Species that exhibit significant movement.
 LACUSTRIN Lentic systems.
 LOWLAND Lowland elevation.
 UPLAND Highland elevation.
 MONTANE Mountainous physiography.
 LARGERIV Medium to large river.
 SMALLRIV Stream to small river.
 SPRGSUBT Spring or subterranean water
 CREEK Creek.
 SLOWCURR Slow current.
 MODCURR Moderate current.
 FASTCURR Fast current.

Macroinvertebrate Life history
 Voltinism 1 Semivoltine (.1 generation/y)
 Voltinism 2 Univoltine (1 generation/y)
 Voltinism 3 Bi- or multivoltine (.1 generation/y)
 Development Fast seasonal
 Development Slow seasonal
 Development Nonseasonal
 Synchronization Poorly synchronized (wk)
 Synchronization Well synchronized (d)
 Adult life span Very short (.1 wk)
 Adult life span Short (.1 mo)
 Adult life span Long (.1 mo)
 Adult ability Absent (not including emergence)
 Adult ability Present
 Ability to swim Absent
 Ability to swim Present
 Mobility
 Female dispersal Low (.1 km flight before laying eggs)
 Female dispersal High (.1 km flight before laying eggs)
 Adult flying Weak (e.g., cannot fly into light breeze)
 Adult flying Strong
 Occurrence Rare (catastrophic only)
 Occurrence Common (typically observed)
 Occurrence Abundant (dominant in drift samples)
 Maximum current Very low (.10 cm/h)
 Maximum current Low (.100 cm/h)
 Maximum current High (.100 cm/h)
 Swimming None
 Swimming Weak
 Swimming Strong
 Morphology Attachment None (free-ranging)
 Attachment Some (sessile, sedentary)
 Attachment Both

Armoring 1 None (soft-bodied forms)
 Armoring 2 Poor (heavily sclerotized)
 Armoring 3 Good (e.g., some cased caddisflies)
 Shape 1 Streamlined (flat, fusiform)
 Shape 2 Not streamlined (cylindrical, round, or bluff)
 Respiration Tegument
 Respiration Gills
 Respiration Plastron, spiracle (aerial)
 Size at mat Small (<9 mm)
 Size at mat Medium (9–16 mm)
 Size at mat Large (>16 mm)
 Ecology Rheophily 1 Depositional only
 Rheophily 2 Depositional and erosional
 Rheophily 3 Erosional
 Thermal preference Cold stenothermal or cool eurythermal
 Thermal preference Cool/warm eurythermal
 Thermal preference Warm eurythermal
 Habit 1 Burrow
 Habit 2 Climb
 Habit 3 Sprawl
 Habit 4 Cling
 Habit 5 Swim
 Habit 6 Skate
 Trophic habit Collector-gatherer
 Trophic habit Collector-filterer
 Trophic habit Herbivore (scraper, piercer, and shedder)
 Trophic habit Predator (piercer and engulfer)
 Trophic habit Shredder (detritivore)

ement related to spawning. We concentrated on movements between marine and freshwater or within f

freshwater from large river, reservoirs, or lakes to tributary streams.