Collection methods - bugs

The BCG models are calibrated for specific collection and processing protocols. Make sure you are using the BCG model that is appropriate for your samples. Note that for macroinvertebrates, it is more about the methods than the state. For example, if you collect a bug sample from a site in Missouri using the Kansas protocols, you should run the sample through the Kansas bug BCG model.

Summary of which BCG model (denoted by Index_Name and Index_Class) to use with each method. See below for more detailed information on each method.

Index_Name	Index_Class	Appropriate Bug Collection and Processing Protocols
IA_Bugs_BCG	All Index_Classes	Iowa DNR
KS_Bugs_BCG	All Index_Classes	Kansas KDHE Probabilistic
KS_Bugs_BCG	All Index_Classes	Kansas KDHE Targeted
MO_Bugs_BCG	Any Index_Classes beginning with DNR_	Missouri DNR
MO_Bugs_BCG	Any Index_Classes beginning with MDC_	Missouri MDC
NE_Bugs_BCG	Any Index_Classes ending with _mNRSA	Nebraska DEQ modified NRSA (2015 onward)
NE_Bugs_BCG	Any Index_Classes ending with _Qual	Nebraska DEQ Qualitative (pre-2015)

HABITAT

Method	Habitat
Iowa DNR	Targeted multihabitat. A single Qualitative (QUAL) sample, which is collected at every site, uses all targeted habitats within reach. Three Standardized Habitat (SH; also referred to as QUANT) samples are spatially and temporally constrained. The SH sample is one of three options, based on substrate and flow. If ~3" deep riffle present, Hess sampler preferred; if shallower riffle present, Surber sampler can be used; otherwise a Hester-Dendy samplers are placed at the site 4-6 weeks before primary sampling (Low-Flow Artificial Substrate, Floating Artificial Substrate, Anchored Artificial Substrate)
Kansas KDHE Probabilistic	Targeted macrohabitats within reach
Kansas KDHE Targeted	All available macrohabitats that can be sampled in one person-hour. Emphasis on biologically rich microhabitats within representative macrohabitats
Missouri DNR and MDC	Targeted multihabitat method; typically three habitats. In Prairie region: rootmat, pool, and large woody debris. In Ozarks: rootmat, pool, and riffle.
Nebraska DEQ - modified NRSA	Multihabitat. 11 transects (NRSA method) + 7 or 8 bank sweep
Oklahoma OCC and OWRB	Multihabitat (rocky riffles, woody debris, streamside vegetation)

INDIVIDUAL SUBSAMPLES

Method	Number of individual subsamples composited
Iowa DNR	Four subsamples, but they are NOT composited. One sample is a whole-reach, qualitative multihabitat timed sample (90 minutes). Three samples are replicates of a Standardized Habitat sample (there are three different SH sample types possible).
Kansas KDHE Probabilistic	2 (one per sampler); each subsample comprises many sweeps/picks
Kansas KDHE Targeted	Two, if performed by two workers. One, if performed by one worker
Missouri DNR and MDC	Three subsamples, but NOT composited: they are kept separate through identification stage
Nebraska DEQ - modified NRSA	# subsamples varies. Broken into TRNS (qualitative), NNDF (pool sample), TRHD (Hester Dendy), TRSU (Surber), NNDP (overhanging veg), TRSU (Surber), or TROTH (all samples combined)
Oklahoma OCC and OWRB	Samples from the three different habitats are NOT composited

SAMPLING SPATIAL AREA

Method	Sampling spatial area
Iowa DNR	QUAL - entire reach. SH (QUANT) - see specs for gear used
Kansas KDHE Probabilistic	entire reach
Kansas KDHE Targeted	entire reach
Missouri DNR and MDC	Pool: six 1-m kicks; Rootmat: six 1-meter lineal sweeps; LWD, twelve one-square-foot scrubs; Riffle: six 1-m kicks.
Nebraska DEQ - modified NRSA	Each transect sample is approx 1 square foot.
Oklahoma OCC and OWRB	Three 1-m^2 areas of riffle habitat, other habitat areas undefined

SAMPLING DURATION

Method	Sampling duration
Iowa DNR	90 person-minutes (2 people x 45 minutes) for QUAL sample; SH (QUANT) samples have their own constraints
Kansas KDHE Probabilistic	60 person-minutes (2 people x 30 minutes); may be extended to achieve sample size of 200
Kansas KDHE Targeted	One person-hour, stop watch-timed active sampling: Sweeping/kicking with D-nets and hand picking large hard substrates. Time is stopped when moving from locatin to location.
Missouri DNR and MDC	None formally
Nebraska DEQ - modified NRSA	30 second kick, kick/sweep, or hand pick per transect sample; plus bank sweeps
Oklahoma OCC and OWRB	3 minutes of streamside vegetation, 5 minutes woody debris, unsure of timing on riffle sampling

REACH LENGTH

Method	Reach length
Iowa DNR	30x channel width (min 150 m, max 350 m)
Kansas KDHE Probabilistic	150 m
Kansas KDHE Targeted	Undefined, flexible
Missouri DNR and MDC	20x channel width (may be extended to capture two riffle-run or glide-pool sequences)
Nebraska DEQ - modified NRSA	40x channel width (min 150 m, max 5000 m)
Oklahoma OCC and OWRB	unsure

SAMPLING GEAR

Method	Sampling gear
IOWA DNR	Qualitative sample uses 500 um mesh D-frame net, forceps, etc; Standard Habitat sample uses one of three types of equipment: Hess sampler, Surber sampler, or Hester-Dendy samplers.
Kansas KDHE Probabilistic	500 um mesh D-frame net and fine point forceps
Kansas KDHE Targeted	500 um mesh D-frame net and fine point forceps
Missouri DNR and MDC	500 um mesh rectangular-frame net
Nebraska DEQ - modified NRSA	500 um mesh D-frame net
Oklahoma OCC	1 m^2 kick net with 595 micron mesh (#30 size), dip net with 595 micron mesh
Oklahoma OWRB	1 m^2 kick net with 500 micron mesh, modified dip net with 500 micron mesh

INDEX PERIOD

Method	Index period
IOWA DNR	Most are Jul 15 - Oct 15, headwaters project includes spring as well (May 15-Jun 30)
Kansas KDHE Probabilistic	Apr 15-Sep 30
Kansas KDHE Targeted	May to leaf fall (October)
Missouri DNR and MDC	Mar-15-Apr 15 (approx) and Sep 15-Oct 15 (approx)
Nebraska DEQ - modified NRSA	Jun 15-Sept 30
Oklahoma OCC	Summer Index Period - June 1 to September 15; Winter Index Period - January 1 to March 15
Oklahoma OWRB	June 1 to September 15

TARGET NUMBER OF ORGANISMS

Method	Target # organisms
IOWA DNR	Target size for each SH sample is 100 individuals. QUAL sample doesn't have target size, but most are 200-300 individuals. So total is typically 100+100+100+300 = 600
Kansas KDHE Probabilistic	At least 200; extend sampling past 60 min to achieve if necessary
Kansas KDHE Targeted	All that can be captured within one-person hour of effort, given the constraints listed above
Missouri DNR and MDC	Riffle subsampled to 600 (±10%); others subsampled to 300 (±10%). Thus, total is 900-1200 plus Large/Rare.
Nebraska DEQ - modified NRSA	500
Oklahoma OCC	100 (non-blackfly)
Oklahoma OWRB	300 since 2007; prior to that, 100

TAXONOMIC RESOLUTION

Method	Taxonomic resolution
IOWA DNR	Mostly lowest practicable. Chiros family-level (wadeable streams)
Kansas KDHE Probabilistic	Lowest practicable, usually genus/species
Kansas KDHE Targeted	Lowest practicable, usually genus/species
Missouri DNR and MDC	Lowest practicable, usually genus/species
Nebraska DEQ - modified NRSA	Lowest practicable
Oklahoma OCC	Genus level, when possible
Oklahoma OWRB	Genus level since 2009. Previously genus for all except family or tribe for midges