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The U.S. Environmental Protection Agency and The Council of State Governments

EMAP
Great River Ecosystems



U.S. EPA Office of Research and Development

Environmental Monitoring and Assessment Program

KANSAS LARGE RIVER BIOASSESSMENT APPROACH

January 2006

**Kansas Department of Health and Environment
Bureau of Environmental Field Services
Topeka, Kansas**

**GREAT PLAINS
ECOREGION
OF
NORTH
AMERICA**

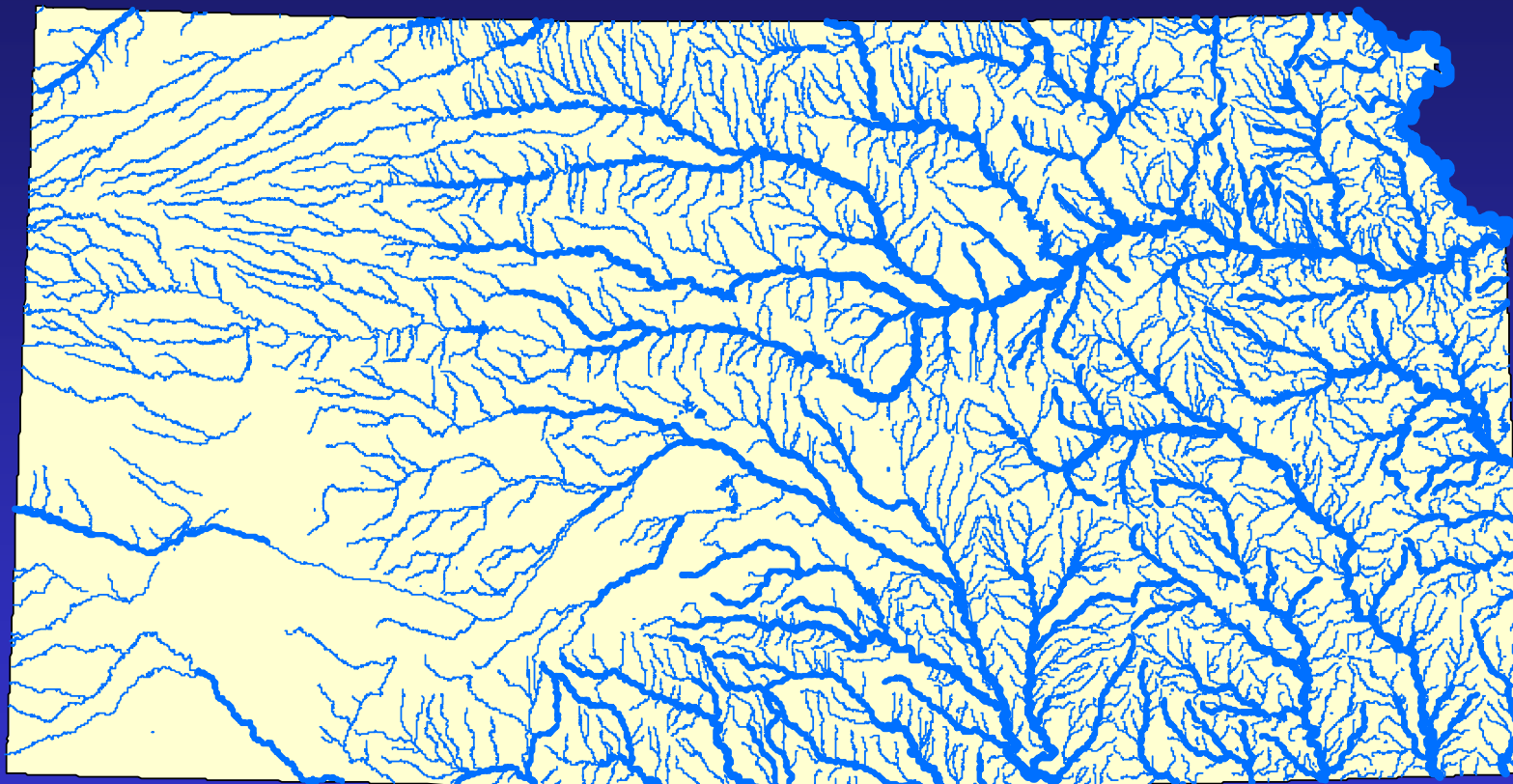






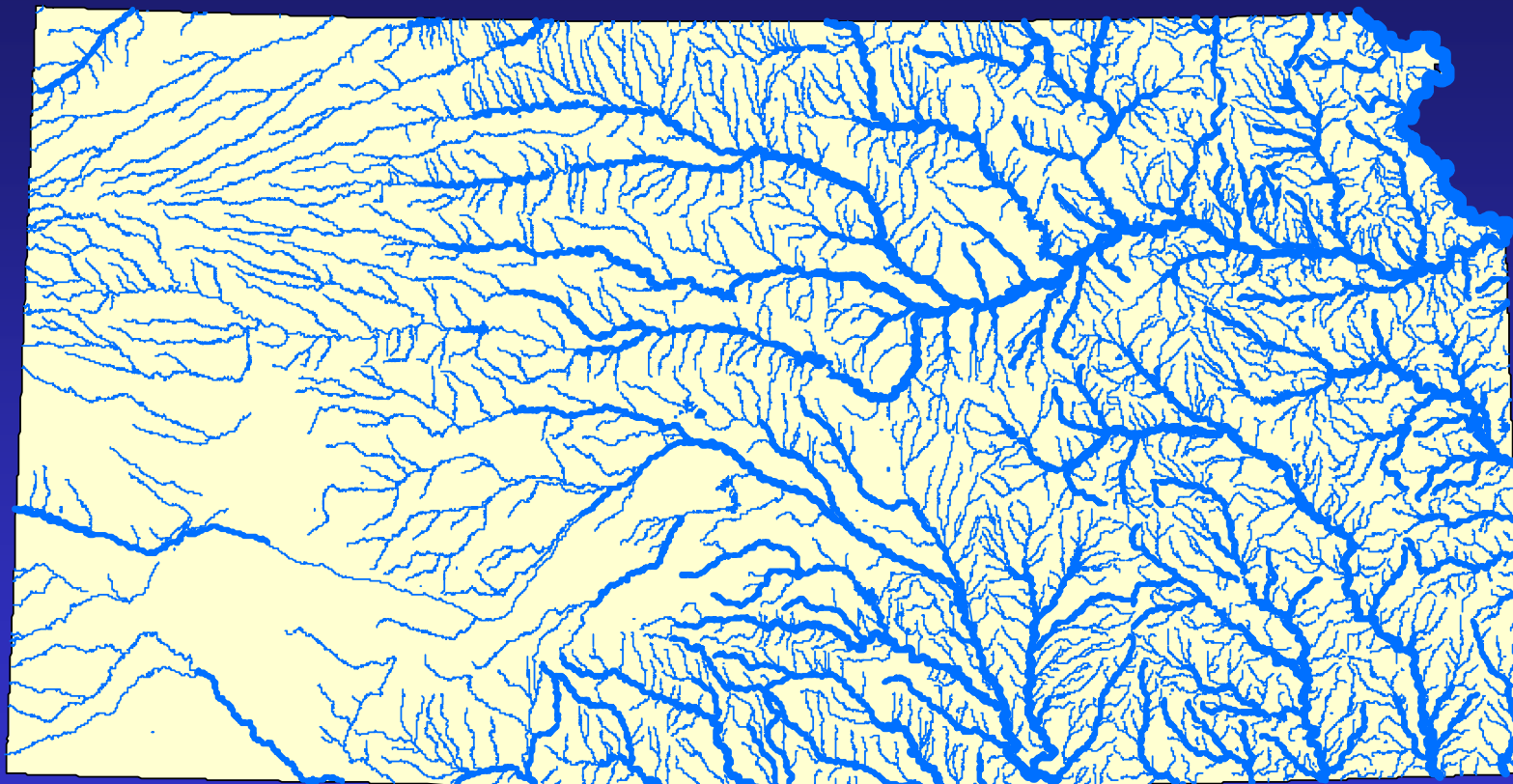


STREAMS INCLUDED IN KANSAS SURFACE WATER REGISTER (AND CORRESPONDING TEN-YEAR MEDIAN FLOW CLASSES)



(Source: USGS, 2004)

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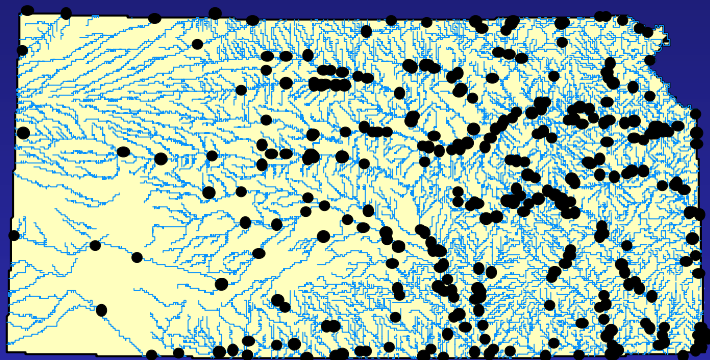
(Source: USGS, 2004)

OVERARCHING MONITORING STRATEGY

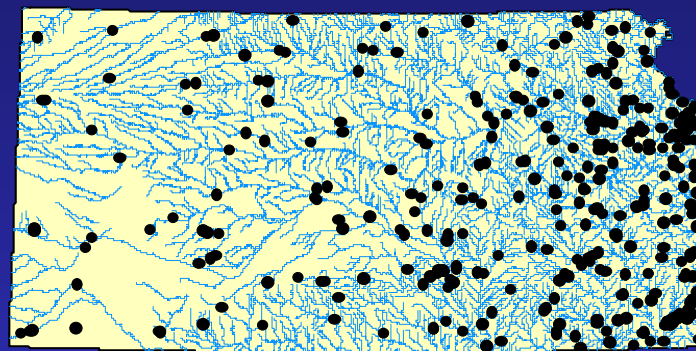
- **Written five-year (2006-2010) strategy approved by EPA in September 2005.**
- **Directs resources primarily towards statewide stream, lake, wetland, and fish tissue monitoring programs (Kansas groundwater program suspended in 2002).**
- **Emphasizes targeted monitoring designs for 303(d) list and TMDL development purposes.**
- **Emphasizes probabilistic monitoring designs for 305(b) assessment and 303(d) screening purposes.**
- **Reserves capacity for special water quality studies (e.g., NPDES permits, bioindicator development, water quality criteria, emergency responses, NRDAs).**

TARGETED WATER QUALITY SURVEILLANCE NETWORKS IN KANSAS

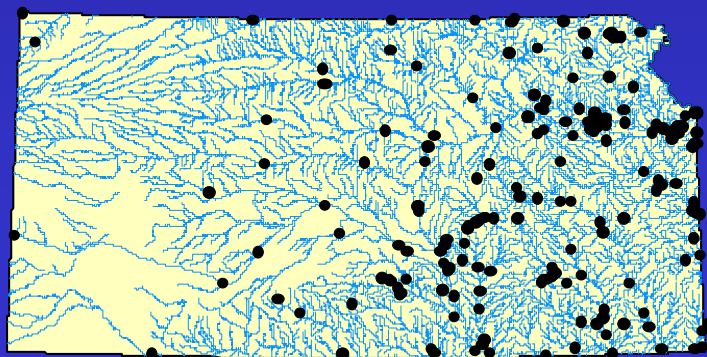
Stream Chemistry Program



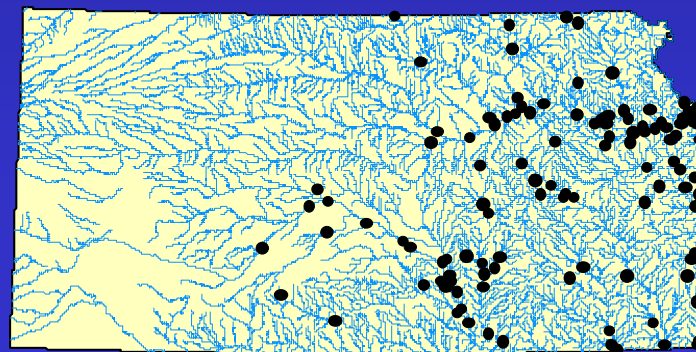
Lake and Wetland Program



Stream Biological Program



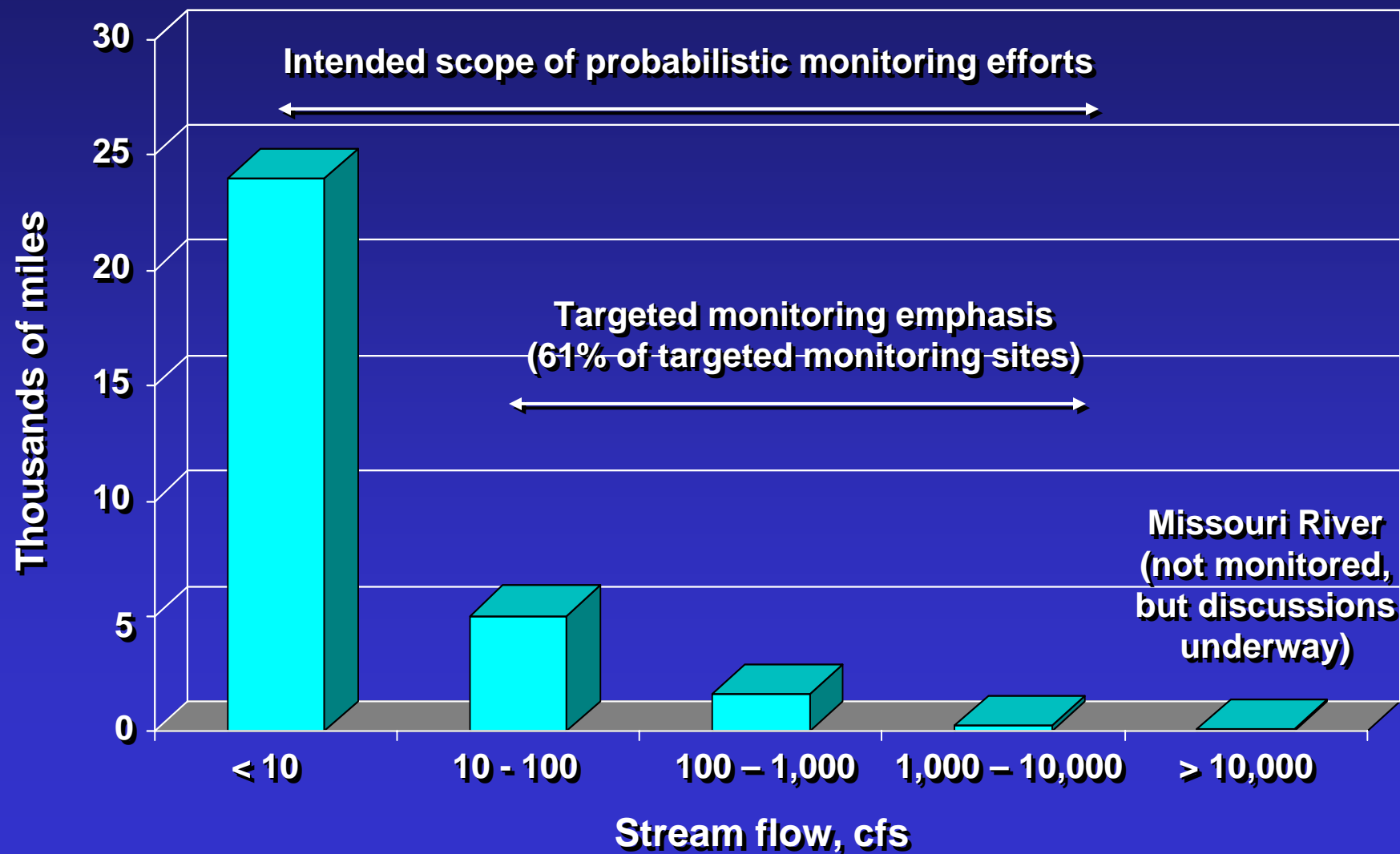
Fish Contaminant Program

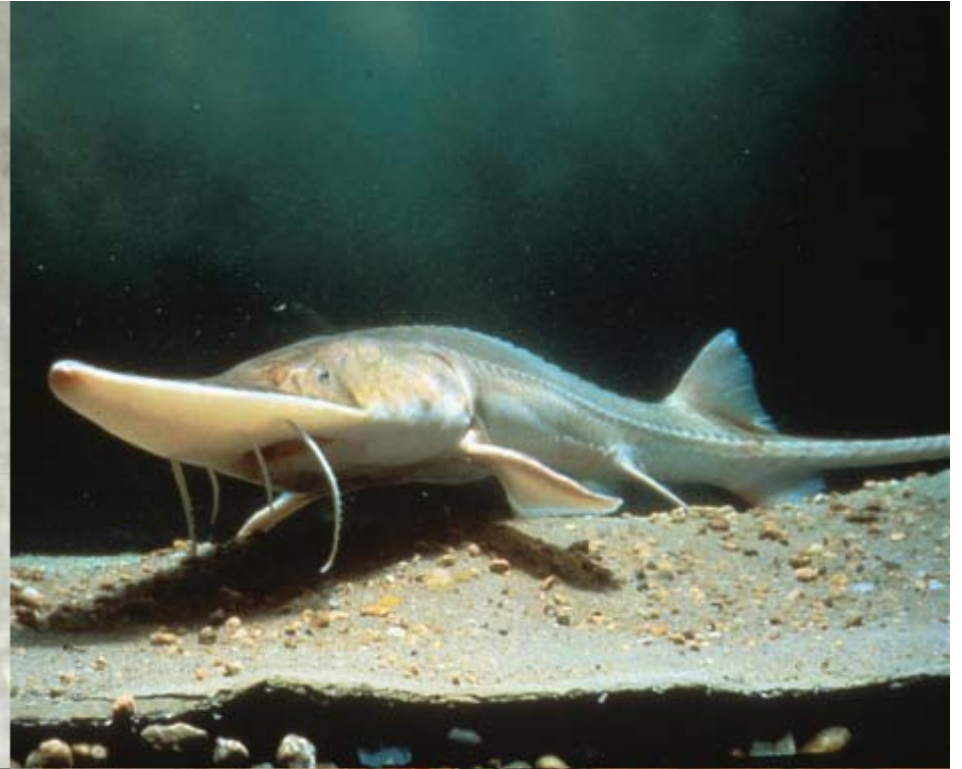


SCOPE OF PROBABILISTIC STREAM MONITORING EFFORTS IN KANSAS

- **Experience gained through State participation in EPA Region VII EMAP initiative (KDWP), National Wadeable Streams Assessment (KDHE), and workshops hosted by Central Plains Center for Bioassessment.**
- **Routine probabilistic stream monitoring program launched by KDHE this year (field operations scheduled for July, August, and September).**
- **Approximately 50 randomly selected sites scheduled for visitation this year (200 sites every four years).**
- **Emphasis on benthic macroinvertebrate (including unionid mussel) assemblages, water chemistry, instream habitat, and landscape variables.**
- **Currently working with EPA-Corvallis to resolve remaining sampling frame and design issues.**

CLASSIFIED STREAM MILEAGE PARTITIONED BY TEN-YEAR MEDIAN STREAM FLOW

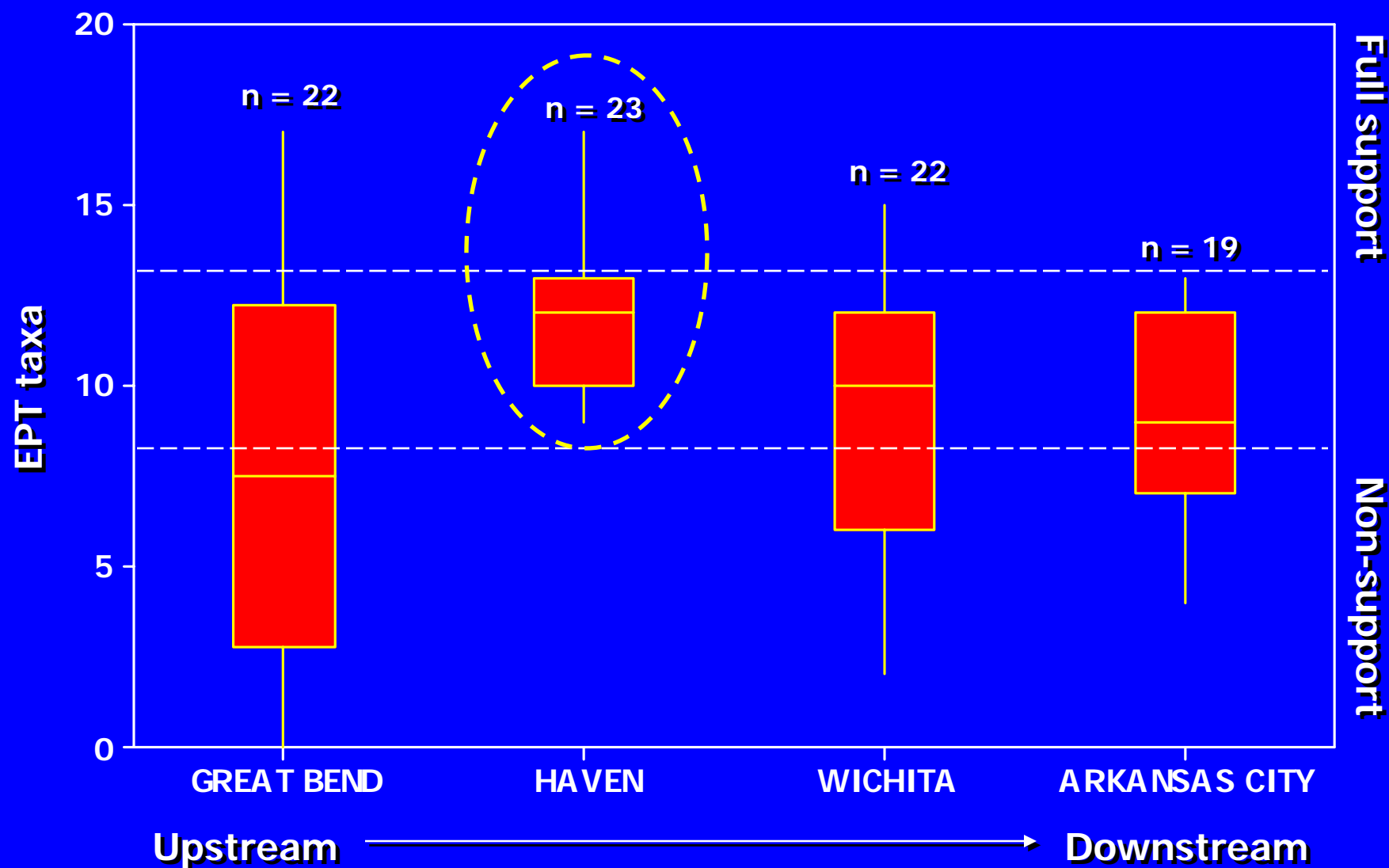




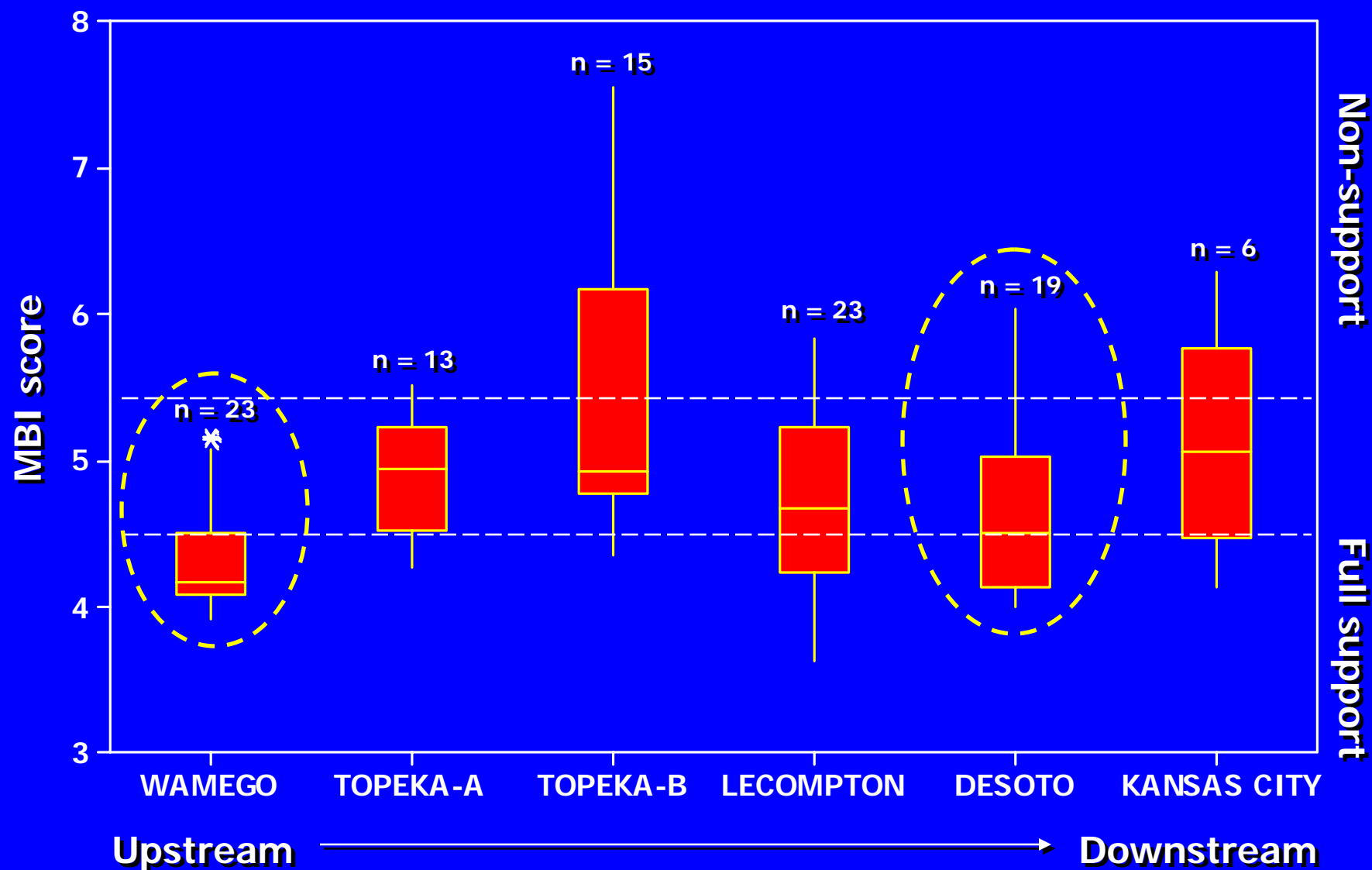
DIAGNOSTIC THRESHOLDS AND RECENT PRECISION ESTIMATES FOR BIOLOGICAL METRICS UTILIZED IN 305(b) REPORTS

ALU Support Category	MBI	KBI	EPT	EPT%	Mussel taxa loss
Full support:	≤ 4.50	≤ 2.6	≥ 13	$\geq 48\%$	$\leq 10\%$
Partial support:	4.51–5.39	2.61-2.99	12-8	47-31%	11-25%
Non-support:	≥ 5.40	≥ 3.0	≤ 7	$\leq 30\%$	$\geq 26\%$
Precision, CY 2004 (based on five sets of duplicate samples)					
mean difference:	4.3%	2.0%	6.7%	11.2%	NA
standard deviation:	2.2%	1.8%	5.9%	12.0%	NA

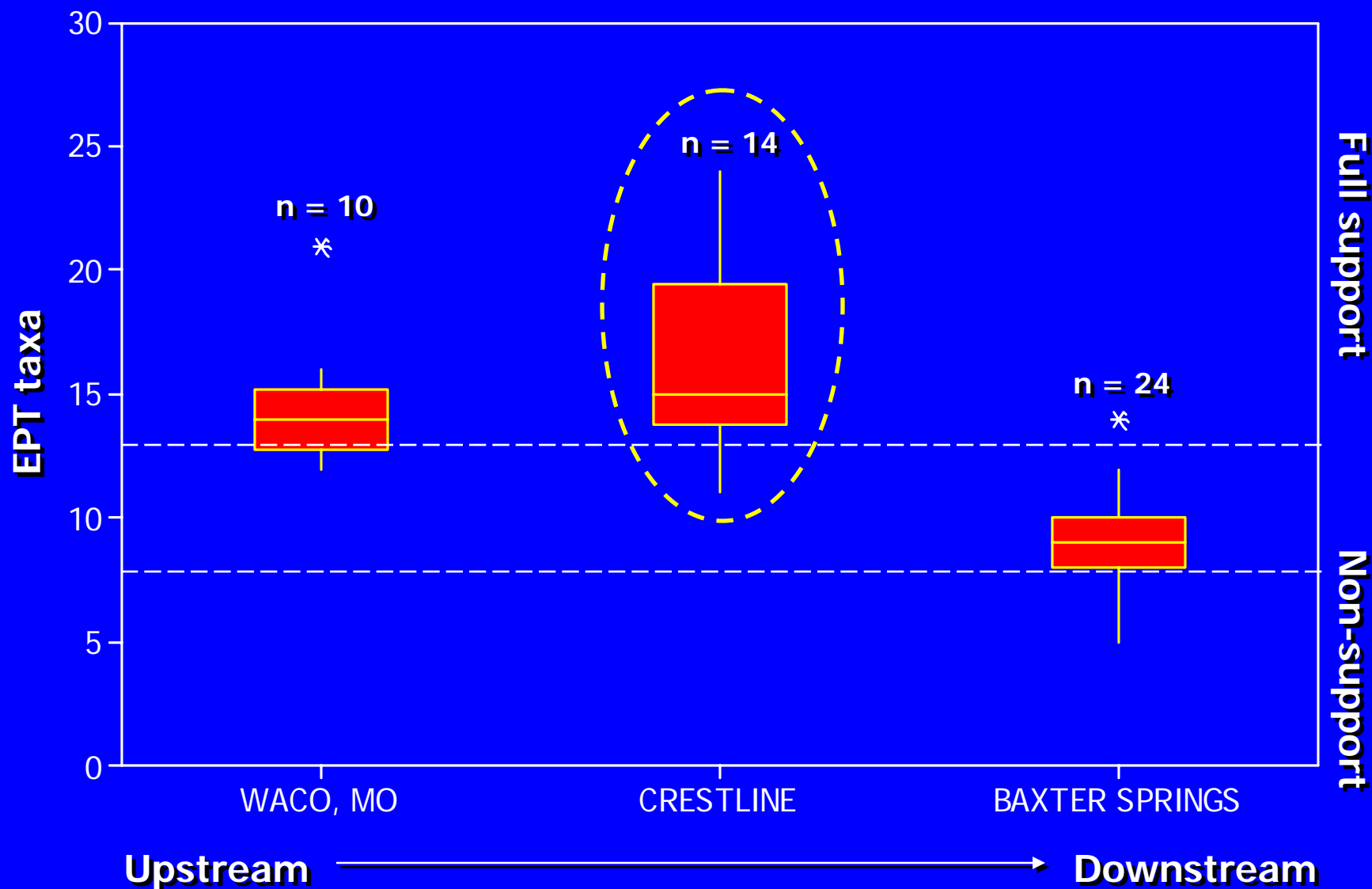
LONGITUDINAL PATTERNS IN EPT TAXA RICHNESS, ARKANSAS RIVER, KANSAS



LONGITUDINAL PATTERNS IN MACROINVERTEBRATE BIOTIC INDEX, KANSAS RIVER



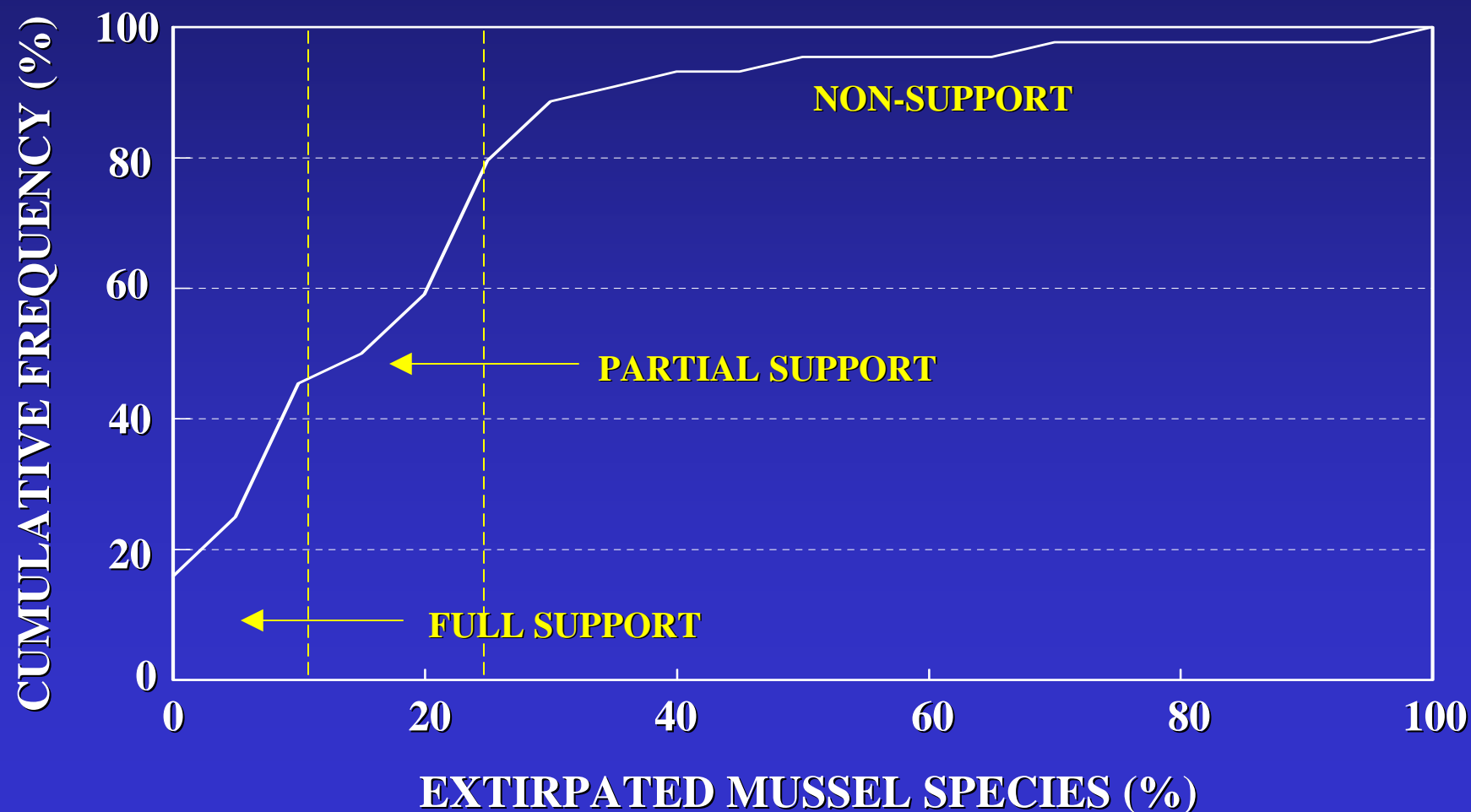
LONGITUDINAL PATTERNS IN EPT TAXA RICHNESS, SPRING RIVER (KANSAS AND MISSOURI)





DECLINE IN NATIVE MUSSEL ASSEMBLAGES

**CUMULATIVE FREQUENCY DISTRIBUTION FOR SITES
WITH MINIMUM THREE-YEAR PERIOD-OF-RECORD
AND FIVE OR MORE SPECIES HISTORICALLY**



BIOLOGICAL INTEGRITY CATEGORIES (CONCEPTUAL FRAMEWORK)

Class A: Historical reference condition

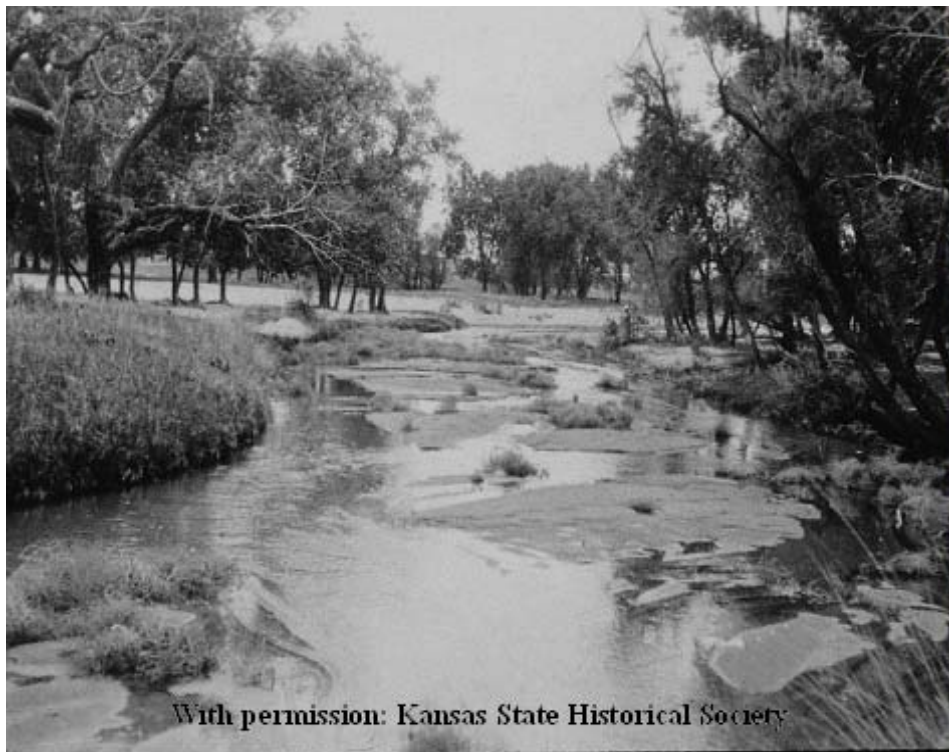
Class B: Minimally disturbed reference condition

Class C: Fully supportive of designated aquatic life use

Class D: Partially supportive of designated aquatic life use

Class E: Non-supportive of designated aquatic life use

Class F: Grossly non-supportive of designated aquatic life use



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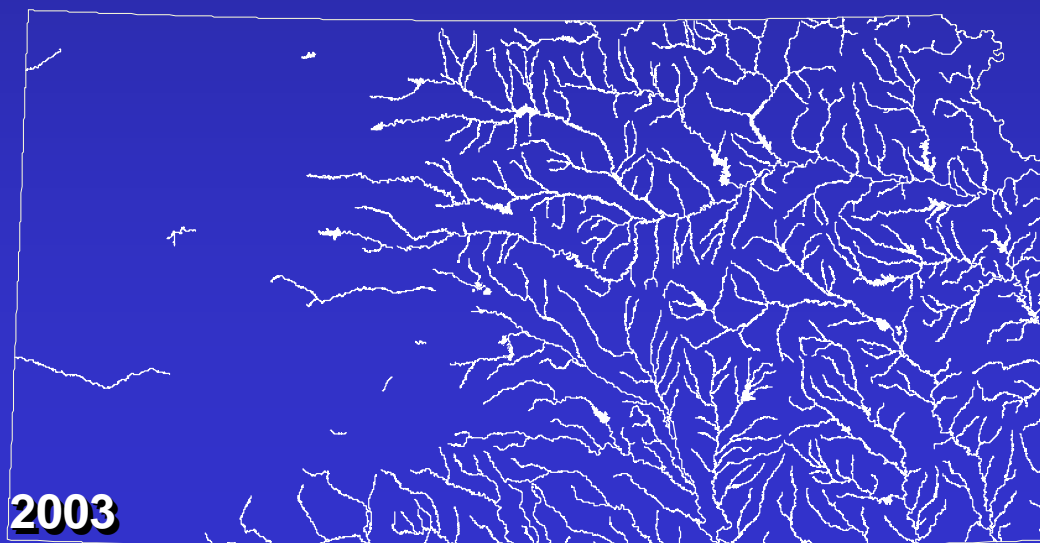
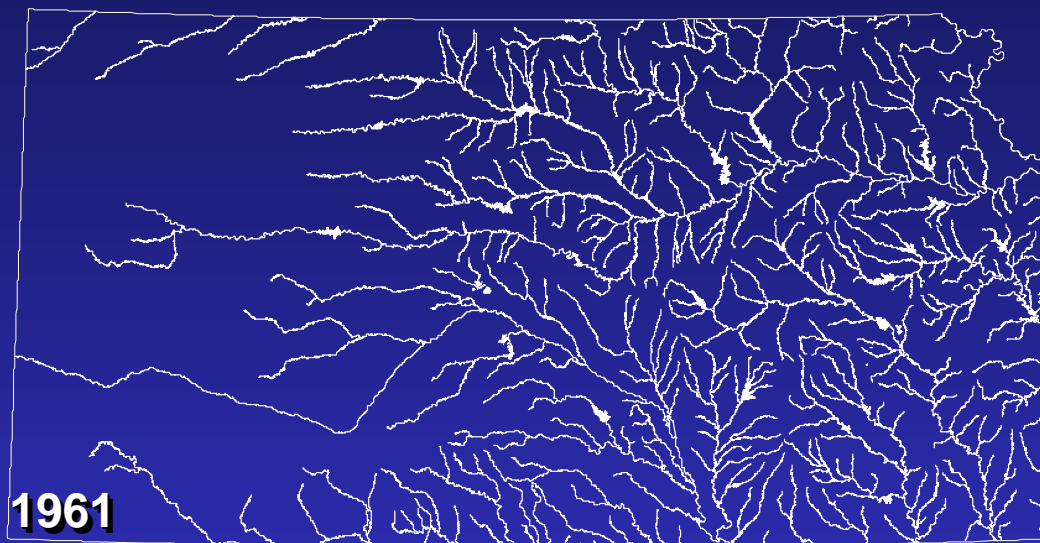


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MAJOR PERENNIAL STREAMS IN KANSAS

1961 VERSUS 2003



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