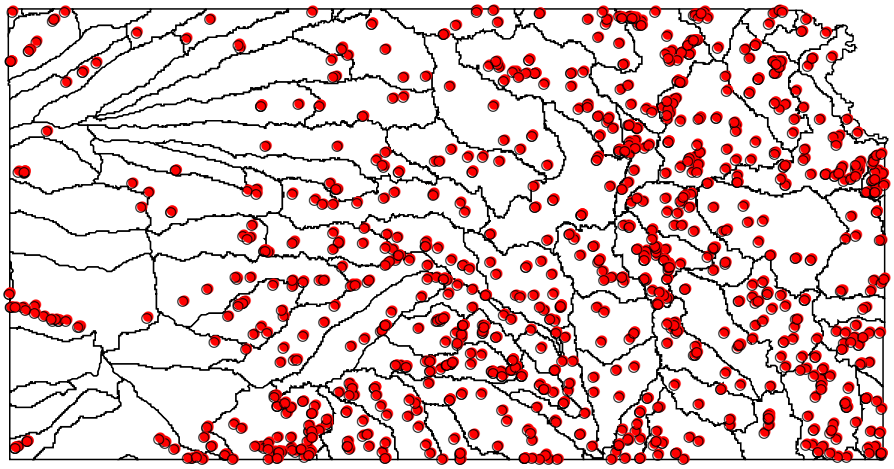
Kansas Department of Wildlife & Parks
Stream Monitoring and Assessment Program
SUB-WATERSHED REPORT

February 2006



Prepared for:

Kansas Alliance for Wetlands and Streams
P.O. Box 236
McPherson, Kansas 67460-0236

Prepared by:

Kansas Department of Wildlife & Parks
Environmental Services Section
Stream Monitoring and Assessment Program
512 SE 25th Ave.
Pratt, KS 67124

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BACKGROUND

The data for this project was compiled from 1,117 Kansas Department of Wildlife and Parks (KDWP) stream assessment surveys from 1994 thru 2004.

The data was primarily evaluated using an Index for Biological Integrity (IBI). This method uses twelve metrics that combine many different biological factors from sampling fish. Expectation criteria are developed for each of these metrics and are assigned a score of zero thru ten. After the data is compiled and summarized, a final score is calculated, thus the IBI score. The higher the IBI score, the greater the stability exhibited by the fish community.

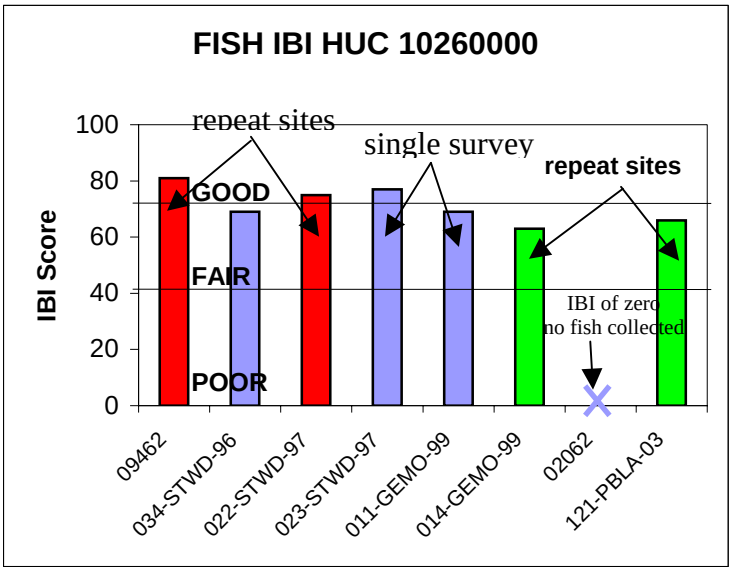
These metrics were based on weighted metrics from an IBI designed from an EPA Region 7 study.

- Total number of native fish species.
- Number of native family richness.
- Total number of individuals collected.
- Number of sensitive species.
- Proportion of tolerant individuals.
- Number of native benthic species
- Number of native water column species.
- Number of long-lived species
- Proportion of individuals of introduced species
- Proportion of individuals as carnivores.
- Proportion of individuals as insectivores and invertevores
- Proportion of individuals as omnivores and herbivores

What the IBI score represents regarding stability of the fish community:

- >=70 good
- 40-69.9 fair
- <40 poor

The colored IBI graph for each HUC represents the IBI score for each survey. The medium blue color bars represent one survey. Matching colored bars represent a repeat survey of same site location.



The abbreviation SINC, means Species In Need of Conservation by the Kansas Department of Wildlife and Parks.

The data was also evaluated through invertebrate samplings.

Macroinvertebrate Biotic Index (MBI):

- calculated using the following formula:

  MBI = (n * t)/N

  n = number of organisms within taxa
  t = tolerance rating of taxa

N= sum of number of individuals of rated taxa

Not all organisms collected in sample are used in MBI calculation. For example, few beetles and no hemipterans are used.

Taxa	*tolerance value*
Unionidae	1.5
Plecoptera	1.5
Other Ephemeroptera	3
Oligoneuriidae	3
Calopterygidae	3.5
Trichoptera (non-Hydropsychidae)	3.5
Heptageniidae	3.5
Megaloptera	3.5
Elmidae or Dryopidae	3.5
Amphipoda	4
Tipulidae	4
Baetidae	4
Turbellaria	4
Anisoptera	4.5
Hydropsychidae	4.5
Caenidae	4.5
Leptohyphidae	4.5
Potamanthidae or Ephemeridae	5
Pisidiidae	5
Cambaridae	5
Asellidae	5.5
Coenagrionidae	5.5
Simuliidae	6
Chironomidae (non-Chironomus)	6
Other Gastropoda	6
Planorbidae	6.5
Lymnaeidae	7
Physidae	9
Hirudinea	9
Other Diptera	10
Oligochaeta	10
Chironomus or red Chironomidae	11

The rating scale used to interpret MBI data is still under review and may be refined in the near future.

MBI Range

≤ *4.5*: No impact from Nutrient and Oxygen demanding pollutants.

4.51 – 5.39: Moderate Impact

≥ *5.4*: High Impact

This score will decrease in value as the health of a stream increases. This is converse to IBI values.

Insect richness:

- Number of individual species that are present at each site.
- Unknown species were not counted.

EPT:

- Proportion of individual Ephemeroptera, Plecoptera, and Trichoptera species out of the total number of individual species present.

Generally speaking, species richness is lower as you go west across the state. Changes in habitat availability (substrate, woody debris) and permanence of water affect species distributions. Many of the state's freshwater mussels, fishes and aquatic insects do not range into western Kansas.

IBI scores, richness values, and EPT scores are generally lower for the western streams because of the extreme conditions of the high plains. Because of this, streams should only be compared to other streams in the same area (or HUC, river basin). For instance, maximum IBI scores will not be

the same for Cimarron River basin sites as for Neosho River basin sites. When interpreting EPT or insect richness values, compare numbers within the HUC. Higher values are generally indicative of higher quality stream sites.

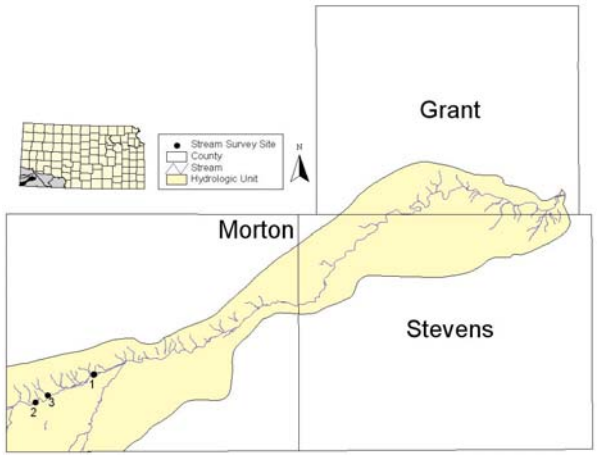
Biological data are highly variable and all watersheds with poor quality sites should be examined (ground-truth) for potential impacts to the aquatic community. It is possible that the timing or condition of the sample, not poor watershed land-use, may have affected the site rating.

Raw water quality data are also included with every report. These data are not lab certified results and should be interpreted with caution.

Fish and mussels sampled within each HUC are listed within each report.

Cimarron River Basin
HUC 11040002

LOCATION



- This HUC consists of 3 sites (7 samples).
- Sites were surveyed between 1999-2004.

BIOLOGICAL HIGHLIGHTS

- 3 of the 5 sites with available data fall within the category of "no impact from nutrient & oxygen demanding nutrients." See Figure 1. Two sites fall within the high impact category.
- The overall MBI value for this HUC is 6.31 indicating it has been highly impacted by nutrient and oxygen demanding pollutants.
- 10 species of fish were found within this HUC.
- No species of mussels were collected.

Image 1. Cimarron River, Cimarron National Grasslands, Morton Co,

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Cimarron	MT	99	10	0.010	6.37	6
1			00	13	0.517	6.87	7
1			04				6
2	Cimarron	MT	02	4	*	4.09	3
2			03	3	*	4	9
2			04				7
3	Cimarron	MT	03	3	*	4.11	6

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered to be in fair health based on the information available at this time.

- All of these surveys were conducted on the Cimarron National Grasslands.
- Maintain special and attention and protection of aquatic areas left on the river.
- A balance between non-native predator fish and native fish needs to be of concern in isolated pools of the Cimarron River.
- Additional surveys should be conducted when the opportunity arises.
    - gain greater accuracy with index values
- A water quality table is presented on the next page.

Cimarron River Basin

HUC 11040002

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	20	1944	10	962	37	3	447	118	0.01	1.1	0.1
1	17	1488	11	727	2	7.4	346	117	0.02	0.9	0.01
1	24	2240	9	1132	6	7.8	430	93	0.01	1.4	0.05
2	23	7990	28	4200	4.7	8.4	293	700	0.01	0.3	0.09
2	21	8080	56	4880	2.3	7.3	302	700	0.07	2.2	0.03
2	18	6870	45	3650	3.4	7.3	239	500	0.03	1.3	0.06
3	20	598	100	321	3	7.4	243	15	0.09	3.8	0.01

TDS = total dissolved solids

Fish Species Collected

black bullhead
bluegill
common carp
fathead minnow
green sunfish
largemouth bass
plains killifish
red shiner
sand shiner
yellow bullhead

Mussel Species Collected

No mussels were collected in this HUC

Cimarron River Basin
HUC 11040002

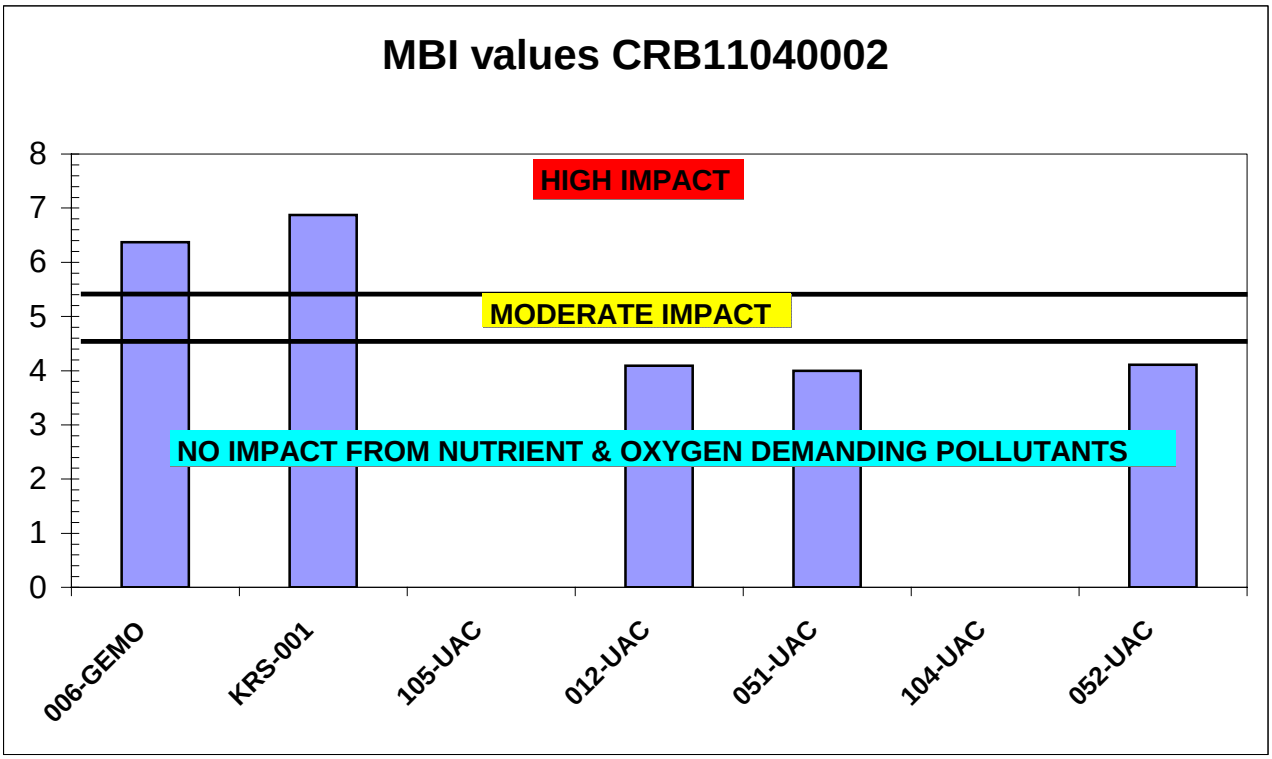


figure 1. graph of MBI values for HUC 11040002

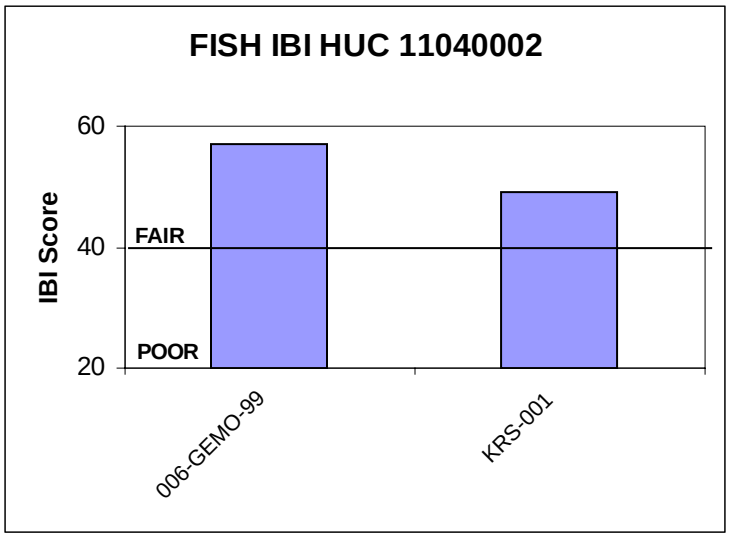
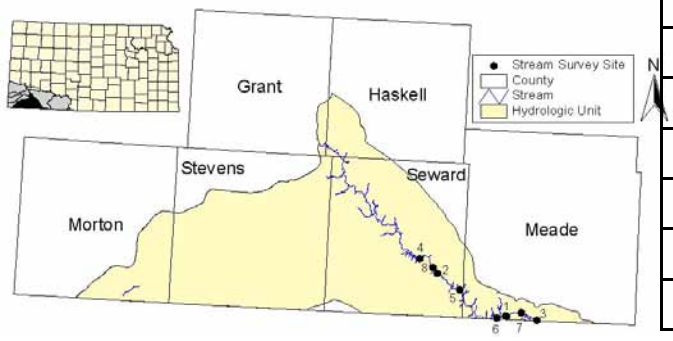


Figure 2. graph of IBI values for HUC 11040002

Cimarron River Basin
HUC 11040006

LOCATION



- This HUC consists of 8 sites (9 samples).
- Sites were surveyed between 1999-2004.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Cimarron	ME	94	11	*	4.34	10
			99	13	*	4.44	9
2	Cimarron	SW	03				8
3	Cimarron	ME	03				14
4	Cimarron	SW	04				6
5	Cimarron	SW	04				11
6	Cimarron	ME	04				15
7	Cimarron	ME	04				14
8	Cimarron	SW	02	11		4.98	4

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

BIOLOGICAL HIGHLIGHTS

- Two samples were not impacted from nutrient and oxygen demanding pollutants, 1994 and 1999 samples in ME county. 1 site was moderately impacted. See figure 1.
- The overall MBI value for this HUC is 4.71 indicating the HUC is moderately impacted by nutrient and oxygen demanding pollutants.
- 17 species of fish were collected within this HUC.
    - Threatened – Arkansas darter
    - SINC – plains minnow
    - New record – Red river pupfish
- No mussel species were collected

Image 1. Cimarron River, Seward Co.

SUMMARY

This HUC could be considered to be in fair health based on the information available at this time.

- Continued efforts to protect the habitat of the threatened Arkansas darter should be utilized.
- Additional surveys should be conducted when the opportunity arises.
    - gain greater accuracy with index values
    - determine extent of distribution of Red river pupfish
- A water quality table is presented on the next page.
- This HUC is the first HUC on the Cimarron River where perennial flow can be monitored. Present day headwaters for the Cimarron River.

Image 2. Cimarron River Meade Co.

Cimarron River Basin
HUC 11040006

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	17	3720	15	1880	9.7	8.63	NA	NA	NA	NA	NA
1	25	3840	23	2000	7.6	8.9	167	24.5	0.32	1.3	0.32
2	23	1346	42	733	3.2	7.8	235	141	0.09	0.2	0.2
3	24	4010	32	2370	6.4	8.1	195	700	0.04	1.6	0.18
4	20	2270	22	1140	6.8	7.8	139	500	0.1	33.6	0.72
5	19	1622	23	808	4.9	7.6	228	342	0.08	3.1	0.29
6	21	3270	30	1670	6.7	7.8	223	500	0.03	1.1	0.31
7	19	3600	33	1840	7	7.9	236	500	0.09	0.1	0.22
8	22	1677	48	825	4.1	8.3	179	276	0.1	9.9	0.9

TDS = total dissolved solids

Fish Species Collected

Arkansas darter	fathead minnow	Red River shiner
black bullhead	green sunfish	red shiner
central stoneroller	largemouth bass	sand shiner
channel catfish	plains killifish	suckermouth minnow
common carp	plains minnow	western mosquitofish
emerald shiner	Red River pupfish	

Mussel Species Collected

No mussels were collected in this HUC

Cimarron River Basin
HUC 11040006

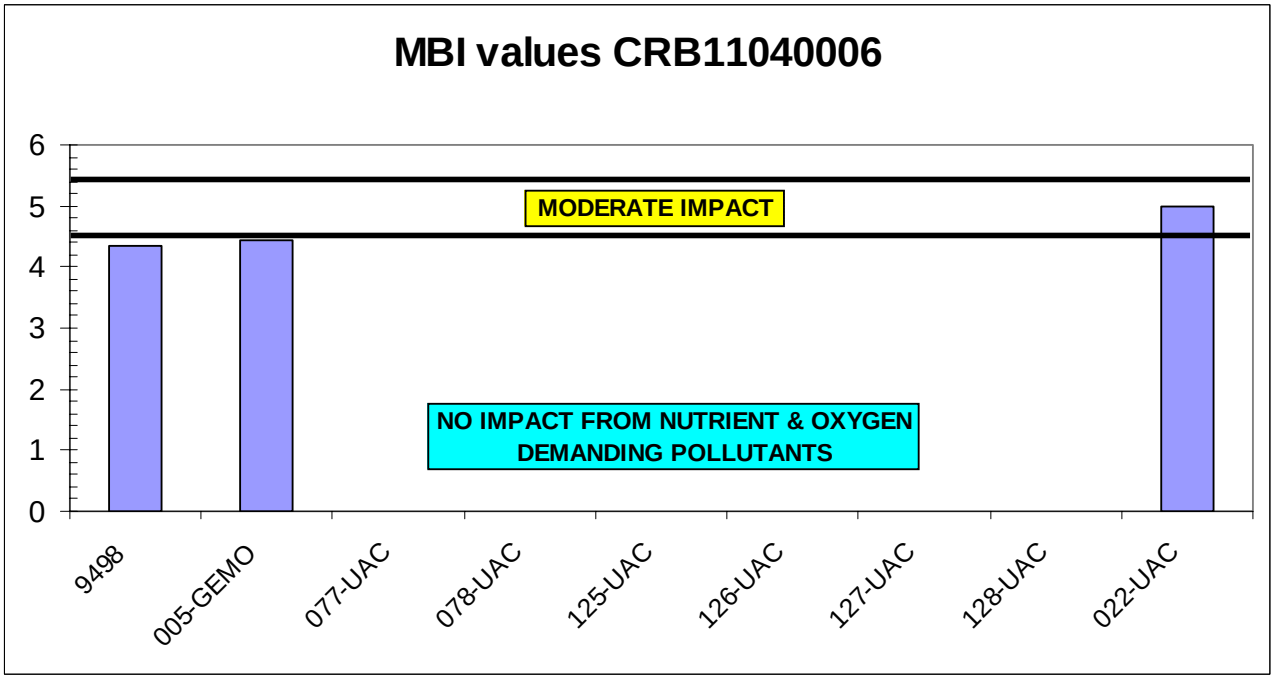


figure 1. graph of MBI values for HUC 11040006

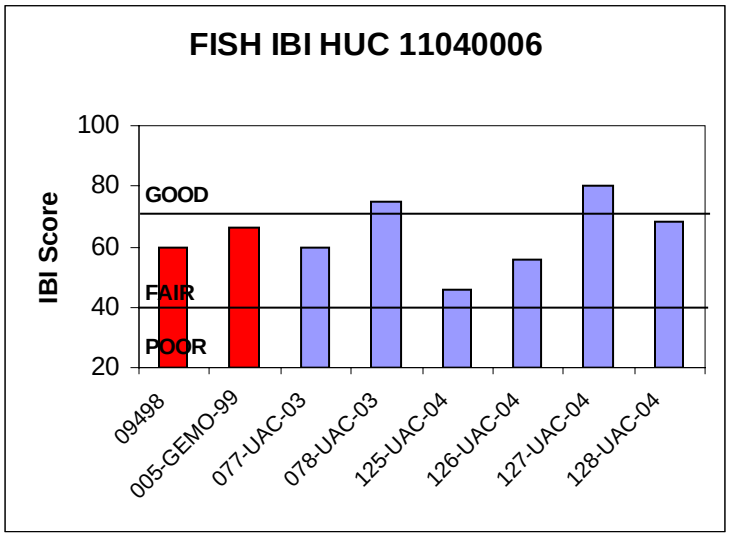
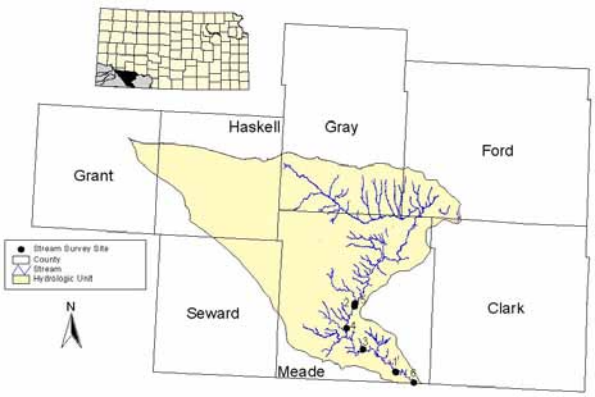


Figure 2. graph of IBI values for HUC 11040006

Cimarron River Basin

HUC 11040007

LOCATION



- This HUC consists of 6 sites (8 samples).
- Sites were surveyed between 1994-2002.

BIOLOGICAL HIGHLIGHTS

- 4 samples were not impacted by nutrient and oxygen demanding pollutants, the other 4 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC is 6.01 indicating that the HUC is highly impacted by nutrient and oxygen demanding pollutants.
- Good IBI scores for this HUC
- 18 species of fish were surveyed within this HUC.
    - Threatened – Arkansas darter
    - SINC – plains minnow
- 1 freshwater mussel species was collected

Image 1. Crooked Creek, Meade Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Crooked	ME	97	7	0.675	4.02	9
1			99	11	0.675	4.45	9
2	Crooked	ME	97	11	0.55	6.36	15
3	Crooked	ME	94	13	0.147	8.99	11
3			00	17	0.496	6.21	11
4	Crooked	ME	04			4	15
5	Crooked	ME	02	4	0.126	4	1
6	Crooked	ME	02	18	0.19	6.86	6

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered to be in fair health based on the information available at this time.

- Continued efforts to protect the habitat of the threatened Arkansas darter should be utilized.
- Lower third of HUC sustains perennial to intermittent flows.
- Additional surveys should be conducted when the opportunity arises.
    - gain greater accuracy with index values

- A water quality table is presented on the next page.

Cimarron River Basin

HUC 11040007

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	25	3820	26	1980	5	8.7	171	881	0.06	0.9	0.07
1	20	2630	81	1330	8.8	7.85	240	507	0.04	4.7	0.18
2	20	892	114	439	6.9	8.16	216	133	0.19	6.1	0.4
3	20	5460	18	3160	6	8.2	178	1740	0.04	0	0.03
3	20	4710	31	2360	7.8	7.49	NA	NA	NA	NA	NA
4	22	5720	16	3010	4.5	8	178	500	0.06	0.3	0.02
5	22	496	12	231	1.5	7.9	208	1	0.1	13	0.19
6	22	3910	6	2000	5.4	7.4	190	700	0	1.2	0.06

TDS = total dissolved solids

Fish Species Collected

Arkansas darter
black bullhead
bluegill
central stoneroller
common carp
fathead minnow
goldfish
green sunfish
largemouth bass
longear sunfish
orangespotted sunfish
plains killifish
plains minnow
red shiner
sand shiner
suckermouth minnow
western mosquitofish
yellow bullhead

Mussel Species Collected

giant floater

Cimarron River Basin
HUC 11040007

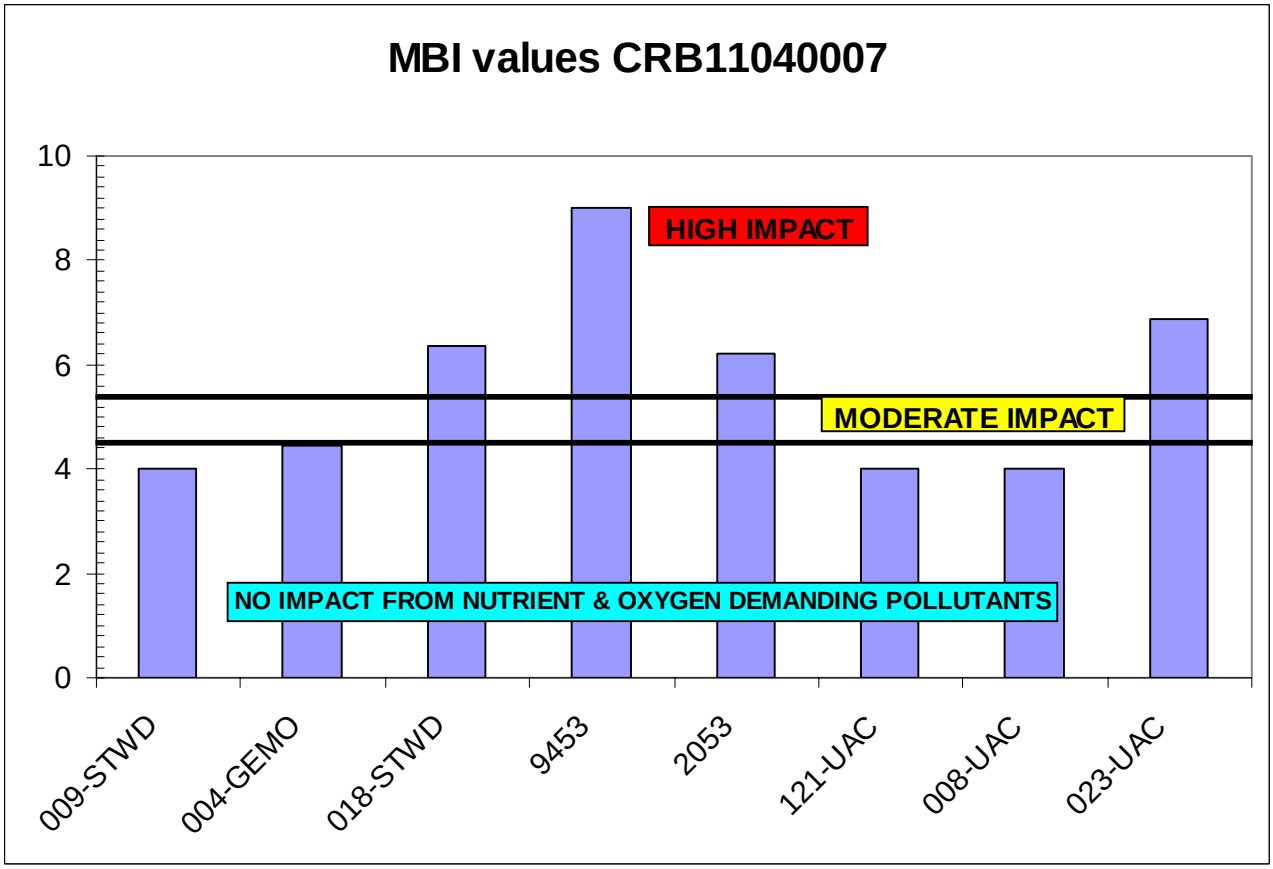


figure 1. Graph of MBI values for HUC 11040007

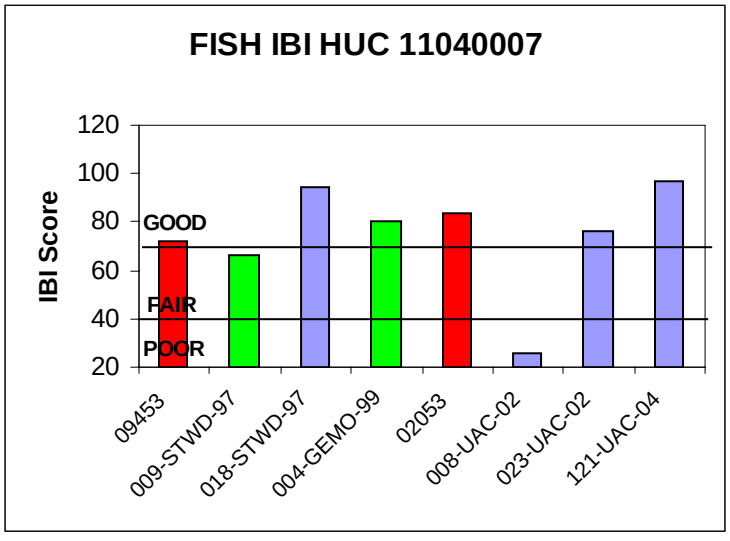
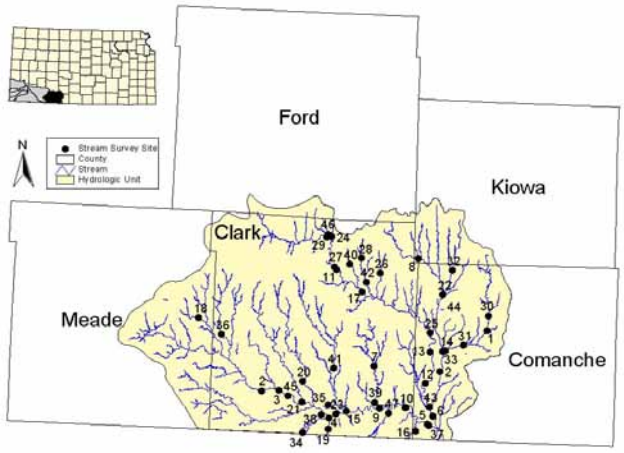


Figure 2. Graph of IBI values for HUC 11040007

Cimarron River Basin
HUC 11040008



- This HUC consists of 47 sites (59 samples).
- Sites were surveyed between 1997-2004.

BIOLOGICAL HIGHLIGHTS

- 21 samples were not impacted by nutrient and oxygen demanding pollutants. 2 were moderately impacted and 8 were highly impacted (figure 1).
- Overall MBI value for this HUC was 5.09 indicating the HUC is moderately impacted.
- IBI values this HUC is considered favorable for the fish community.
- 26 species of fish were surveyed within this HUC. See fish species collected on page 4.
    - Red river pupfish
    - Larger than expected numbers of Arkansas darters
    - creek chub new basin record
- 5 species freshwater mussel species collected.

Image 1. Kiowa Creek, Comanche Co

SUMMARY

This HUC could be considered in fair to good condition based on the information available at this time.

- Continued efforts to protect the habitat of the threatened Arkansas darter should be utilized.
- Most aquatic diversity of all the HUCs in the Cimarron river basin. Also contains the most reaches of streams with intermittent or perennial flow available.
- Additional surveys should be conducted when the opportunity arises
    - Verify presence of Red river pupfish to determine its distribution
    - Isolated population of creek chub needs further examination.
    - This HUC had the most abundant populations of the Arkansas darter.
- A water quality table is presented on page 3.

Image 2. Big Sandy Creek, Clark Co.

Image 3. Cimarron River, Comanche Co

Cimarron River Basin
HUC 11040008

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Cavalry	CM	97	11	0.342	7.1	14
1			02	3	*	4.18	11
2	Cavalry	CM	97	10	*	6.55	11
2			04	6		0	
3	Big Sandy	CA	97	10	*	4.58	13
3			04		*	4.27	10
4	Cimarron	CA	97	4	*	4.35	10
5	Cimarron	CM	97	10	*	4.73	12
6	Bluff	CM	97	10	*	4.28	16
6			03	10	0.55	4.28	15
7	Day	CA	02			4	9
8	W Kiowa	KW	03	11	0.775	4.13	6
8			04				6
9	Cimarron	CA	03	4	*	4.06	15
10	Cimarron	CA	03				14
10			04				16
11	Bluff	CA	02	3	*	4	9
11			03				8
12	Bluff	CM	03				8
13	Bluff	CM	03				10
13			04				14
14	Cavalry	CM	02	20	0.497	5.82	9
14			03				11
15	Cimarron	CA	03				14
16	Willow	CM	03				10
17	Bluff	CA	03	5	*	4.44	7
18	Gyp Trib	ME	03				9
19	Clark	CA	03				12
20	Little Sandy	CA	03				12
21	Big Sandy	CA	03				8
22	Kiowa	CM	03				14
22			04	8	0.727	4.19	11
23	Cimarron	CA	02	19	0.024	6.12	1
23			03				15
23			04	7	0.742	4.11	3
24	Bluff	CA	03				10
25	Bluff	CM	04				6
26	Granger	CA	04				3
27	Bluff	CA	04				3
28	Fish	CA	04				4
29	Bluff	CA	04				10
30	Cavalry	CM	04				5
31	Cavalry	CM	04				9
32	E Kiowa	CM	04	5	*	3.91	10
33	Kiowa	CM	04	8	0.891	4.47	6
34	Cimarron	CA	04	3	*	4.28	1
35	Clark	CA	04	7	*	4.01	13
36	John's	CA	04				6
37	Cimarron	CM	04				5
38	Big Sandy Trib	CA	02	5	*	4.02	5
39	Day	CA	02				3
40	Cat	CA	02	5	0.192	4.09	10
41	Bear	CA	02	5	*	4	6
42	Fish	CA	02	3	*		5
43	Bluff	CM	02	19	0.479	5.69	11
44	Kiowa	CM	02	22	0.439	4.47	13
45	Big Sandy	CA	02	20	0.599	5.67	8
46	Simmons	CA	02	23	0.314	6.42	8
47	Snake	CA	02	15	0	5.91	7

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

Cimarron River Basin
HUC 11040008

Water Quality Table

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	17	309	29	142	3.3	8.25	271	7.5	0.15	0.1	0.02
1	22	387	13	183	5.2	8.2	185	7	0.07	1.3	0.22
2	19	510	128	243	4.6	8.45	88	12.2	0.03	6.9	0.02
2	21	1425	4	702	4.5	8	251	72	0.08	1.4	0.01
3	22	1990	11	698	5.7	7.85	235	489	0.06	0.4	0.03
3	23	1078	4	522	2.4	7.4	189	186	0	1.2	0.02
4	22	3840	44	1970	6.6	8.27	251	1155	0.01	1.7	0.04
5	23	3050	40	1970	7.7	8.28	232	838	0.01	1.2	0.02
6	22	853	81	482	8	8.18	224	38	0.1	4.6	0.08
6	20	1861	5	1030	4.4	7.7	217	74	0.1	1.3	0.02
7	25	2420	18	1210	0.8	7.3	179	349	0.04	1.5	0.1
8	14	601	6	329	7.2	8.5	248	43	0.05	2	0.02
8	18	490	26	234	7	8.3	221	23	0.06	1.3	0.06
9	19	3810	21	2200	7	8.3	168	700	0.01	0.3	0.06
10	17	3930	23	2260	7	7.7	214	700	0.04	0.2	0.44
10	22	2300	71	1130	6.8	8.3	121	544	0.05	0.6	0.01
11	17	1086	75	528	5.9	8.4	88	80	0.08	0.5	0.01
11	19	1293	17	707	6.2	6.9	173	77	0.12	0.03	0.01
12	21	1344	9	734	6	7.6	271	52	0.05	0.5	0.06
13	19	1288	2	703	6.3	7.7	270	55	0.04	0.6	0.06
13	24	1666	5	821	1.3	8.1	260	260	0	1.1	0.1
14	23	1040	15	501	4.8	8.5	279	12	0.05	0.7	0.13
14	19	583	14	315	7.5	7.7	220	23	0.04	0.8	0.03
15	24	4260	13	2450	7	7.5	241	700	0.01	0.5	0.11
16	22	3450	21	1950	2.7	7.5	214	342	0.01	0.05	0.04
17	22	2080	17	1150	3	7.7	262	78	0.02	0.1	0.01
18	18	783	12	423	5.4	7.5	195	85	0.01	1.4	0.01
19	21	2380	11	1340	3	7.4	189	206	0.02	0.6	0.02
20	28	1142	77	608	5.3	7.8	212	61	0.07	4.2	0.08
21	21	1377	9	754	2.5	7.6	198	246	0.02	0.6	0
22	20	533	24	289	6.1	8.5	210	12	0.08	0.3	0.04
22	19	442	28	211	6.1	8.1	202	59	0.01	0.1	0.02
23	22	2860	16	1440	7.1	7.8	182	700	0.04	1.1	0.05
23	23	3220	16	1820	5.3	8	207	668	0.03	0.4	0.04
23	22	3930	23	2010	6.9	8.1	192	500	0.04	0.1	0.01
24	23	484	65	257	3	7.6	242	18	0.19	2.4	0.01
25	25	1418	7	691	3.9	8.2	221	3	0.02	1.6	0.03
26	16	1108	22	539	5.1	8.3	301	71	0.01	0.3	0.08
27	23	4580	127	2380	1.6	8.4	182	500	0.55	0.8	0.03
28	21	529	8	254	5.8	8.7	211	1	0.03	1.5	0.08

TDS = total dissolved solids

Water Quality Table (cont.)

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
29	21	724	11	349	2.7	7.6	216	74	0.01	0.9	0.04
30	18	318	3	152	5.7	8.1	132	13	0.01	4.8	0.04
31	23	504	7	244	6.3	8.1	212	98	0.01	1.2	0.06
32	20	442	23	212	12.2	8.2	207	41	0.05	0.3	0.06
33	22	639	3	310	6.3	8.3	112	84	0.04	1.3	0.21
34	24	4390	25	2260	7	8.6	112	500	0.04	0.3	0.01
35	24	2320	14	1160	3.8	7.9	179	254	0.05	0.9	0.03
36	23	1405	10	687	3.3	8.2	232	287	0.04	1.4	0.07
37	22	2870	6	1450	6.3	8.5	222	500	0.02	0.8	0.02
38	17	3840	29	1970	4.1	8.1	368	700	0.13	1.4	0.12
39	17	1584	20	762	2.1	7.8	227	135	0.05	1.2	0.06
40	21	2750	8	1380	1.9	7.8	195	110	0	2.1	0.01
41	20	2610	174	1310	3.2	8.4	328	367	0.16	0.2	0.02
42	20	1508	7	743	5.3	8.4	316	30	0.01	2.1	0.07
43	23	2280	4	1140	5.6	8.3	166	17	0.04	1.2	0.18
44	18	491	27	236	6.2	8.5	202	28	0.02	2	0.09
45	23	1449	14	707	3.6	7.2	217	233	0.12	1.3	0.22
46	22	442	18	210	5.7	7.1	198	50	0.04	1.3	0.01
47	23	2010	9	994	2.1	7.6	198	131	0.01	1.5	0.09

TDS = total dissolved solids

Fish Species Collected

Arkansas darter
black bullhead
bluegill
bluegill X green sunfish hybrid
bluegill X redear sunfish hybrid
central stoneroller
channel catfish
common carp
creek chub
emerald shiner
fathead minnow
gizzard shad
goldfish
green sunfish
largemouth bass
longear sunfish
orangespotted sunfish
plains killifish
plains minnow
Red River pupfish
Red River shiner
red shiner
river carpsucker
sand shiner
suckermouth minnow
western mosquitofish
white crappie
yellow bullhead

Mussel Species Collected

giant floater
paper pondshell
pondhorn
Asian clam
fingernail clam

Cimarron River Basin
HUC 11040008

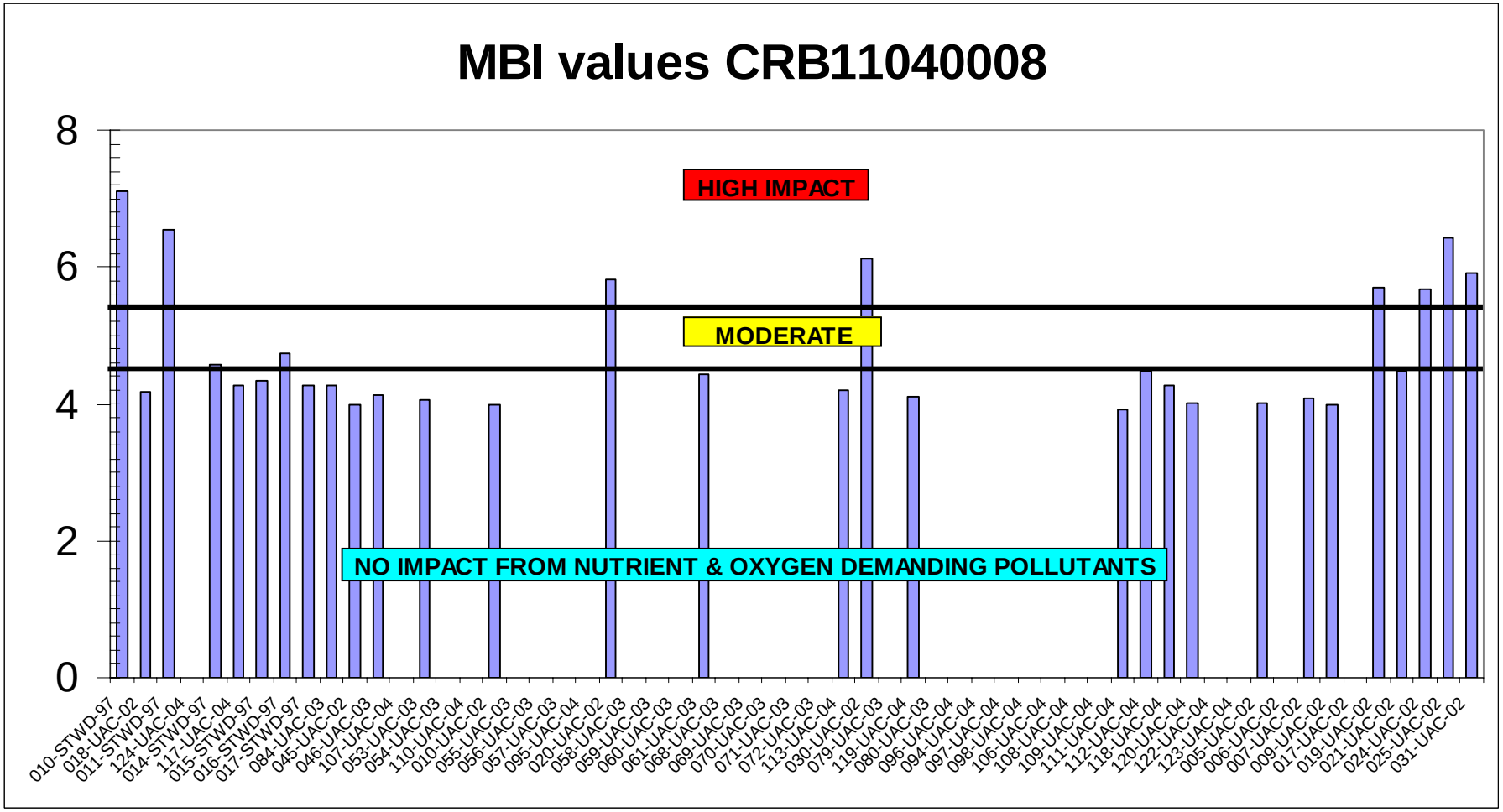


figure 1. Graph of MBI values for HUC 11040008

Cimarron River Basin
HUC 11040008

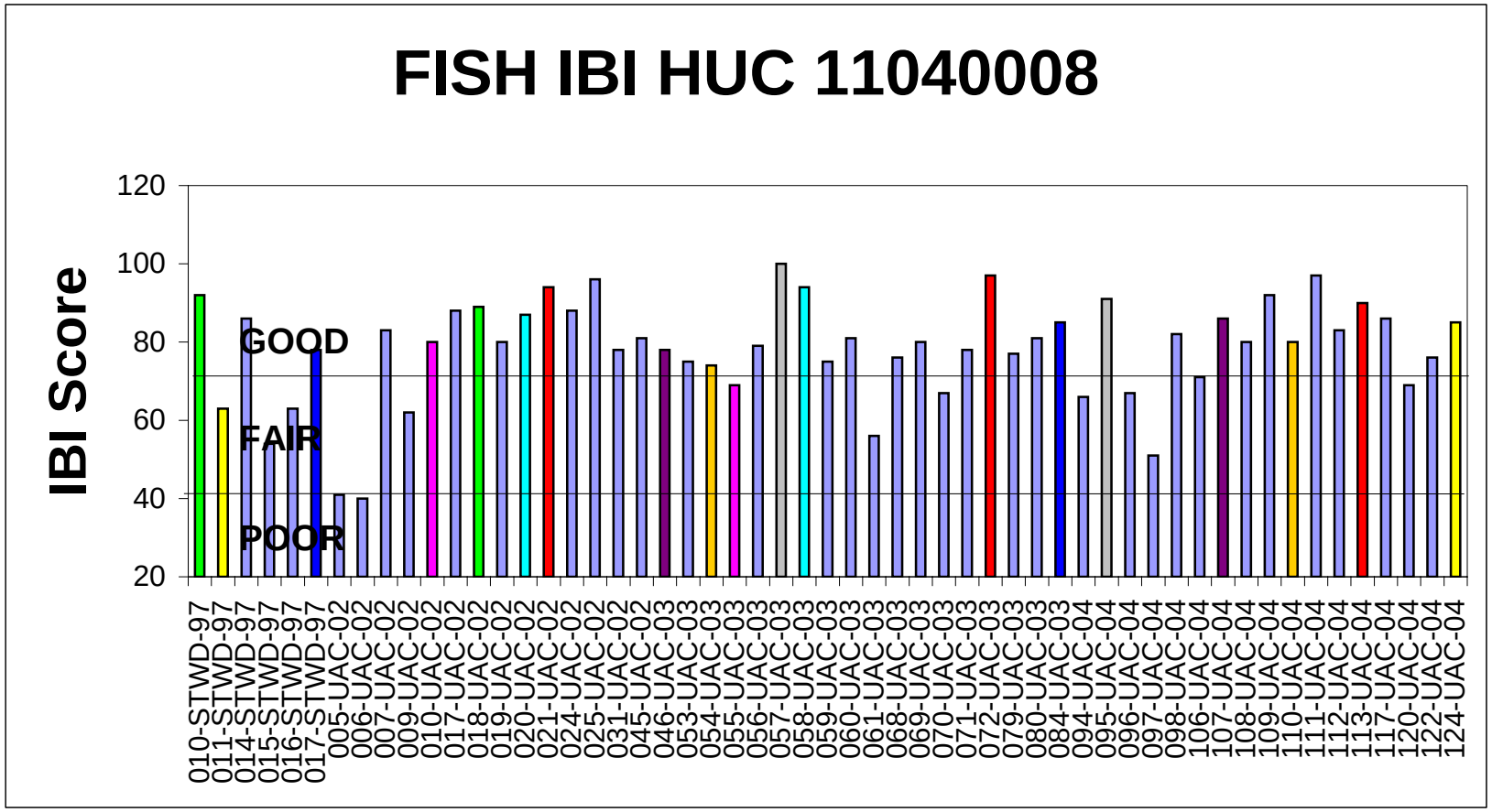
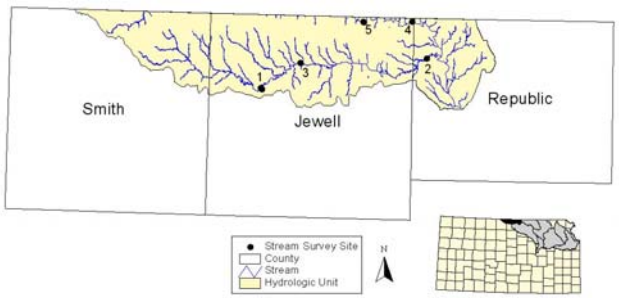


Figure 2. graph of IBI values for HUC 11040008

Kansas-Lower Republican River Basin

HUC 10250016

LOCATION



- This HUC consists of 5 sites (8 samples).
- Sites were surveyed between 1996-2000.

BIOLOGICAL HIGHLIGHTS

- 1 sample was not impacted by nutrient and oxygen demanding pollutants, 2 were moderately impacted, 5 were highly impacted (see figure 1).
- The overall MBI value for this HUC was 6.3 indicating that the HUC is highly impacted by nutrient and oxygend demanding pollutants.
- 26 species of fish were surveyed. See fish species list, page 2.
    - Plains minnow – SINC species
    - Speckled chub – endangered in KS
- 6 species of freshwater mussels surveyed, see page 2.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	White Rock	JW	96	12	0.536	4.91	7
1			97	8	0.54	7.25	12
1			98	8	*	3.77	8
2	White Rock	RP	96	7	*	7.39	10
3	White Rock	JW	99	16	0.382	4.89	10
4	Republican	JW	00	9	0.08	9.02	13
5	Republican	JW	97	8	*	9.72	25
5			98	10	*	7.6	17

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair to good condition based on the information available at this time.

- Protection efforts should be utilized to maintain endangered population of speckled chub and SINC population of plains minnow
- A water quality table is presented on page 2

Kansas-Lower Republican River Basin
HUC 10250016

Water Quality Table

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	17	1121	86	544	5.7	8.17	392	24.5	0.21	0.21	2.8
1	24	1094	62	530	3.8	8.03	250	32	0.09	1.4	0.54
1	23	1257	57	613	5.6	7.72	296	41	0.09	0.6	0.6
2	20	733	186	355	5	7.3	215	24.5	0.18	8.7	0.39
3	23	943	104	456	8	2.2	236	26	0.15	3.9	0.96
4	20	737	37	353	6.4	NA	206	51	0	2.5	0.19
5	18	672	26	323	5.3	8.17	166	30	0.01	0.7	0.39
5	24	795	23	384	4.9	7.96	203	41	0.03	0.1	0.49

TDS = total dissolved solids

Fish Species Collected

bigmouth shiner
bluegill
central stoneroller
channel catfish
common carp
creek chub
emerald shiner
fathead minnow
flathead catfish
freshwater drum
gizzard shad
goldeye
green sunfish
largemouth bass
longnose gar
orangespotted sunfish
plains killifish
plains minnow
red shiner
river carpsucker
sand shiner
speckled chub
suckermouth minnow
white bass
white crappie
white sucker

Mussel Species Collected

fingernail clam
fragile papershell
giant floater
pink papershell
pondhorn
white heelsplitter

Kansas-Lower Republican River Basin
HUC 10250016

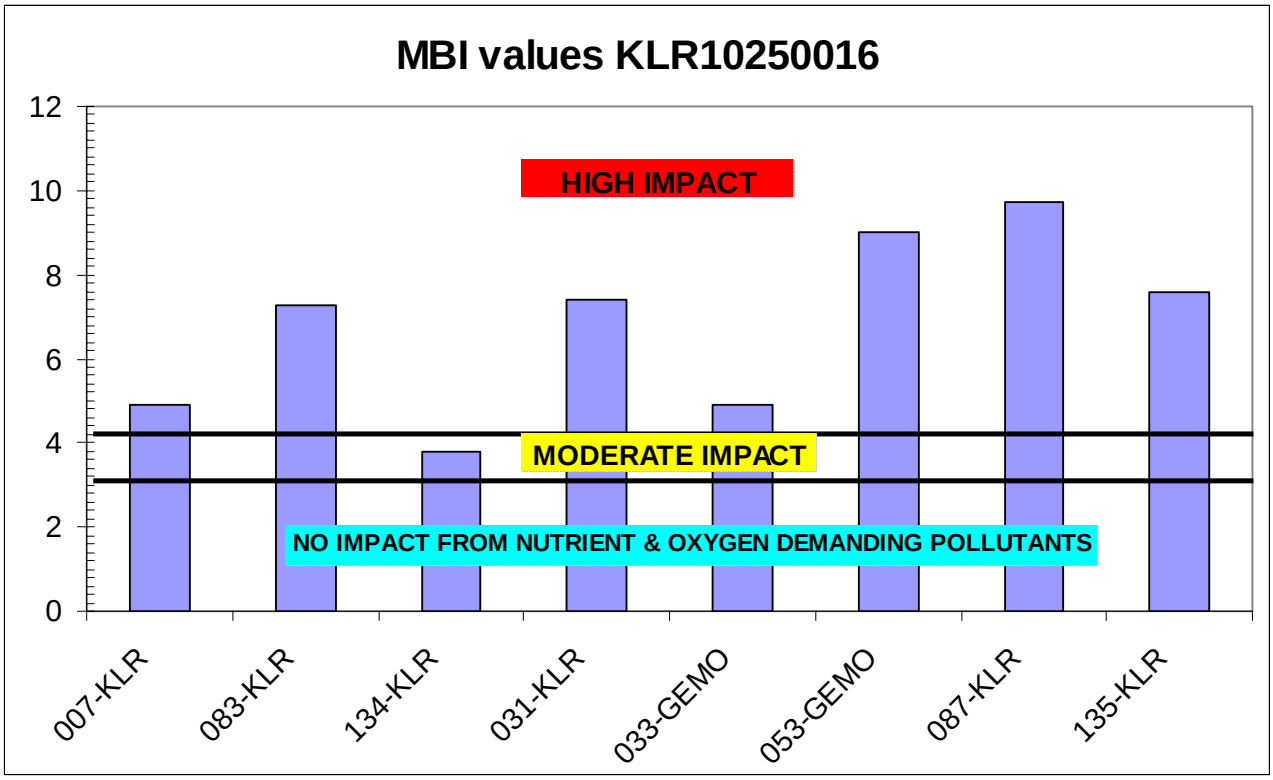


Figure 1. Graph of MBI values HUC 10250016

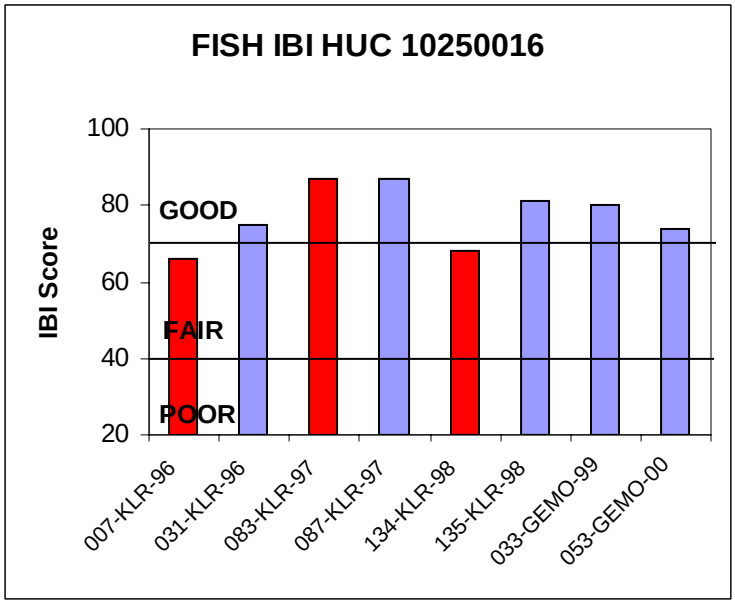
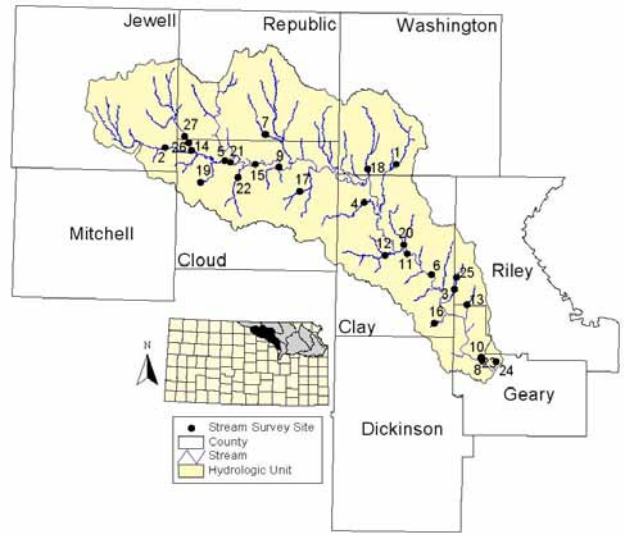


Figure 2. graph of IBI values for HUC 10250016

Kansas-Lower Republican River Basin

HUC 10250017



- This HUC consists of 27sites (35 samples).
- Sites were surveyed between 1999-2003.

BIOLOGICAL HIGHLIGHTS

- 2 samples were moderately impacted by nutrient and oxygen demanding pollutants, 33 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 8.5 indicating that this HUC is highly impacted by nutrient and oxygen demanding pollutants.
- 48 species of fish were sampled. See fish species list page 4.
    - speckled chub – endangered in KS
- 15 species of freshwater mussels sampled. See mussel list page 4.
    - Wabash pigtoe & creeper - SINC

Kansas-Lower Republican River Basin

HUC 10250017

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Peats	WS	96	4	*	7.92	6
2	Buffalo	JW	96	7	*	8.25	13
3	Timber	RL	96	13	*	5.42	16
4	Mulberry	CY	96	13	*	7.2	10
5	Buffalo	CD	96	10	*	8.14	14
6	Republican	CY	94	8	*	6.69	13
6			00	10	0.067	7.56	14
7	West	RP	94	8	*	7.61	9
7			00	9	0.082	9.22	11
8	Four Mile	GE	94	11	*	6.29	13
8			00	8	*	8.62	17
9	Republican	CD	96	13	*	4.98	18
9			97	7	*	5.35	19
9			98	8	*	8.67	18
10	Four Mile	GE	96	14	0.449	6.49	12
11	Republican	CY	99	11	0.058	7.23	15
12	Five	CY	96	11	*	8.04	10
13	Madison	RL	97	19	*	7.24	19
14	Marsh	CD	97	3	*	10	5
15	Republican	CD	00	17	0.362	6.66	15
16	Quimby	CY	97	5	*	11	7
16			98	10	0.019	10.78	10
17	Elm	CD	95	4	*	10.25	12
18	Parsons	WS	95	1	*	11	9
18			01	8	*	5.57	9
19	Whites	CD	95	6	*	8.66	8
19			01	9	*	10.68	6
20	Huntress	CY	98	4	*	9.64	12
21	Buffalo	CD	95	0	*	0	12
22	Wolf	CD	01	10	*	5.8	9
23	Republican	GE	02	14	0.671	5.56	30
24	Republican	GE	03	19	0.099	9.1	25
25	Timber	RL	02	16	0.055	6.53	16
26	Marsh	CD	02	11	0.104	6.84	13
27	Marsh	RP	02	11	0.01	6.21	17

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair condition based on IBI and MBI scores available at this time.

- Determine status of speckled chub within this HUC if possible.
- A water quality table is presented on page 3.

Kansas-Lower Republican River Basin

HUC 10250017

Water Quality Table

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	18	259	408	123	6	5.51	114	9	NA	0.3	0.31
2	21	1354	113	661	6	7.98	325	4.5	0.23	8.6	0.19
3	22	674	92	323	3.75	7.95	345	22.5	0.13	1.6	0.21
4	24	431	63	205	5.2	7.83	209	19.6	0.06	2.7	0.13
5	25	2550	103	1270	7.6	8.31	285	24.5	0.03	3.3	0.23
6	21	768	12	405	7.5	8.3	204	73	0.06	2.6	0.12
6	26	950	45	480	5.4	7.39	NA	NA	NA	NA	NA
7	20	775	74	450	4.2	8	335	50	0.55	1.8	0.35
7	18	1170	30	590	4.9	7.22	NA	NA	NA	NA	NA
8	24	599	7	298	8.4	8.5	304	11	0	3.1	0.08
8	23	650	40	330	6.5	7.91	NA	NA	NA	NA	NA
9	22	719	101	344	5.3	8.27	165	24.5	0	5	0.03
9	27	727	57	369	3.2	8.07	121	58	0.05	2.2	0.08
9	26	758	86	367	4.9	8.12	192	53	0.1	2.8	0.5
10	19	478	127	230	6.5	8.16	267	18.2	0.07	7.2	0.09
11	24	801	52	386	5.7	2.1	128	60	0.04	1.9	0.84
12	22	1705	55	805	2.6	7.79	251	15.1	0.06	1.9	0.1
13	15	364	346	273	5.4	7.83	162	0.7	0.24	35.8	0.86
14	17	3430	47	1760	5.5	8.33	136	24.5	0.23	0.5	0.02
15	26	726	103	350	7.1	NA	185	43	0.09	3.3	0.09
16	20	747	30	359	0.7	7.93	315	13	2.32	0	2.66
16	24	819	25	414	3.6	7.71	336	13.1	0.24	0.3	2.03
17	18	620	170	320	NA	7.42	NA	NA	NA	NA	NA
18	22	NA	23	NA	8.9	8.3	272	22	0.06	3.1	0.13
18	19	510	153	270	5.3	7.23	NA	NA	NA	NA	NA
19	22	NA	20	NA	1.2	8.3	238	311	0.23	2.5	0.15
19	24	890	91	460	2.9	7.41	NA	NA	NA	NA	NA
20	24	737	66	355	4.4	7.77	172	7.5	0.23	3.2	1.17
21	22	2560	137	1290	3.8	7.66	NA	NA	NA	NA	NA
22	22	NA	28	NA	8.2	8.5	383	27	0.22	3.7	0.29
23	22	673	6	329	5.3	8.8	227	4.1	0.06	0.8	0.14
24	26	717	1	349	1.27	7.8	185	47	0.05	2	0.56
25	20	720	53	348	3.1	8.4	384	0.1	0.27	2.1	0.04
26	25	3500	74	1672	3.7	9	428	74.9	0.05	2.3	0.5
27	24	1425	62	707	2.9	8.3	212	16.7	0.1	2.8	0.38

TDS = total dissolved solids

Kansas-Lower Republican River Basin

HUC 10250017

Fish Species Collected

bigmouth buffalo
black buffalo
black bullhead
bluegill
bluegill X green sunfish hybrid
bluntnose minnow
bullhead minnow
central stoneroller
channel catfish
common carp
common shiner
creek chub
emerald shiner
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden shiner
goldeye
goldfish
green sunfish
green sunfish X bluegill hybrid
green sunfish X orangespotted sunfish
Johnny darter
largemouth bass
logperch
longear sunfish
longnose gar
orangespotted sunfish
orangethroat darter
plains minnow
quillback
red shiner
redfin shiner
river carpsucker
rosyface shiner
sand shiner
shorthead redhorse
shortnose gar
smallmouth bass
smallmouth buffalo
speckled chub
stonecat
suckermouth minnow
walleye
walleye X saugeye hybrid
western mosquitofish
white bass
white crappie
white sucker
wiper
yellow bullhead

Mussel Species Collected

Asian clam
creeper
fingernail clam
fragile papershell
giant floater
hickorynut
lilliput
mapleleaf
pink papershell
pondhorn
pondmussel
threeridge
Wabash pigtoe
white heelsplitter
yellow sandshell

Kansas-Lower Republican River Basin
HUC 10250017

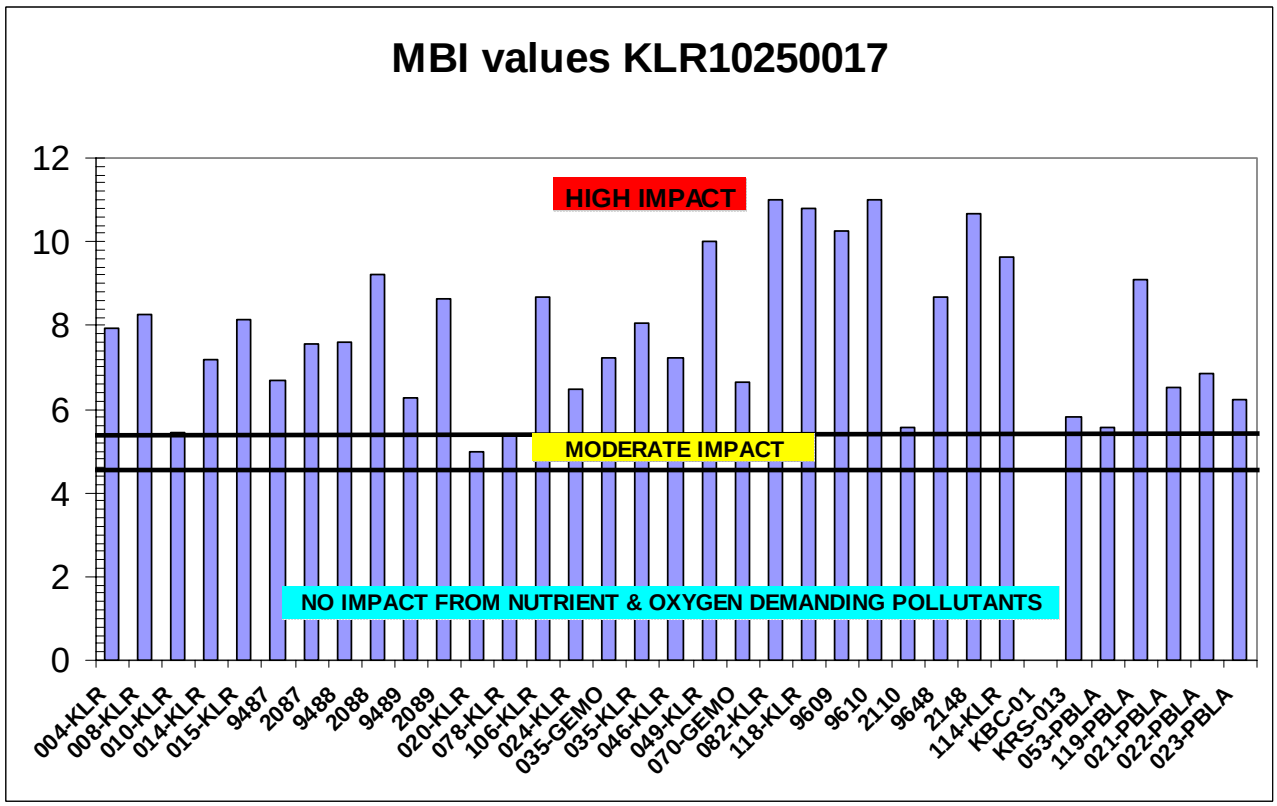


Figure 1. Graph of MBI values for HUC 10250017

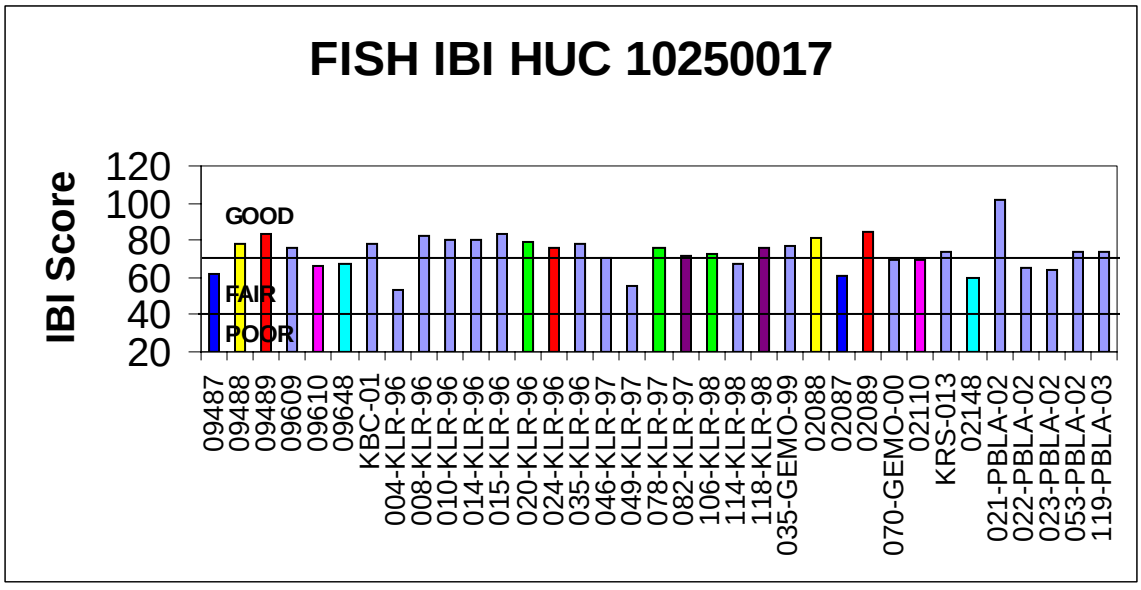
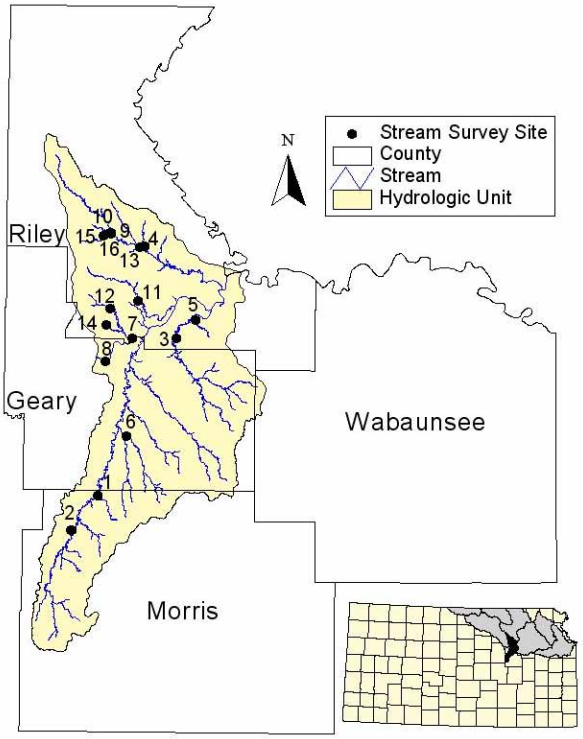


Figure 2. graph of IBI values for HUC 10250017

Kansas-Lower Republican River Basin

HUC 10270101

LOCATION



- This HUC consists of 16 sites (20 samples).
- Sites were surveyed between 1995-2002.

BIOLOGICAL HIGHLIGHTS

- 3 samples were not impacted by nutrient & oxygen demanding pollutants, 3 were moderately impacted and 14 were highly impacted (see figure 1).
- Overall MBI value for this HUC was 6.67 indicating that the HUC is highly impacted from nutrient and oxygen demanding pollutants.
- 50 species were surveyed within this HUC. See fish list page 2.
    - Topeka shiner – federally endangered
- 16 species of freshwater mussels were surveyed.
    - SINC species – creeper, Wabash pigtoe

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Clarks	MR	96	22	0.382	3.99	25
2	Clarks	MR	97	14	0.252	8.42	23
2			98	16	0.380	4.75	20
3	McDowell	RL	98	11	0.505	3.7	24
4	Kitten	RL	95	7	*	6.82	15
4			95	4	*	8.74	16
4			01	18	0.066	10.22	15
5	Kings	RL	98	8	0.021	10.26	15
6	Thomas	GE	98	11	0.66	3.75	19
7	Kansas	GE	02	19	0.53	5.84	24
7			03	20	0.129	7.24	25
8	Kansas	GE	03	22	0.263	7.66	28
9	Wildcat	RL	03	15	0.119	8.21	21
10	Little Arkansas	RL	02	13	*	7.27	16
11	Sevenmile	RL	02	12	*	4.65	17
12	Threemile	RL	02	14	0.46	5.48	16
13	Wildcat	RL	02	16	0.233	7.8	24
14	Forsyth	RL	02	7	*	6.81	7
15	Wind	RL	02	12	*	5.64	11
16	Wildcat	RL	02	20	0.524	5.22	19

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair to good condition based on the information available at this time.

- Protection efforts should be utilized to maintain and improve the Topeka shiner population.
- Additional surveys are needed to accurately assess the biological integrity of this HUC
- A water quality table is presented on the next page.

Kansas-Lower Republican River Basin

HUC 10270101

Water Quality Table

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	25	563	21	269	5.1	8.17	276	10.1	0	0	0.07
2	17	658	34	316	5.6	8	262	13	0	1.1	0.34
2	21	707	20	NA	5.7	7.86	297	7.3	0.02	0.9	0.33
3	18	719	24	344	5.8	8.17	266	4.6	0.11	0.4	0.15
4	19	717	20	347	2.3	8	290	20	0.17	2	0.19
4	17	650	7	330	5.9	7.53	NA	NA	NA	NA	NA
4	15	720	6	370	5.6	6.94	NA	NA	NA	NA	NA
5	23	594	38	319	6.4	8.15	332	3.3	0.09	1.2	0.27
6	19	676	4	328	7.2	7.79	236	2.6	0.02	1	0.17
7	24	1669	34	833	5.1	8.6	165	36.1	0.03	0.1	0.16
7	24	2250	98	1135	3.5	7.9	178	412	0.08	1.4	0.32
8	24	2390	92	1210	5.8	8	176	495	0.07	0.8	0.31
9	24	653	31	317	1.6	7.7	314	4	0.48	0.1	0.24
10	22	10	19	249	4.1	8.5	293	0.25	0.01	0.3	0.45
11	19	648	27	315	4.1	8.2	328	0.2	0.55	1	0.54
12	22	654	15	319	4.2	8.5	304	0.1	0.7	0.2	0.33
13	24	641	18	312	5.2	8.5	298	0.1	0.05	0.2	0.38
14	24	737	19	360	7	8.1	261	13.1	0.2	11.9	0.57
15	24	157.4	42	230	2.4	8.4	607	0.1	0.04	1.6	0.45
16	23	678	29	331	6.8	8.8	332	0.1	0	0.9	0.26

TDS = total dissolved solids

Fish Species Collected

black buffalo
black bullhead
blue catfish
blue sucker
bluegill
bluegill X green sunfish hybrid
bluntnose minnow
bullhead minnow
carmine shiner
central stoneroller
channel catfish
common carp
freshwater drum
gizzard shad
golden redhorse
green sunfish
Johnny darter
largemouth bass
logperch
longear sunfish
longnose gar
orangespotted sunfish
orangethroat darter
quillback
shorthead redhorse
shortnose gar
shovelnose sturgeon
slender madtom
slenderhead darter
smallmouth buffalo
southern redbelly dace
speckled chub
spotted bass
stonecat
suckermouth minnow
Topeka shiner

Kansas-Lower Republican River Basin

HUC 10270101

Fish Species Collected

common shiner
common shiner X creek chub
creek chub
emerald shiner
fathead minnow
flathead catfish
red shiner
redfin shiner
river carpsucker
rosyface shiner
sand shiner
western mosquitofish
white bass
white crappie
white sucker
yellow bullhead

Mussel Species Collected

Asian clam
creeper
fingernail clam
fragile papershell
giant floater
hickorynut
lilliput
mapleleaf
pimpleback
pink papershell
pistolgrip
pondhorn
pondmussel
threeridge
Wabash pigtoe
white heelsplitter

Kansas-Lower Republican River Basin
HUC 10270101

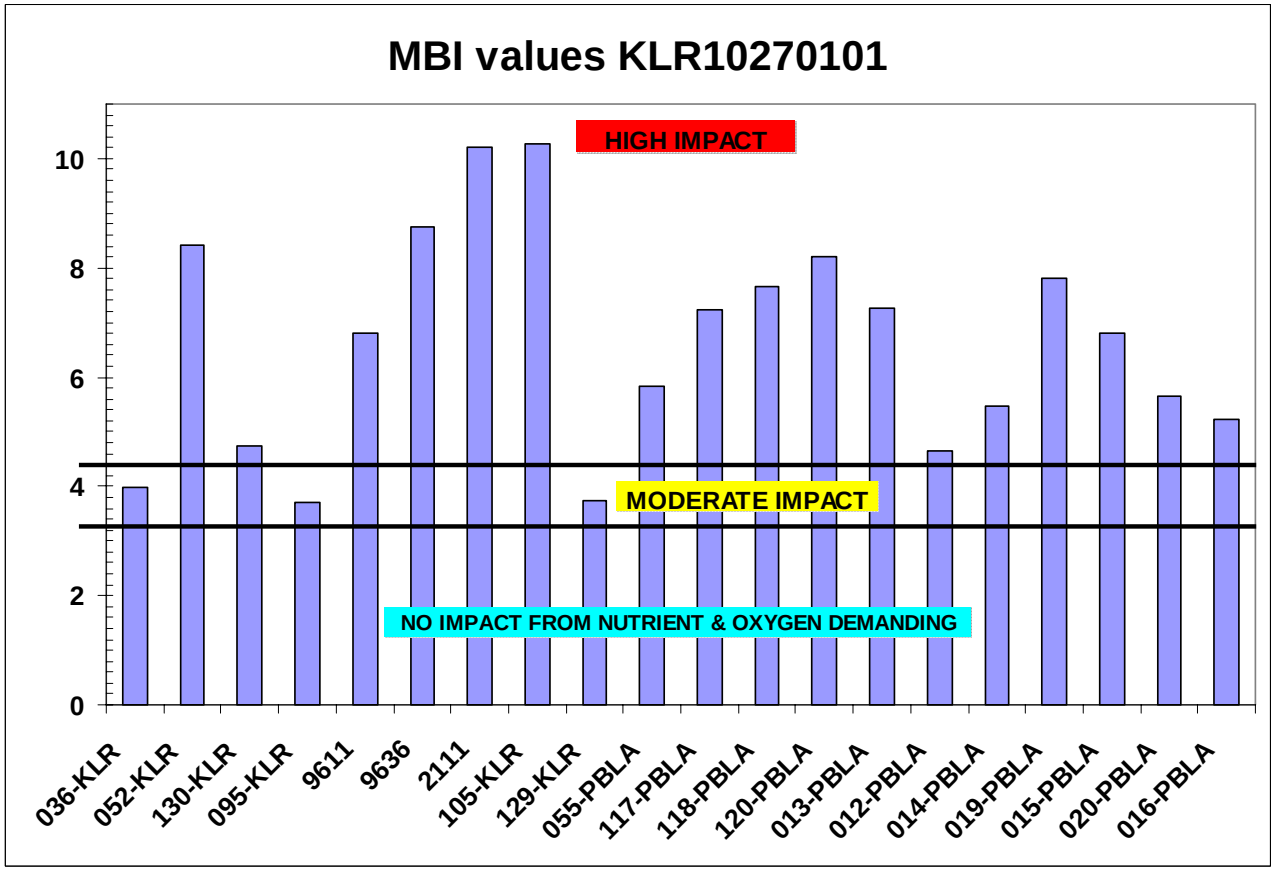


Figure 1. Graph of MBI values for HUC 10270101

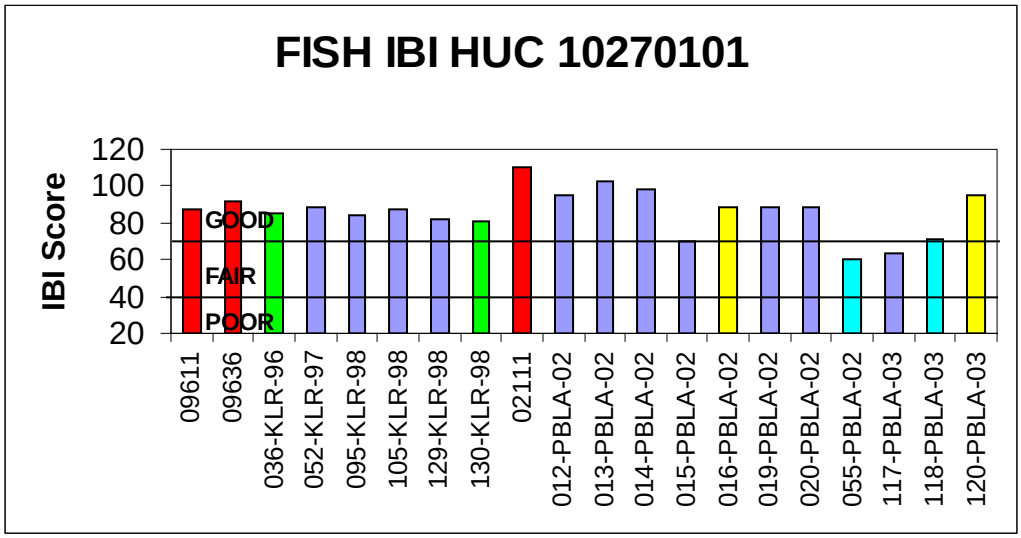
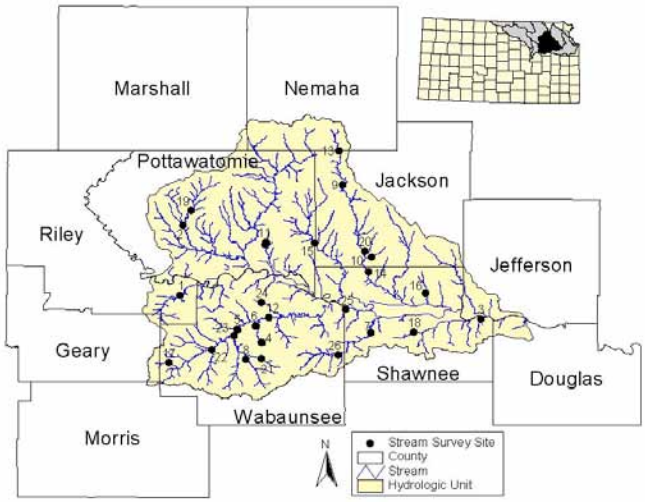


Figure 2. graph of IBI values of HUC 10270101

Kansas-Lower Republican River Basin

HUC 10270102



- This HUC consists of 26 sites (37 samples).
- Sites were surveyed between 1994-2003.

BIOLOGICAL HIGHLIGHTS

- 2 samples were not impacted from nutrient & oxygen demanding pollutants, 8 were moderately impacted, and 27 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC is 6.76 indicating that it is highly impacted from nutrient and oxygen demanding nutrients.
- This HUC displayed many good IBI scores
- 45 species of fish were surveyed within this HUC. See fish list page 4.
    - Topeka shiner – federally endangered
- 22 species of freshwater mussels
    - SINC species – creeper, cylindrical papershell, fat mucket, Wabash pigtoe

SUMMARY

This HUC could be considered in fair to good condition based on the information available at this time.

- Protection efforts should be utilized to maintain and improve the Topeka shiner population.
- A water quality table is presented on page 3.

Image 1. Clear Fork Creek, Pottawatomie Co.

Kansas-Lower Republican River Basin

HUC 10270102

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Deep	RL	95	10	*	4.52	22
1			96	15	0.866	4.08	24
1			00	23	0.555	5.86	24
2	Rock	PT	96	16	0.570	5.62	15
3	Whetstone	SN	94	11	0.875	5.11	30
3			00	8	0.000	10.54	19
4	Kuenzli	WB	94	12	0.583	6.35	15
4			00	11	*	6.73	12
5	Mill	WB	94	18	0.345	6.27	21
5			00	21	0.217	7.09	24
6	Kuenzli	WB	96	20	0.580	5.45	21
6			97	10	0.244	9.03	18
6			98	18	0.270	8.54	19
7	Mission	SN	96	22	0.394	5.03	21
8	EB Mill	WB	96	24	0.642	5.15	23
9	Soldier	JA	00	14	*	6.32	18
10	Dutch	JA	97	13	*	9.05	14
10			98	7	0.021	10.85	15
11	Lost	PT	97	16	*	8.68	16
11			98	19	0.423	5.8	17
11			03	22	0.094	8.9	19
12	Mill	WB	00	25	0.477	4.67	21
13	Soldier	JA	00	15	0.374	6.88	20
14	Soldier	SN	00	17	0.492	6.07	12
15	Cross	JA	95	9	*	5.67	14
15			01	23	*	4.96	22
16	Halfday	SN	98	6	0.019	10.7	21
17	WB Mill Trib	WB	98	10	0.334	8.25	8
18	Shunganunga	SN	98	6	*	6.71	11
19	Rock	PT	95	20	0.753	4.47	21
20	Soldier	JA	00	18	0.500	4.92	22
21	Nehring	WB	00	13	0.687	5.92	21
22	Illinois	WB	00	13	0.799	5.38	20
23	Mill	WB	02	17	*	6.74	11
24	Mulberry	WB	03	27	0.201	8.22	19
25	Post	SN	03	24	0.048	8.74	17
26	Mission	WB	03	21	0.355	7.15	21

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

Kansas-Lower Republican River Basin

HUC 10270102

Water Quality Table

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	20	590	11	300	6.6	7.73	NA	NA	NA	NA	NA
1	21	623	22	297	6.7	5.63	NA	43	NA	0	0.03
1	27	548	14	257	8.8	8.3	201	17	0.05	1.3	0.04
2	14	557	30	266	8.5	8.29	NA	70	NA	1.1	0.185
3	22	478	46	248	4	8.1	219	76	0.05	0	0.05
3	18	590	101	310	7.1	7.64	NA	NA	NA	NA	NA
4	19	493	19	272	4.9	8.2	273	0	0.15	0	0.07
4	19	520	17	290	4.9	7	NA	NA	NA	NA	NA
5	20	615	9	334	6	8.2	161	17	0.02	0.8	0.05
5	23	690	32	360	5.6	7.02	NA	NA	NA	NA	NA
6	25	576	8	270	5.1	6.36	296	11.2	0.06	0	0.04
6	19	486	31	235	5.5	8.21	190	8	0.24	1.3	0.04
6	24	502	65	240	5.4	8.02	216	9.4	0.08	2.2	0.23
7	24	464	13	220	5.1	7.7	170	11.9	0.01	0	0.02
8	24	855	14	413	5.2	7.75	279	24.5	0.05	0	0.01
9	25	550	31	263	5.8	8.2	197	19	0.04	0	0.02
10	19	504	34	244	5.5	7.89	155	11	0	1.7	0.12
10	25	497	24	286	5.1	8.02	171	5.4	0.82	0.4	0.19
11	22	554	11	271	5.9	8.23	186	2	0	0.4	0.01
11	21	713	8	348	4.1	6.9	22.9	1.1	0.03	0.5	0.02
11	25	494	14	236	7.2	8.09	205	3.2	0.07	0.5	0.04
12	29	273	27	272	6.6	NA	199	18	0.06	1.9	0.05
13	22	474	83	226	6.9	NA	183	15	0.2	3.2	0.27
14	24	597	87	285	6.3	NA	261	7	0.1	0.3	0.1
15	26	NA	35	NA	5.7	8.5	158	33	0.07	NA	0.05
15	25	590	32	300	5	8.1	NA	NA	NA	NA	NA
16	19	633	59	304	5.9	8.08	195	18.7	0.2	2.4	0.13
17	19	533	1	262	4.7	7.78	271	5.1	0.1	1.4	0.57
18	24	559	19	268	5.6	7.7	141	22.4	0.12	0.1	1.41
19	16	590	10	310	7.2	7.21	NA	NA	NA	NA	NA
20	25	605	44	292	8.1	8.5	177	34	0.06	0.3	0.05
21	15	605	6	364	5	7.8	305	7	0.04	3.2	0.04
22	14	452	2	283	5.5	8.1	236	8	0.03	1	0.03
23	28	646	16	313	3.3	8.6	176	0.1	0.02	0.1	0.17
24	22	692	10	338	4.3	6.9	26.4	1.8	0.04	0.5	0.08
25	18	771	13	378	2.3	6.9	21.8	2.7	0.09	0.1	0.03
26	24	726	25	354	4.5	7	21.3	1	0.07	0	0.01

TDS = total dissolved solids

Kansas-Lower Republican River Basin

HUC 10270102

Fish Species Collected

bigmouth buffalo
black bullhead
blackside darter
bluegill
bluegill hybrid
bluegill X green sunfish hybrid
bluntnose minnow
brook silverside
bullhead minnow
central stoneroller
channel catfish
common carp
common shiner
creek chub
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden redhorse
golden shiner
green sunfish
green sunfish hybrid
Johnny darter
largemouth bass
logperch
longear sunfish
longnose gar
orangespotted sunfish
orangethroat darter
quillback
red shiner
redfin shiner
river carpsucker
rosyface shiner
sand shiner
shorthead redhorse
slender madtom
smallmouth buffalo
southern redbelly dace
spotted bass
stonecat
suckermouth minnow
Topeka shiner
walleye
western mosquitofish
white crappie
white sucker
yellow bullhead

Mussel Species Collected

Asian clam
black sandshell
bleufer
creeper
cylindrical papershell
fatmucket
fingernail clam
fragile papershell
giant floater
lilliput
mapleleaf
pimpleback
pink heelsplitter
pink papershell
pistolgrip
plain pocketbook
pondhorn
pondmussel
threeridge
Wabash pigtoe
white heelsplitter
yellow sandshell

Kansas-Lower Republican River Basin
HUC 10270102

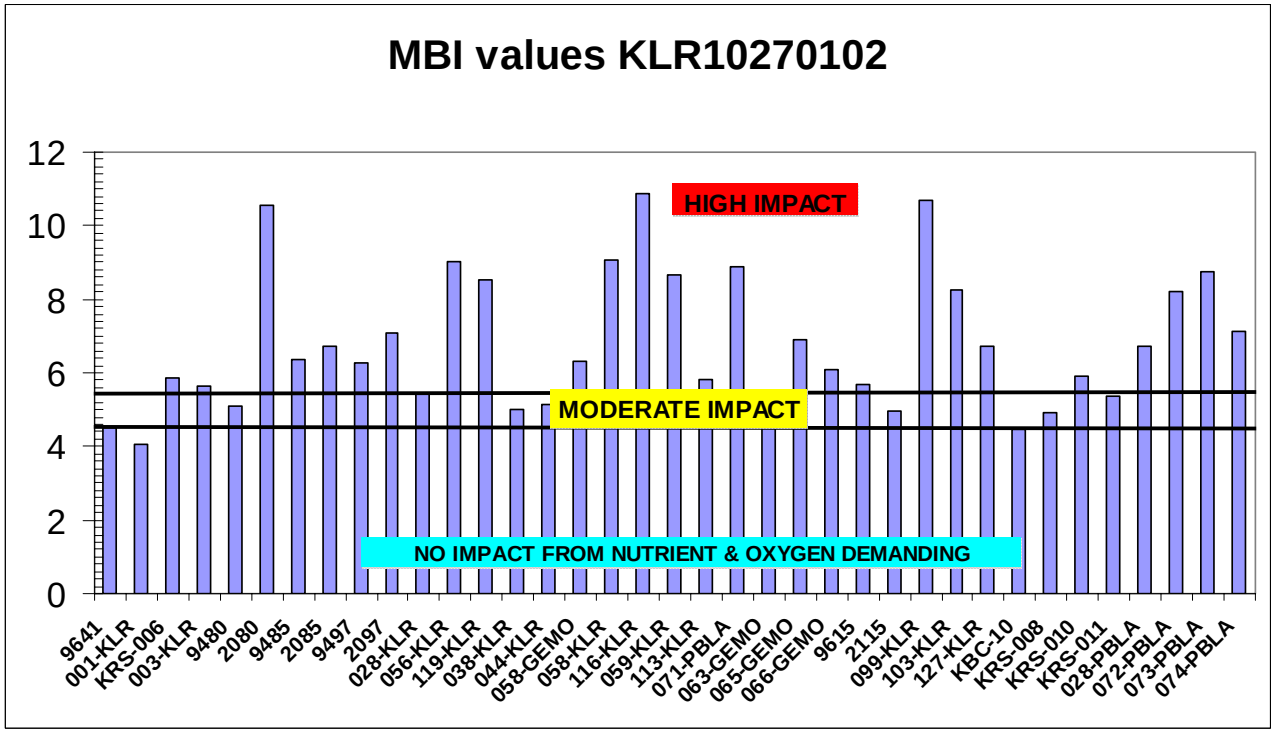


Figure 1. Graph of MBI values for HUC 10270102

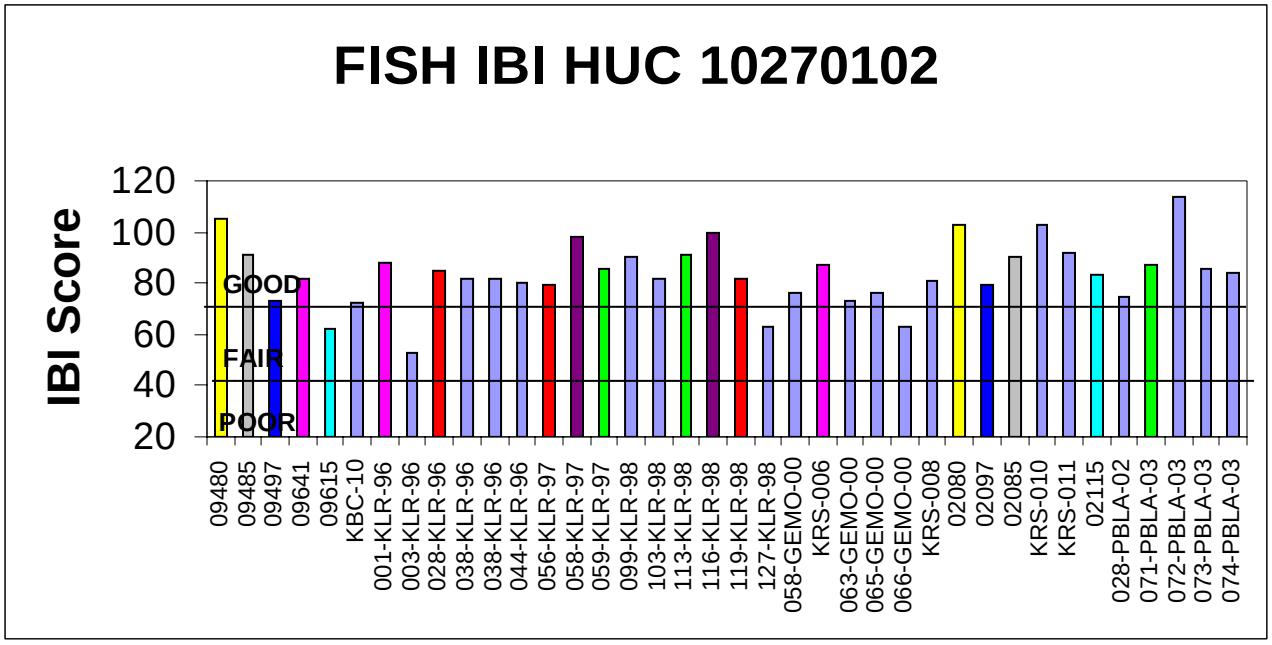
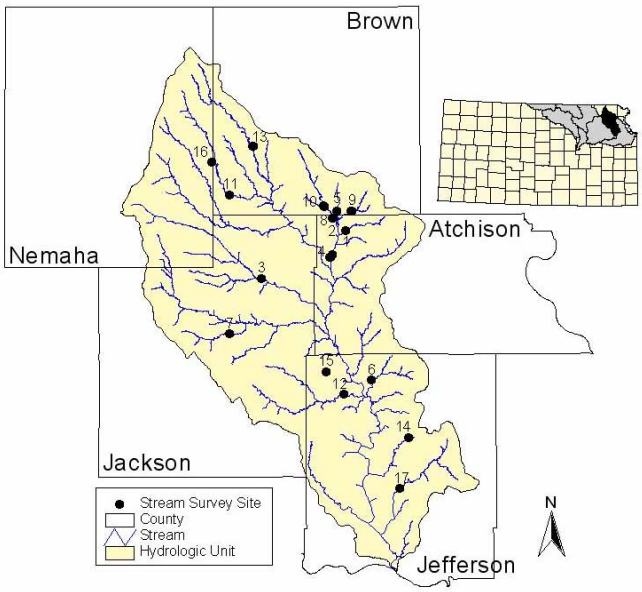


Figure 2. graph of IBI values for HUC 10270102

Kansas-Lower Republican River Basin
HUC 10270103

LOCATION



- This HUC consists of 17 sites (35 samples).
- Sites were surveyed between 1994-2001.

BIOLOGICAL HIGHLIGHTS

- 3 samples were not impacted by nutrient & oxygen demanding pollutants, 5 samples were moderately impacted category, and 27 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC is 6.69 indicating it to be highly impacted by nutrient and oxygen demanding pollutants.
- 33 species of fish were surveyed within this HUC. See fish species collected on page 4
- 16 species of freshwater mussels were collected. See mussel species collected on page 4.
    - SINC species – creeper, fat mucket, Wabash pigtoe, yellow sandshell

SUMMARY

This HUC should be considered in fair condition based on the available information.

- Efforts should be utilized to maintain and protect the SINC species of mussels present within this HUC.
- Additional surveys should be performed when the opportunity arises to further assess the biotic integrity of this HUC.
- A water quality table is presented on page 3.

Kansas-Lower Republican River Basin

HUC 10270103

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Clear	AT	96	6	*	6.96	11
1			97	17	*	5.7	23
1			98	16	0.343	7.28	21
2	Grasshopper	AT	96	6	*	6.89	13
3	Straight	JA	96	12	*	4	12
3			97	12	0.625	5.35	15
3			98	11	*	4.06	12
4	Grasshopper	AT	96	17	0.693	4.62	16
4			97	9	*	7.2	19
4			98	15	0.333	8.17	19
5	Mission	BR	96	12	*	6.18	12
5			97	13	*	9.13	11
5			98	7	0.015	10.81	12
6	Walnut	JF	96	13	*	5.6	14
7	Banner	JA	94	7	*	4.97	3
7			00	12	0.457	7.41	13
8	Grasshopper	AT	96	8	*	6.17	12
8			97	4	*	11	14
8			98	8	*	7	12
9	Otter	BR	96	16	0.204	4.68	12
9			97	13	0.236	8.45	14
9			98	8	0.083	9.33	16
10	Grasshopper	BR	96	18	0.631	6.04	11
10			97	12	0.118	7.05	14
10			98	11	0.369	7.77	16
11	Craig	BR	96	21	0.814	4.25	16
12	Cedar	JF	96	13	0.862	4.83	21
13	Delaware	BR	96	16	0.010	8.83	17
13			97	8	*	8.87	17
13			98	6	*	8.91	16
14	Fishpond	JF	94	11	0.546	6.16	12
15	Delaware Trib	JF	95	6	*	6.59	7
15			01	30	0.363	7.13	7
16	Craig Trib	NM	98	9	0.268	8.84	9
17	Slough	JF	98	8	*	6.76	6

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

Kansas-Lower Republican River Basin
HUC 10270103

Water Quality Table

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	18	311	148	347	7.6	8.02	177	24.5	0.27	32.9	0.2
1	23	403	60	193	3.3	7.86	169	12	0.05	0.9	0.06
1	23	432	38	202	4.9	7.91	170	5.5	0.24	1.5	0.39
2	22	404	193	227	5.8	7.86	245	24.5	0.16	12.1	0.19
3	23	699	50	337	8.4	6.13	289	23.7	0.03	1.4	0.17
3	19	685	44	330	4.6	7.99	202	35	0.15	1.7	0.35
3	25	533	85	254	6.2	8.02	206	16.3	0.11	4.6	0.76
4	28	445	50	211	7.3	8.28	240	15.8	0	0.2	0.15
4	24	432	20	202	3.2	8.17	142	18	0.04	0.5	0.13
4	21	554	53	267	3.7	8.34	244	13.6	0.12	2.3	0.51
5	28	395	158	188	5.1	7.71	157	24.5	0.1	10.5	0.19
5	19	451	52	215	3.7	7.98	128	24	0.14	1.9	0.51
5	25	443	33	209	6	7.8	186	73	0.38	0.2	0.62
6	23	417	13	244	5.5	8.25	210	6.4	0.01	1.2	0.07
7	21	366	30	191	8.1	8	219	47	0.55	0.1	0.12
7	13	2120	20	600	6.1	7.95	NA	NA	NA	NA	NA
8	19	485	66	233	6.1	7.98	187	23.6	0.11	1.2	0.21
8	24	653	46	312	3.1	NA	161	22	0.16	0.6	0.92
8	25	428	82	204	6.6	8.03	166	19	0.07	4.9	1.1
9	18	342	218	164	6	7.45	140	24.5	0.13	14.5	0.16
9	24	532	57	255	3.6	8.09	211	11	0.21	1.2	0.54
9	25	433	44	205	4.5	8.03	238	9.1	0.09	0.9	0.39
10	22	456	88	218	5	7.85	236	16.6	0.08	4	0.13
10	13	517	49	245	7.6	8.32	173	8	0.08	0.3	0.42
10	22	306	223	144	5.2	8.04	142	21.8	0.3	15.4	0.71
11	22	731	37	351	4.5	8	185	11.2	0.02	1.1	0.06
12	23	569	13	272	5.7	8.03	279	0.5	0.04	0	0.07
13	22	933	64	451	4.4	7.91	285	24.5	0.18	1.3	0.11
13	18	860	39	417	6.8	8.23	208	16	0.26	1.1	0.31
13	25	813	34	392	5.8	8.07	191	18	0.08	0.7	0.43
14	19	550	22	280	5.4	7.89	NA	NA	NA	NA	NA
15	24	NA	37	NA	3.2	8.3	190	21	0.17	2	0.04
15	23	570	100	290	5.5	7.88	NA	NA	NA	NA	NA
16	24	556	28	267	5.1	6.68	235	5.8	0.07	0.7	0.31
17	25	623	19	303	5.9	7.85	266	10.2	0.02	0.2	0.36

TDS = total dissolved solids

Kansas-Lower Republican River Basin
HUC 10270103

Fish Species Collected

bigmouth shiner
black bullhead
bluegill
bluntnose minnow
central stoneroller
channel catfish
common carp
creek chub
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden shiner
green sunfish
largemouth bass
longnose gar
orangespotted sunfish
orangethroat darter
quillback
red shiner
redfin shiner
river carpsucker
sand shiner
shorthead redhorse
slender madtom
stonecat
suckermouth minnow
walleye
western mosquitofish
white bass
white crappie
white sucker
yellow bullhead

Mussel Species Collected

creeper
fatmucket
fingernail clam
fragile papershell
giant floater
lilliput
mapleleaf
pimpleback
pink heelsplitter
pink papershell
pondhorn
pondmussel
threeridge
Wabash pigtoe
white heelsplitter
yellow sandshell

Kansas-Lower Republican River Basin
HUC 10270103

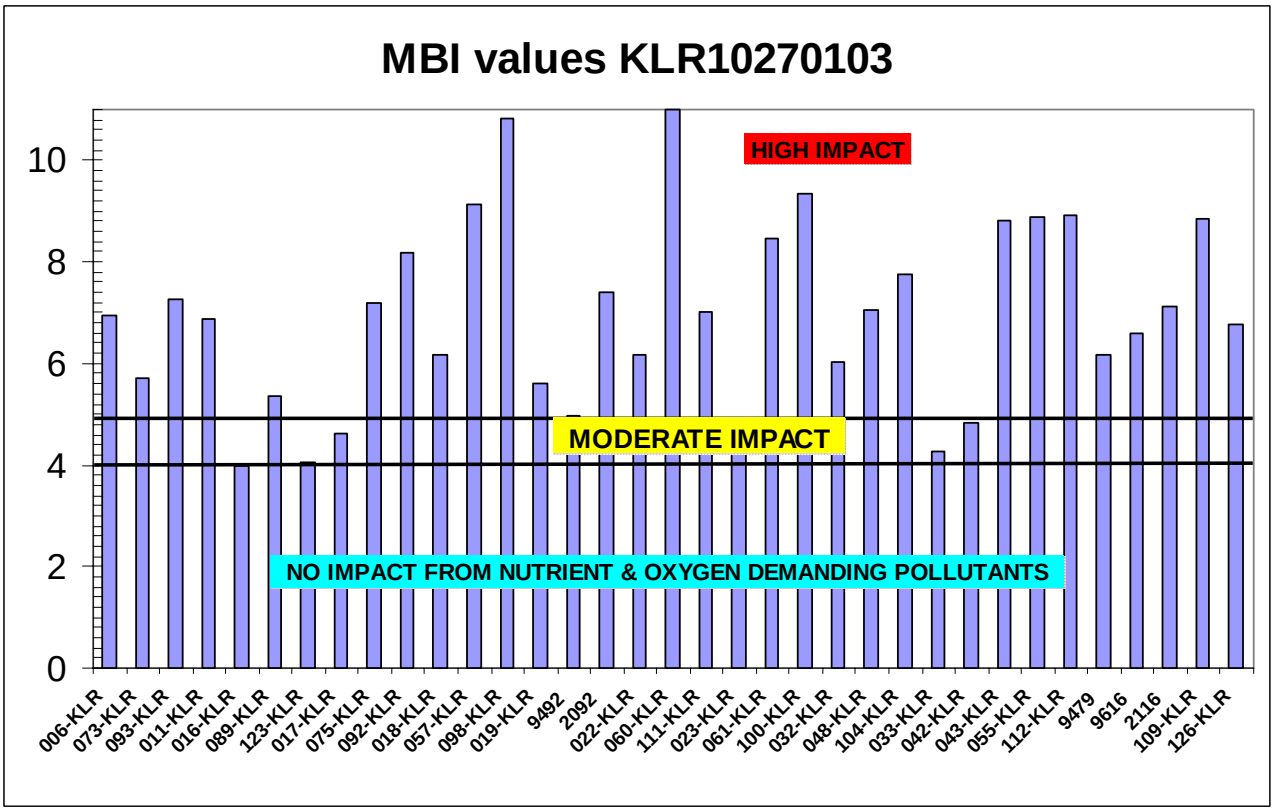


Figure 1. Graph of MBI values for HUC 10270103

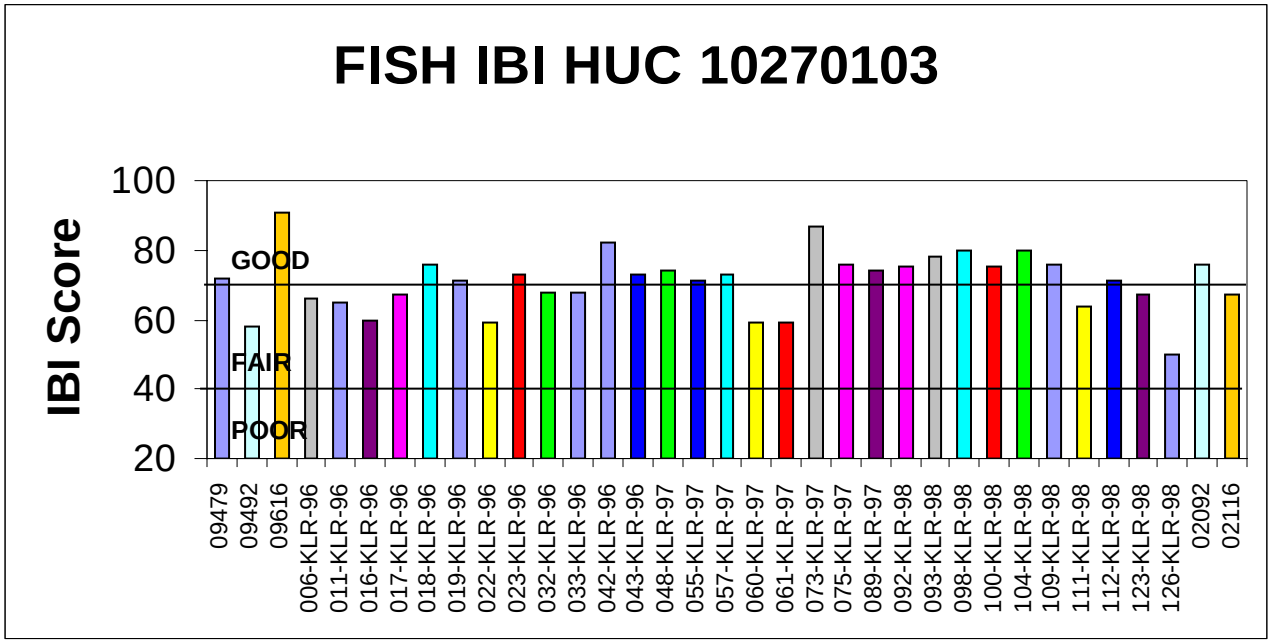
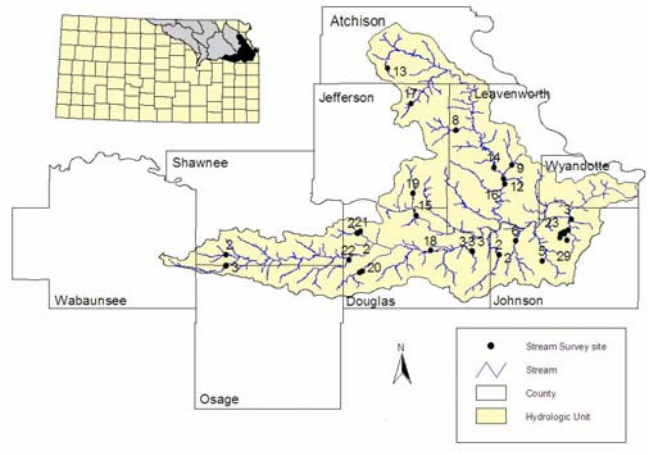


Figure 2. graph of IBI values for 10270103

Kansas-Lower Republican River Basin

HUC 10270104



- This HUC consists of 29sites (35samples).
- Sites were surveyed between 1994-2003.

Image 1. Kill Creek, Johnson Co.

BIOLOGICAL HIGHLIGHTS

- 5 samples within this HUC not impacted by nutrient and oxygen demanding pollutants, 8 were moderately impacted category, 22 samples were highly impacted.
- Overall, the MBI value for this HUC was 7.3, indicating it is highly impacted from nutrient and oxygen demanding pollutants.
- 42 species of fish were surveyed within this HUC. See fish species collected, page 4.
- 21 species of freshwater mussels were surveyed. See mussel species collected, page 4.
    - SINC species – creeper, cylindrical papershell, fat mucket, fawnsfoot, Wabash pigtoe, yellow sandshell

SUMMARY

This HUC could be considered in fair to good condition based on the information available

- A mixture of good and fair IBI scores with only one poor score for this HUC. A good sign for this high human populated HUC.
- A water quality table is presented on page 3.

Kansas-Lower Republican River Basin

HUC 10270104

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Little Wakarusa	DG	96	10	*	5	16
1			97	4	0.492	7.43	15
1			98	8	0.017	10.78	14
2	MF Wakarusa	SN	96	8	*	4.64	11
3	Little Mill	JO	96	13	0.509	7.27	15
4	Captain	JO	96	11	0.831	4.48	15
4			01	20	0.57	6.96	15
5	Cedar	JO	96	5	*	5.39	13
6	Kill	JO	96	12	0.303	4.86	19
7	SF Wakarusa	OS	96	14	0.766	4.05	13
7			97	6	0.413	6.97	14
7			98	10	0.169	8.54	13
8	Walnut	LV	96	14	0.165	4.64	18
9	Little Stranger	AT	96	13	*	7.05	17
10	Rock	DG	96	21	0.357	5.9	16
11	Deer	DG	97	10	*	8.44	14
11			98	14	0.273	6.88	14
12	Stranger	LV	00	10	*	4.99	11
13	Little Stranger	AT	97	9	*	8.06	4
14	Stranger	LV	97	6	*	8.89	11
15	Kansas	DG	94	1	*	4.5	13
16	Stranger	LV	94	9	*	4.18	10
17	Crooked	JF	98	16	0.858	4.84	17
18	Wakarusa	DG	98	14	0.653	4.15	17
19	Buck	JF	01	20	0.671	5.85	20
20	Rock	DG	02	14	0.608	5.16	16
21	Deer Trib	DG	02	8	*	7.45	10
22	Elk	DG	02	8	*	9.66	12
23	Coon Trib	JO	03	11	*	10.65	7
24	Coon Trib	JO	03	8	0.556	9.32	5
25	Coon Trib	JO	03	12	0.738	10.08	8
26	Coon	JO	03	19	0.268	8.04	13
27	Coon Trib	JO	03	11	0.017	8.03	10
28	Coon Trib	JO	03	18	*	7.12	4
29	Coon Trib	JO	03	14	*	10.14	2

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

Kansas-Lower Republican River Basin

HUC 10270104

Water Quality Table

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	24	455	119	217	3.9	7.57	175	24.5	0.16	6.9	0.09
1	24	601	11	288	2.5	7.52	206	14	0.09	0.3	0.14
1	25	430	30	231	4.6	5.9	179	8.3	0.15	0.7	0.43
2	20	314	105	153	5.3	7.58	195	11.6	0.1	5.8	0.05
3	21	750	9	370	7	8.6	165	24.5	0.01	0	0.05
4	27	310	33	150	5.1	8.3	119	2.4	0	1.76	0.05
4	27	NA	24	NA	4.5	8.1	401	109	0.12	2.8	0.08
5	25	460	19	230	5	8.3	173	1.5	0	39.16	0.04
6	25	420	46	210	6.1	8.5	142	15.2	0.01	3.52	0.08
7	25	587	12	280	3.4	7.65	245	5.8	0.02	0	0.02
7	24	549	30	252	4.1	7.64	143	3	0.07	0	0.01
7	25	511	35	249	4.6	7.79	263	5.4	0.15	1.2	0.09
8	18	495	9	238	5.7	8.01	208	9.2	0.05	0.1	0.04
9	19	510	15	243	4.3	7.89	220	22.4	0.01	0	0.05
10	22	466	14	229	6.1	7.85	254	5.9	0	0	0.01
11	14	545	64	261	6.6	7.95	182	9	0.06	2.7	0.5
11	22	514	46	248	6.3	7.86	259	6.2	0.07	0.9	0.15
12	26	426	144	203	5.4	NA	170	7	0.2	NA	0.18
13	23	551	90	249	2.1	7.99	237	28	0.2	5.8	0.48
14	23	483	84	232	4.9	8	182	11	0.08	5.4	0.14
15	28	910	87	460	5.8	8.37	NA	NA	NA	NA	NA
16	25	500	104	260	6.3	7.99	NA	NA	NA	NA	NA
17	24	589	22	283	5.7	8.01	215	13.3	0.03	0.1	0.12
18	25	360	141	172	4.5	7.48	116	28	0.16	8.5	0.17
19	24	NA	35	NA	4.1	8.5	139	17	0.08	0	0.02
20	28	456	28	220	2.5	8.5	171	3	0.03	0.5	0.05
21	24	623	2.4	306	3.2	8.5	18.1	10.4	0.14	0.6	0.28
22	28	354	47	260	1.13	8.3	207	0.1	0.16	NA	0.01
23	20	1152	12	568	1.4	7.9	26.3	4.6	0.47	0	0.22
24	22	987	43	484	3.8	8.1	12.7	4.6	0.13	1.3	0.03
25	24	1164	23	574	0.9	7.9	191	92	0.55	0	0.01
26	26	1040	36	511	3.7	7.9	198	69	0.05	0.4	0.01
27	24	1156	19	569	0.9	7.9	251	20	0.22	0.7	0.02
28	24	629	24	306	3.8	8	62	70	0.09	0.6	0.11
29	22	1017	305	527	0.3	7.9	166	53	0.55	NA	0.01

TDS = total dissolved solids

Kansas-Lower Republican River Basin

HUC 10270104

Fish Species Collected

bigmouth shiner
black bullhead
black crappie
bluegill
bluntnose minnow
bullhead minnow
central stoneroller
channel catfish
common carp
common shiner
creek chub
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden redhorse
golden shiner
green sunfish
green sunfish X bluegill hybrid
green sunfish X longear hybrid
Johnny darter
largemouth bass
logperch
longear sunfish
longear sunfish hybrid
longnose gar
orangespotted sunfish
orangethroat darter
quillback
red shiner
redfin shiner
river carpsucker
sand shiner
shorthead redhorse
shortnose gar
slender madtom
slenderhead darter
smallmouth buffalo
stonecat
suckermouth minnow
western mosquitofish
white bass
white crappie
white sucker
yellow bullhead

Mussel Species Collected

Asian clam
creeper
cylindrical papershell
fatmucket
fawnsfoot
fingernail clam
fragile papershell
giant floater
lilliput
mapleleaf
paper pondshell
pimpleback
pink heelsplitter
pink papershell
plain pocketbook
pondhorn
pondmussel
threeridge
Wabash pigtoe
white heelsplitter
yellow sandshell

Kansas-Lower Republican River Basin
HUC 10270104

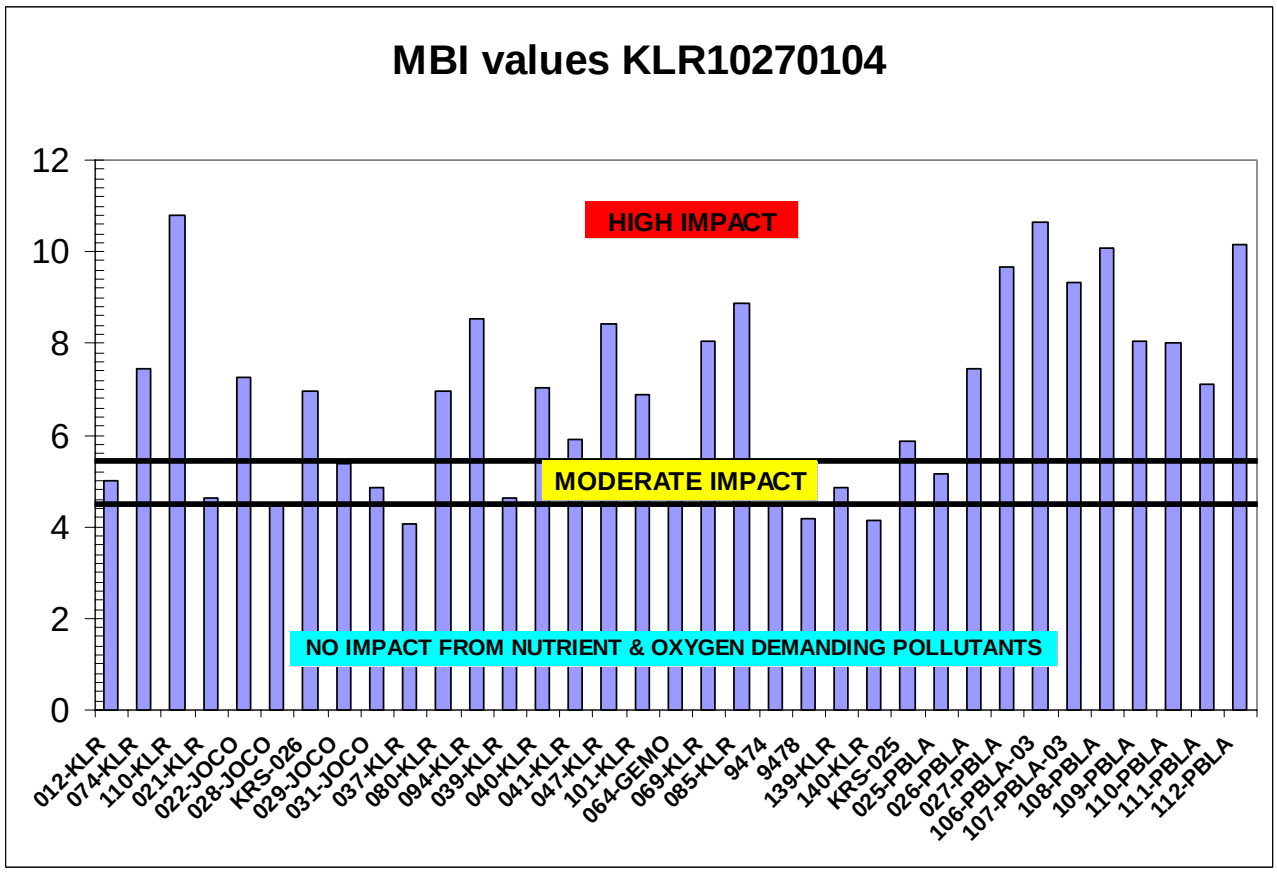


Figure 1. Graph of MBI values for HUC 10270104

Kansas-Lower Republican River Basin
HUC 10270104

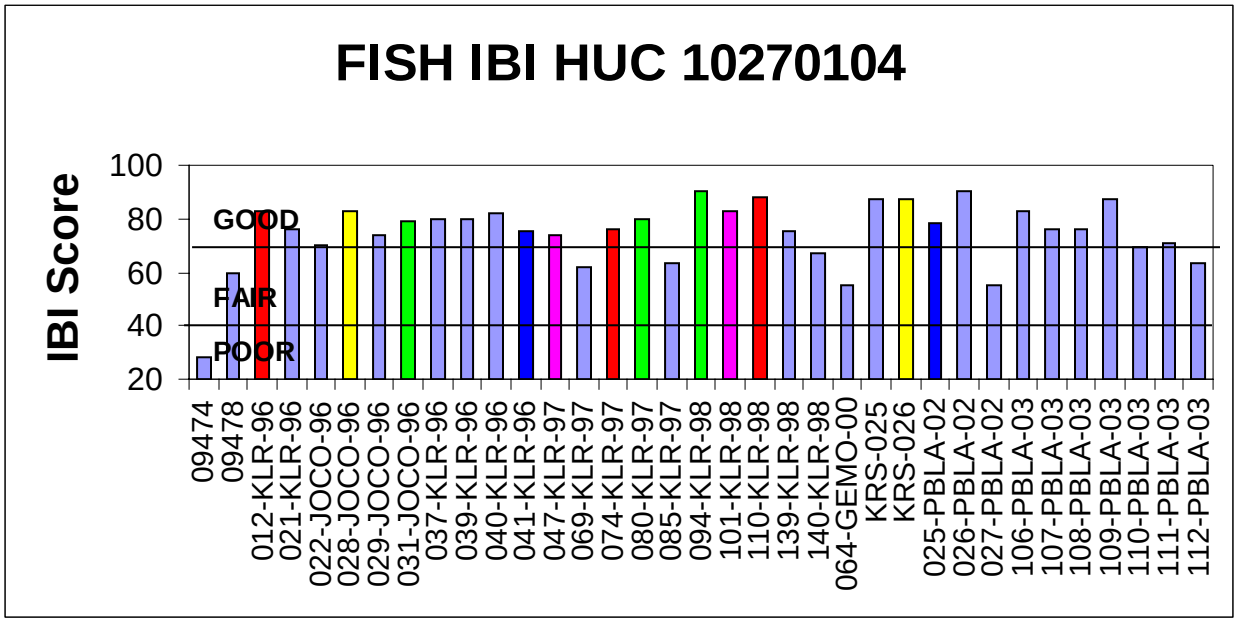
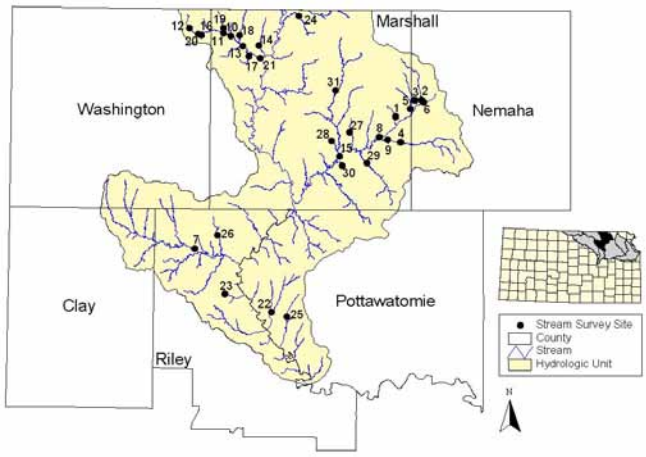


Figure 2. Graph for IBI values for HUC 10270104

Kansas-Lower Republican River Basin

HUC 10270205

LOCATION



- This HUC consists of 31 sites (46 samples).
- Sites were surveyed between 1995-2000.

BIOLOGICAL HIGHLIGHTS

- 3 samples within this HUC were not impacted from nutrient & oxygen demanding pollutants, 8 were moderately impacted category, while 35 were highly impacted category (see figure 1).
- Overall, the MBI value for this HUC is 7.13 indicating that the HUC was highly impacted from nutrient and oxygen demanding pollutants.
- IBI values were good for this HUC considering various stream impacts.
- 35 species of fish were surveyed. See fish species collected, page 4.
    - Topeka shiner – federally endangered
- 20 species of freshwater mussels were surveyed. See mussel species collected page 4.
    - SINC species – creeper, cylindrical papershell, fat mucket

SUMMARY

- This HUC could be considered in fair to good condition based on the information available.
    - Additional surveys should be performed when the opportunity arises to continue assessment of the biological integrity of this HUC.
    - A water quality table is presented on page 3.

Kansas-Lower Republican River Basin

HUC 10270205

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	NF Black Vermillion Trib	MS	96	8	*	7.78	12
1			97	10	*	7.81	15
1			98	13	0.779	5.31	14
2	NF Black Vermillion	NM	96	6	*	6.97	8
2			97	8	0.259	9.12	9
3	NF Black Vermillion Trib	NM	96	9	*	7.87	7
3			97	12	*	5.19	7
3			98	7	0.202	9.15	9
4	Black Vermillion	MS	96	12	*	5.26	13
4			97	7	*	9.58	19
4			98	10	*	6.01	20
5	NF Black Vermillion Trib	MS	96	16	0.458	4.39	6
5			97	17	0.623	4.97	9
5			98	9	0.562	6.75	13
6	NF Black Vermillion Trib	NM	96	15	0.11	8.96	9
6			97	5	*	9.7	10
7	Fancy	RL	96	20	0.379	4.7	11
8	NF Black Vermillion	MS	96	23	0.333	5.78	15
8			97	11	0.849	4.19	15
8			98	12	*	4.09	13
9	Black Vermillion	MS	96	15	0.94	5.02	13
10	Horseshoe	MS	96	21	0.156	5.82	11
10			97	9	*	8.76	11
10			98	7	0.667	6.44	12
11	Horseshoe	MS	97	14	0.125	8.73	11
12	Horseshoe	WS	97	10	0.075	10.42	7
13	Mountain	MS	97	7	*	8.42	10
14	Horseshoe	MS	97	5	*	10.54	16
15	Black Vermillion	MS	00	18	0.686	4.93	20
16	Horseshoe Trib	WS	97	9	0.035	10.36	12
17	Raemer	MS	97	7	*	9.41	13
18	Indian	MS	97	9	0.048	10.4	12
19	Little Indian	MS	97	20	0.341	6.67	14
20	Horseshoe	WS	97	11	0.226	8.88	11
21	Horseshoe	MS	97	5	*	10.28	16
21			98	10	*	6.42	9
22	Carnahan	PT	98	11	0.451	6.87	14
23	Baldwin	RL	98	13	0.08	10.02	12
24	North Elm	MS	98	12	0.556	6.54	15
25	McIntire	PT	98	11	0.536	6.07	6
26	North Otter	RL	98	9	0.504	6.36	13
27	Little Timber	MS	98	5	0.114	10.13	13
28	Robidoux Trib	MS	98	9	0.654	6.17	15
29	Irish	MS	98	11	*	5.59	19
30	Cedar	MS	98	9	0.375	5.99	18
31	Robidoux	MS	95	23	0.778	5.23	20

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

Kansas-Lower Republican River Basin

HUC 10270205

Water Quality Table

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	NA	NA	NA	NA	NA	8.01	NA	NA	NA	0	NA
1	20	442	155	211	6.3	8.05	191	11	0.04	10.6	0.25
1	23	697	89	358	5.5	7.88	285	9.4	0.22	4.9	0.35
2	14	751	56	360	7.3	8.29	320	14.9	0.07	0.1	0.22
2	23	586	27	281	4.5	8.12	171	10	0.06	0.1	0.18
3	20	590	9	284	8.2	8.28	240	17.7	0.03	1.5	0.07
3	24	495	28	219	4.8	8.09	173	12	0.12	0	0.46
3	25	625	37	299	5.1	7.73	228	10.1	0.05	1.4	0.47
4	24	420	108	200	6.3	8.36	192	14.8	0.03	5.5	0.21
4	22	525	63	258	4.2	7.72	163	15	0.16	3.1	0.33
4	22	492	24	235	5	8.14	209	7.1	0.11	0	0.52
5	21	533	12	255	5.4	7.6	218	10.2	0.02	0	0.06
5	16	656	44	316	7.4	8.34	208	10	0.17	0.1	0.45
5	25	388	200	185	7.1	8.06	193	16.3	0.5	4.3	0.48
6	24	687	59	330	4.6	8.27	248	19.2	0.09	1.1	0.22
6	23	491	36	234	4.9	8.23	236	210	20	3.6	0.91
7	27	729	44	347	4.8	8.11	211	17.4	0.02	0.8	0.04
8	20	603	53	291	4.8	6.6	259	16.6	0.15	1.3	0.19
8	23	452	28	213	4.2	8.13	151	16	0.04	0	0.31
8	24	716	25	345	4.8	7.95	152	8.3	0.13	0.2	0.57
9	22	530	108	254	4.9	7.8	277	24.3	0.11	6.6	0.09
10	23	661	148	318	5	7.76	150	19.9	0.29	8.4	0.31
10	25	1335	35	649	4.7	7.99	307	16	0.08	0.4	0.58
10	22	973	76	472	6.1	7.74	286	6.3	0.27	1.5	1.11
11	18	1455	34	696	5.1	7.97	248	11	0	1.6	0.57
12	17	637	11	307	4.1	8.21	252	11	0.26	0	0.33
13	21	1383	71	738	4.5	8	312	17	0.05	2.2	0.81
14	24	1299	49	631	4.5	8.08	291	21	0.12	0.6	0.82
15	22	529	58	254	7.3	NA	207	27	0.1	1.7	0.21
16	21	1106	22	535	3.2	7.9	286	19	0.18	0.1	1.07
17	22	1392	51	680	4.8	7.94	227	32	0.19	1.9	0.35
18	21	951	17	464	2.4	7.61	203	16	0.05	0.2	0.66
19	21	460	102	366	3.7	7.75	186	33	0.26	6	0.96
20	19	859	25	413	3.1	8	183	15	0.14	0.8	0.28
21	20	1467	NA	697	4.8	8.09	222	37	NA	NA	NA
21	23	1347	23	531	5.9	7.94	339	11.9	0.05	0.4	0.55
22	21	672	6	313	6.7	8.18	271	6.4	0.01	1	0.07
23	22	706	48	334	5.5	8.09	348	10.3	0.12	2.1	0.35
24	23	452	142	217	6	7.82	205	12.8	0.17	8.1	0.43
25	23	578	11	279	5.1	7.78	227	2.5	0.06	0.4	0.33
26	24	677	23	330	5.1	8.09	342	9.2	0.09	1.3	0.29

Kansas-Lower Republican River Basin
HUC 10270205

Water Quality Table (continued)

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
27	23	563	23	301	5.3	8.06	211	5.8	0.08	0.9	0.7
28	25	418	103	202	6.2	7.77	201	7.3	0.1	6.2	0.49
29	26	636	10	312	NA	8.14	257	4.8	0.07	0.5	0.32
30	26	824	11	397	4.2	7.71	226	5.3	0.07	0.4	0.64
31	12	680	33	350	7.7	7.12	NA	NA	NA	NA	NA

TDS = total dissolved solids

Fish Species Collected

black buffalo
black bullhead
black crappie
bluegill
bluntnose minnow
central stoneroller
channel catfish
common carp
common shiner
creek chub
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden shiner
green sunfish
green sunfish X bluegill hybrid
Johnny darter
largemouth bass
longnose gar
orangespotted sunfish
orangethroat darter
red shiner
river carpsucker
sand shiner
shorthead redhorse
slender madtom
smallmouth buffalo
southern redbelly dace
stonecat
suckermouth minnow
Topeka shiner
white bass
white crappie
white sucker
yellow bullhead

Mussel Species Collected

black sandshell
creeper
cylindrical papershell
fatmucket
fragile papershell
giant floater
lilliput
mapleleaf
paper pondshell
pimpleback
pink heelsplitter
pink papershell
pistolgrip
plain pocketbook
pondhorn
pondmussel
threeridge
Wabash pigtoe
white heelsplitter
yellow sandshell

Kansas-Lower Republican River Basin
HUC 10270205

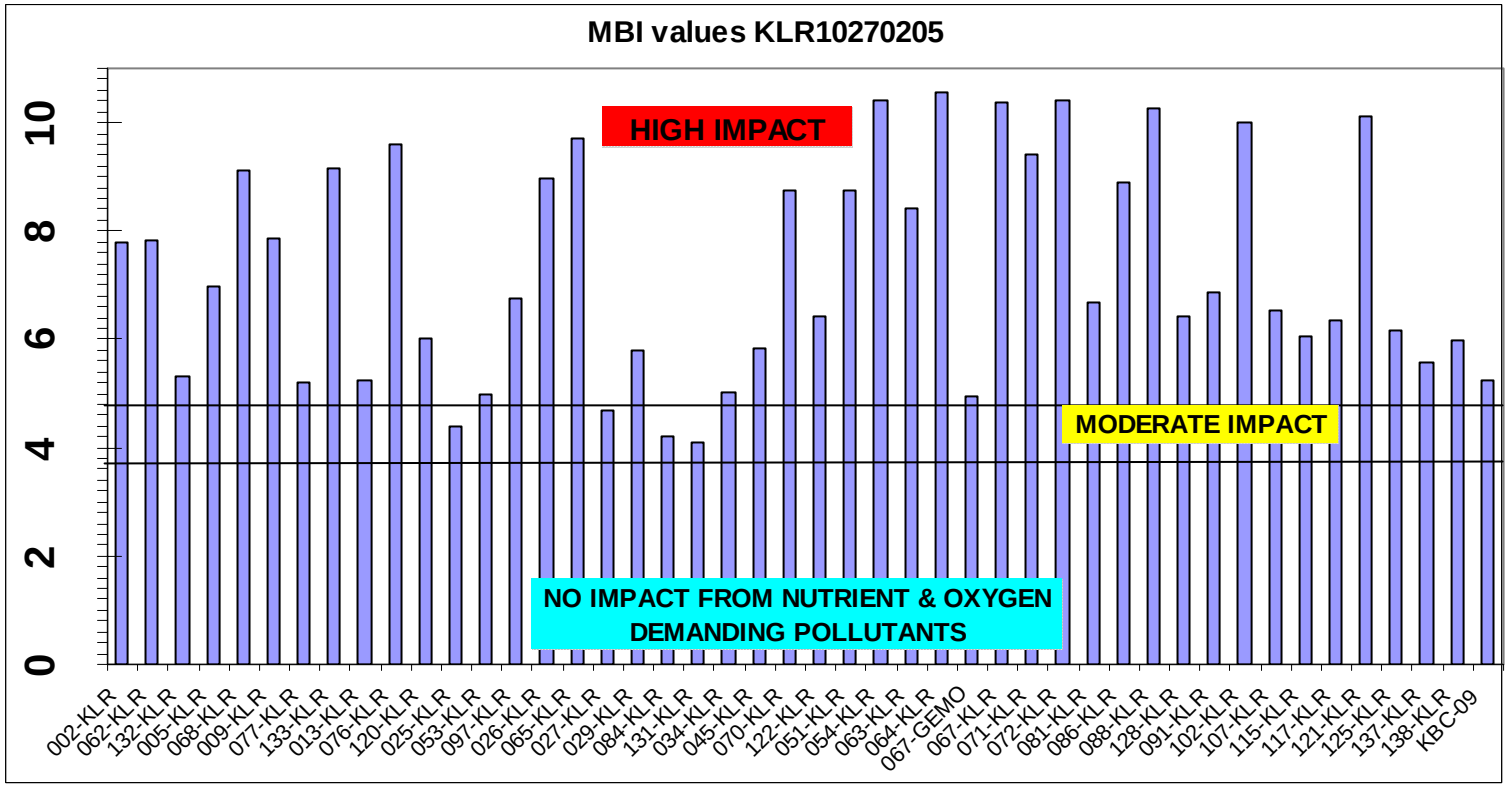


Figure 1. Graph of MBI values for HUC 10270205

Kansas-Lower Republican River Basin
HUC 10270205

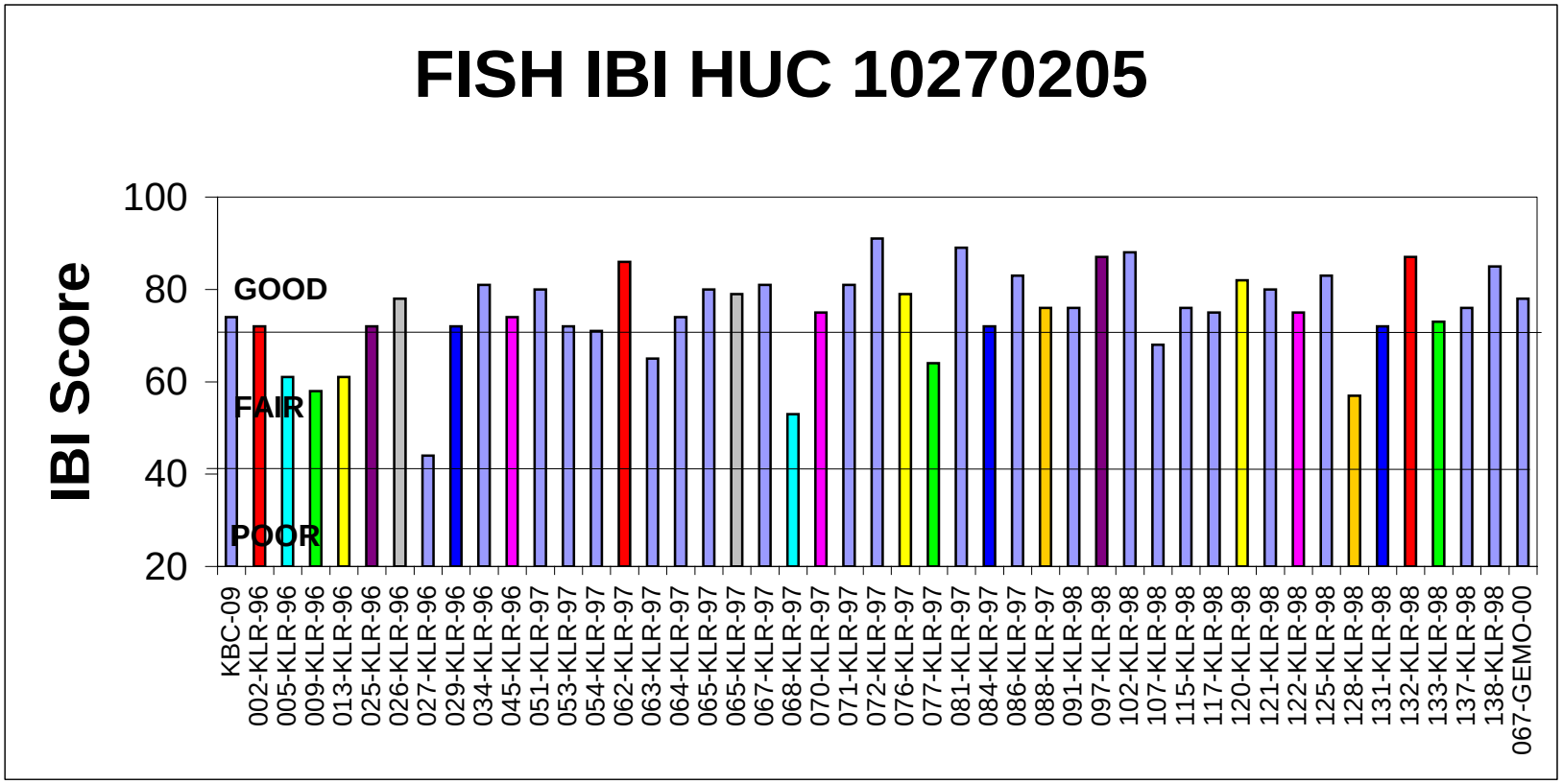
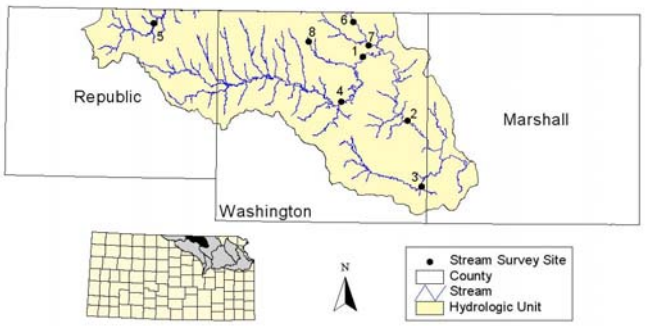


Figure 2. graph of IBI values for HUC 10270205

Kansas-Lower Republican River Basin

HUC 10270207

LOCATION



- This HUC consists of 8 sites (10 samples).
- Sites were surveyed between 1996-2002.

BIOLOGICAL HIGHLIGHTS

- 5 samples were moderately impacted by nutrient and oxygen demanding pollutants, 5 samples were highly impacted (see figure1).
- The overall MBI value for this HUC is 5.94 indicating it is highly impacted from nutrient and oxygen demanding pollutants.
- This HUC contained no sensitive fish species and a high number of tolerant species.
- 32 species of fish were surveyed. See fish species collected, page 2.
- 20 species of freshwater mussels were surveyed. See mussel species collected, page 2.
    - SINC species – creeper, cylindrical papershell, fat ucket, Wabash pigtoe, yellow sandshell

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Mill	WS	96	16	0.769	4.61	14
2	Little Blue	WS	99	11	*	7.42	15
3	Coon	WS	97	14	0.410	6.98	16
3			98	9	0.738	5.09	17
4	Mill	WS	00	12	*	7.16	14
5	Rose	RP	97	9	0.760	4.73	9
5			98	12	0.066	9.13	13
6	Little Blue	WS	00	17	0.682	5.13	17
7	Little Blue	WS	98	7	*	4.73	11
8	Devils	WS	02	14	0.162	7.98	9

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered in fair to good condition based on the information available.
    - Additional surveys should be performed when the opportunity arises to continue assessment of the biological integrity of this HUC.
    - A water quality table is presented on page 2.

Kansas-Lower Republican River Basin
HUC 10270207

Water Quality Table

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	23	578	84	275	5.1	6.27	228	24.5	0.04	3.5	0.09
2	25	552	64	264	5.8	2	125	34	0.06	1.7	0.08
3	19	978	76	478	4.7	8.07	257	7	0.16	4	0.37
3	26	844	26	403	6.6	8.03	271	9.3	0.03	0.3	0.22
4	22	483	113	231	4.4	NA	145	43	0.44	6.1	0.17
5	20	779	21	385	3.9	8.01	287	4.1	0.04	0.6	0.41
5	16	716	51	334	7	7.71	371	65	0.16	2.5	0.41
6	25	587	50	279	6.1	NA	178	27	0.07	2.7	0.33
7	27	574	87	278	5.2	7.82	178	30	0.06	4.1	0.89
8	23	374	60	1798	3.8	8.3	128	0.6	0.13	3.2	0.4

TDS = total dissolved solids

Fish Species Collected

black bullhead
bluegill
bluntnose minnow
central stoneroller
channel catfish
common carp
common shiner
creek chub
emerald shiner
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden shiner
green sunfish
Johnny darter
largemouth bass
longnose gar
orangespotted sunfish
orangethroat darter
plains killifish
red shiner
river carpsucker
sand shiner
smallmouth buffalo
stonecat
suckermouth minnow
western mosquitofish
white bass
white crappie
white sucker
yellow bullhead

Mussel Species Collected

black sandshell
creeper
cylindrical papershell
fatmucket
fingernail clam
fragile papershell
giant floater
lilliput
mapleleaf
pimpleback
pink heelsplitter
pink papershell
pistolgrip
plain pocketbook
pondhorn
pondmussel
threeridge
Wabash pigtoe
white heelsplitter
yellow sandshell

Kansas-Lower Republican River Basin
HUC 10270207

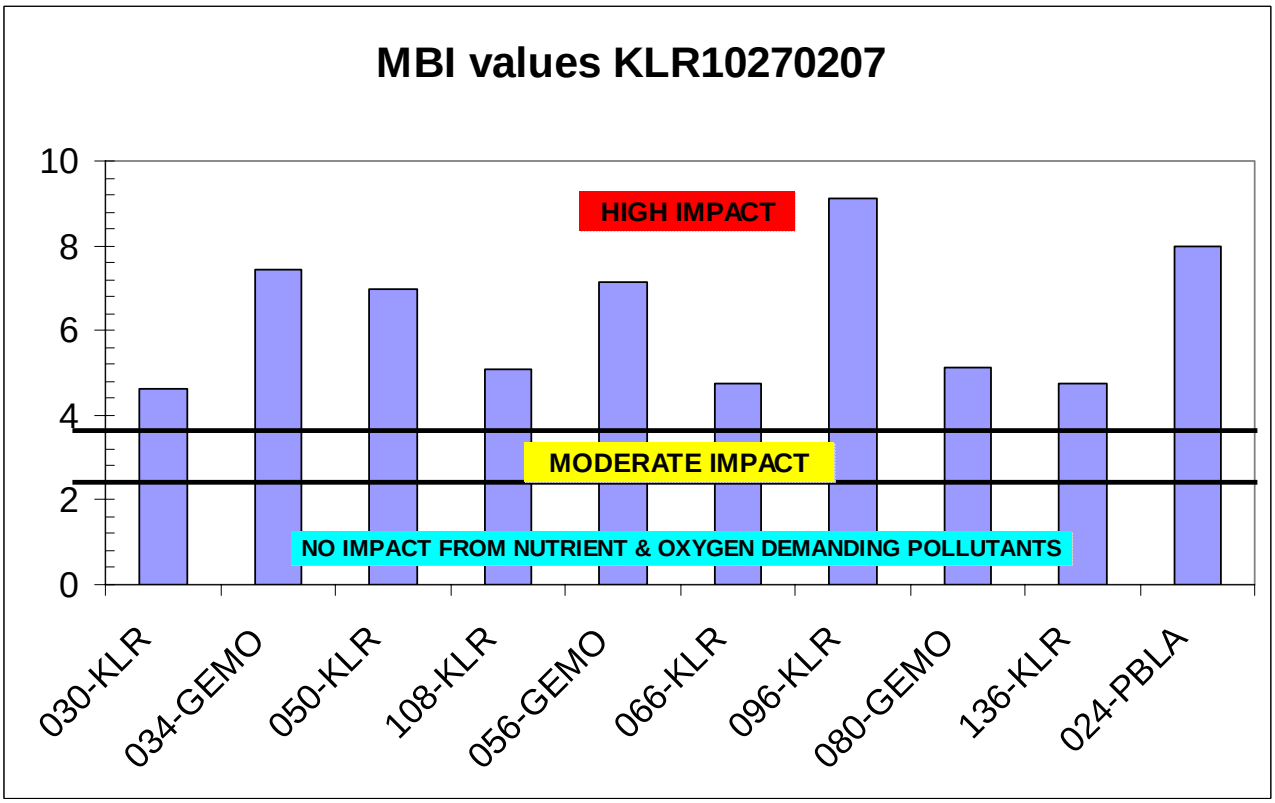


Figure 1. Graph of MBI values for HUC 10270207

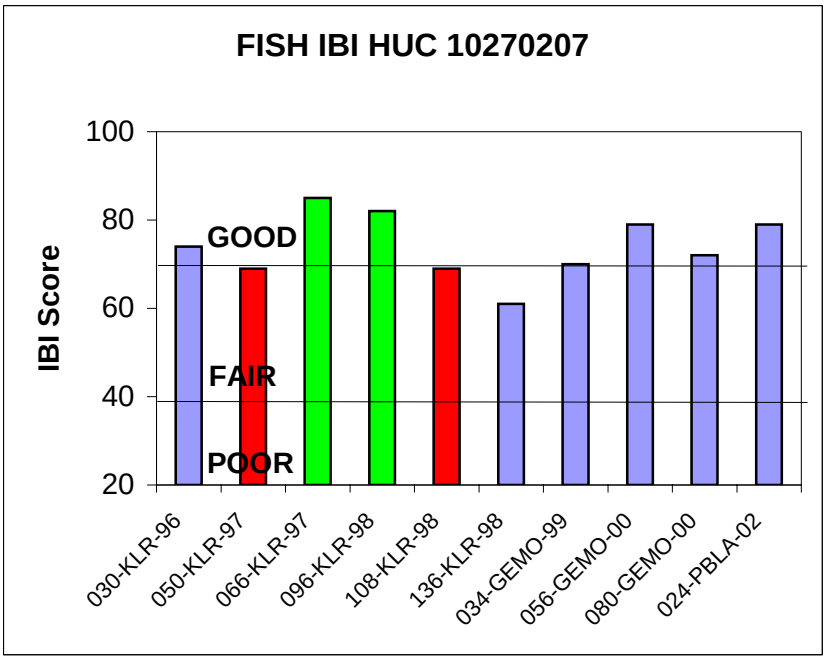
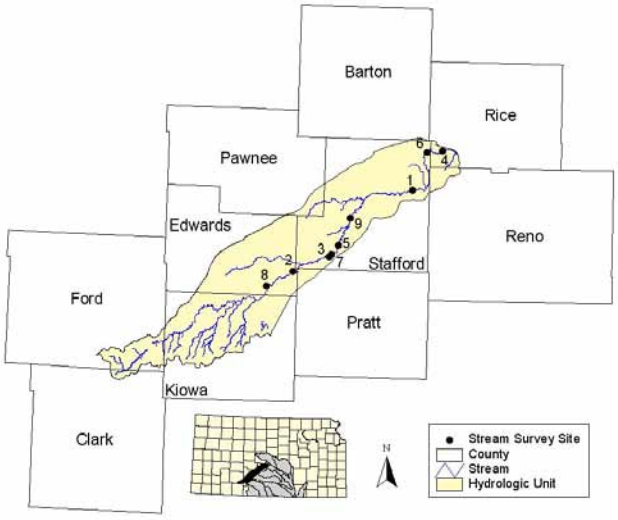


Figure 2. Graph of IBI values for HUC 10270207

Lower Arkansas River Basin
HUC 11030009

LOCATION



- This HUC consists of 9 sites (12 samples).
- Sites were surveyed between 1995-2001.

BIOLOGICAL HIGHLIGHTS

- 2 samples not impacted from nutrient & oxygen demanding pollutants, 2 samples were moderately impacted, and the remaining 8 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC is 6.12 indicating that it is highly impacted.
- 20 species of fish were surveyed within this HUC. See fish species collected page 2.
    - State threatened – Arkansas darter
- 5 species of freshwater mussels were collected. See mussel species collected, page 2.

Image 1. Rattlesnake Creek, Stafford Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Rattlesnake	SF	99	12	0.197	7.04	12
2	Rattlesnake	ED	99	14	0.093	8.49	11
3	Rattlesnake	SF	99	5	*	4.3	9
4	Rattlesnake	RC	99	10	*	5.4	7
5	Rattlesnake	SF	95	3	*	8.07	11
5			99	8	*	5.28	12
5			00	14	0.732	5.13	11
5			01	21	0.574	5.88	13
6	Rattlesnake	SF	99	7	*	5.65	15
7	Rattlesnake	SF	99	13	0.248	7.54	14
8	Rattlesnake	ED	00	11	0.19	8.17	11
9	Rattlesnake	SF	00	15	0.718	4.06	10

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair to good health.

- Protection efforts should be utilized to maintain the Arkansas darter population.
- High nitrate readings could be the result of the amount of row crop agriculture in this HUC.
- A water quality table is presented on page 2.

Lower Arkansas River Basin
HUC 11030009

Water Quality Table

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	29	3330	56	1680	5.9	8.2	201	757	0.14	1.7	0.38
2	22	563	23	271	5.2	8.2	224	24	0.1	5.2	0.09
3	22	499	37	238	5.3	8.5	168	26	0.06	2.2	0.33
4	23	5600	150	295	6.1	2.9	165	1683	0.09	3.1	0.08
5	23	500	36	260	5.2	8.24	NA	NA	NA	NA	NA
5	26	440	119	209	5.6	8.7	172	25	0.11	2.7	0.17
5	24	507	73	246	7	8.9	209	52	0.01	0.5	0.12
5	22	457	82	218	8	7.9	126	97	0.08	1.7	0.04
6	22	4230	133	2180	7.1	8.8	174	1279	0.12	6.2	0.02
7	21	502	34	265	6.3	9	200	55	0.04	1.6	0.08
8	16	364	32	173	5.5	7.5	196	48	0.55	1.1	0.26
9	24	534	132	254	5.9	9	240	108	0.05	6.2	0.08

TDS = total dissolved solids

Fish Species Collected

Arkansas darter
black bullhead
bluegill
channel catfish
common carp
fathead minnow
flathead catfish
gizzard shad
goldfish
green sunfish
largemouth bass
orangespotted sunfish
plains killifish
red shiner
sand shiner
shorthead redhorse
suckermouth minnow
western mosquitofish
white crappie
yellow bullhead

Mussel Species Collected

fingernail clam
giant floater
lilliput
mapleleaf
pondhorn

Lower Arkansas River Basin
HUC 11030009

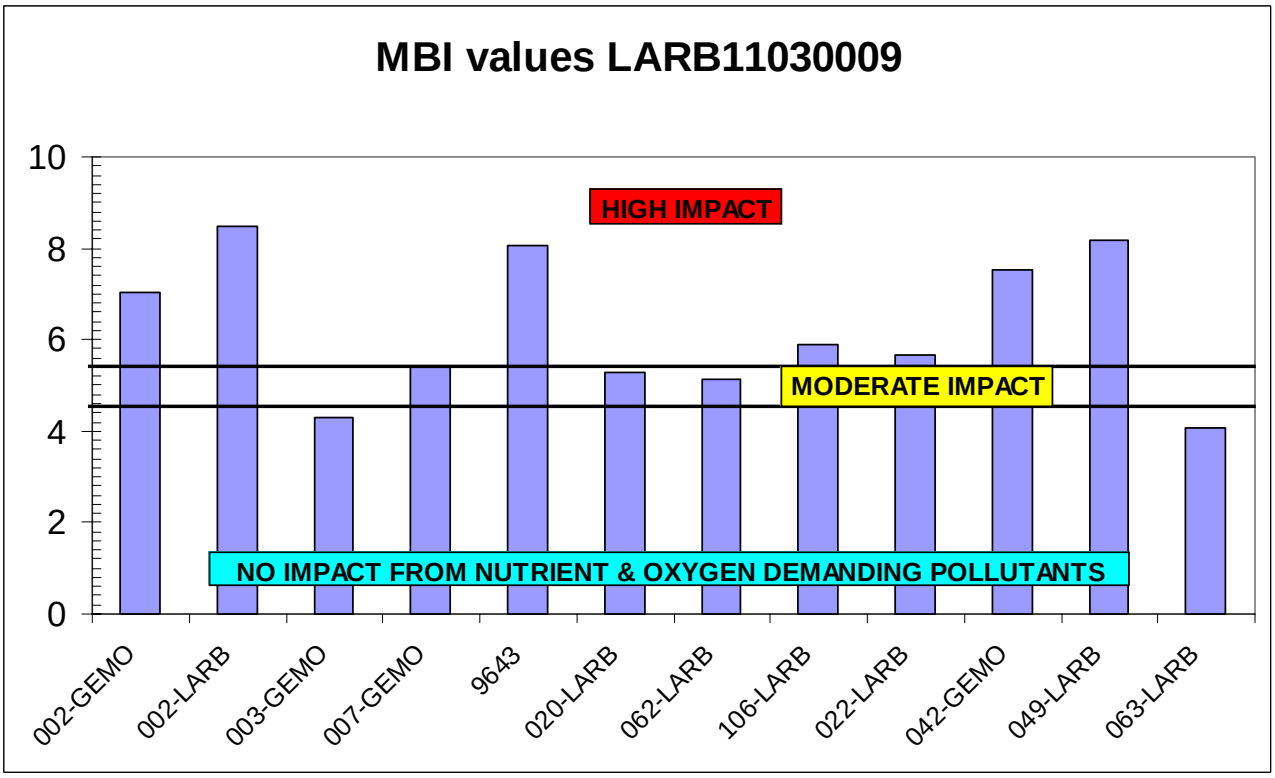


Figure 1. Graph of MBI values for HUC 11030009

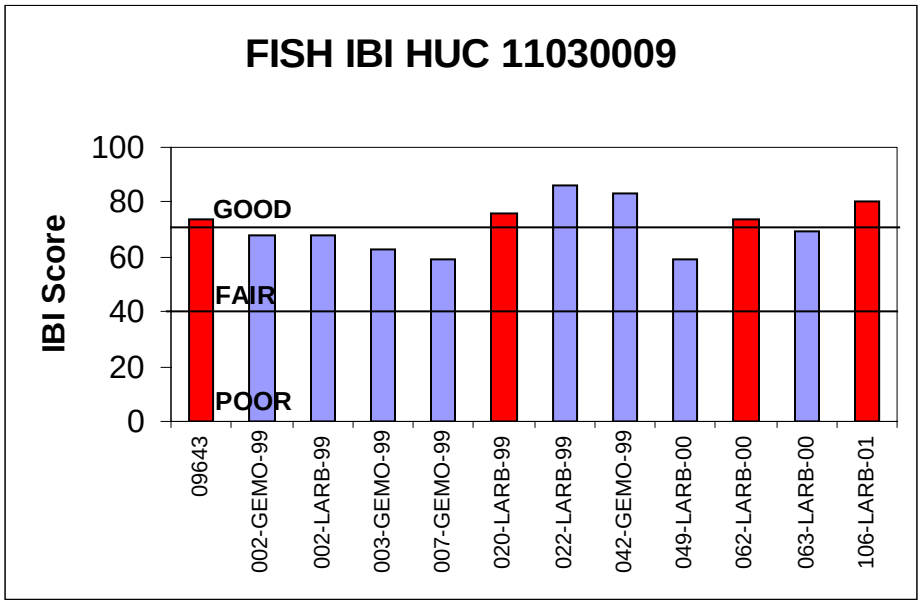
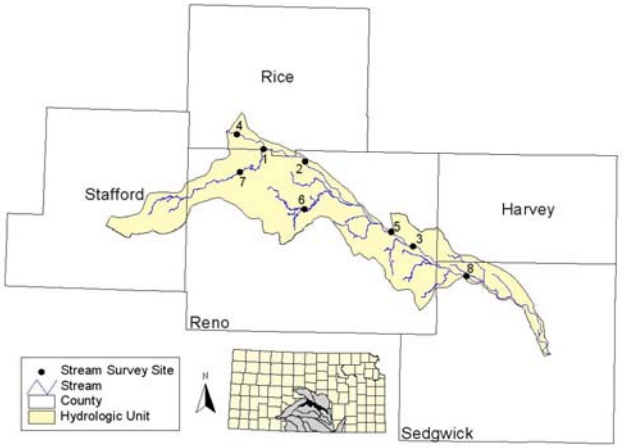


Figure 2. Graph of IBI values for HUC 11030009

Lower Arkansas River Basin
HUC 11030010

LOCATION



- This HUC consists of 8 sites (8 samples).
- Sites were surveyed between 1999-2001.

BIOLOGICAL HIGHLIGHTS

- 1 sample was moderately impacted by nutrient and oxygen demanding pollutants, 7 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 6.96, indicating high impact from nutrient and oxygen demanding pollutants.
- Tributaries to the Arkansas River contain sensitive fish species.
- This HUC has a high introduced species to native fish species proportion.
- 23 species of fish were surveyed. See fish species collected page 2.
    - State threatened – Arkansas darter.
- 5 species of freshwater mussels were collected.

Image 1. Arkansas River, Reno Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Peace	RN	99	12	*	4.85	14
2	Arkansas	RN	00	13	0.437	7.68	12
3	Arkansas	RN	00	25	0.517	6.78	9
4	Arkansas	RC	00	14	0.611	6.5	9
5	Arkansas	RN	00	19	0.606	6.02	10
6	Salt	RN	01	5	*	8.83	13
7	Peace	RN	01	13	0.081	6.28	10
8	Arkansas	SG	01	32	0.182	8.57	15

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair condition based on the information available at this time.

- Protection efforts should be utilized to maintain the Arkansas darter population.
- Additional surveys should be performed as the opportunity arises to continue accurate assessment of the biological integrity of this HUC.
- A water quality table is presented on the next page.
- High conductivity and chlorides are evident in this HUC.

Lower Arkansas River Basin
HUC 11030010

Water Quality Table

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	20	5480	59	2890	8.3	8.6	179	1501	0.15	1	0.07
2	27	1477	385	721	6.7	NA	166	211	0.3	0	0.31
3	24	2120	17	1070	4.9	NA	180	380	0.03	2.3	0.06
4	25	2070	37	1030	6.1	8.1	234	441	0.04	0.05	0.6
5	24	2080	33	1030	6.8	8	193	432	0.02	1.4	0.03
6	24	806	139	386	4.5	7.7	194	460	0.18	6.6	0.45
7	20	7610	28	4090	8.2	8.1	240	2512	0.03	0.8	0.06
8	24	2010	36	994	6.6	7.8	123	449	0.1	0.4	0.03

TDS = total dissolved solids

Fish Species Collected

Arkansas darter
black bullhead
bluegill
bullhead minnow
channel catfish
common carp
fathead minnow
flathead catfish
gizzard shad
goldfish
green sunfish
largemouth bass
longear sunfish
orangespotted sunfish
plains killifish
quillback
red shiner
river carpsucker
sand shiner
shorthead redhorse
smallmouth buffalo
suckermouth minnow
western mosquitofish

Mussel Species Collected

Asian clam
giant floater
mapleleaf
pondhorn
pondmussel

Lower Arkansas River Basin
HUC 11030010

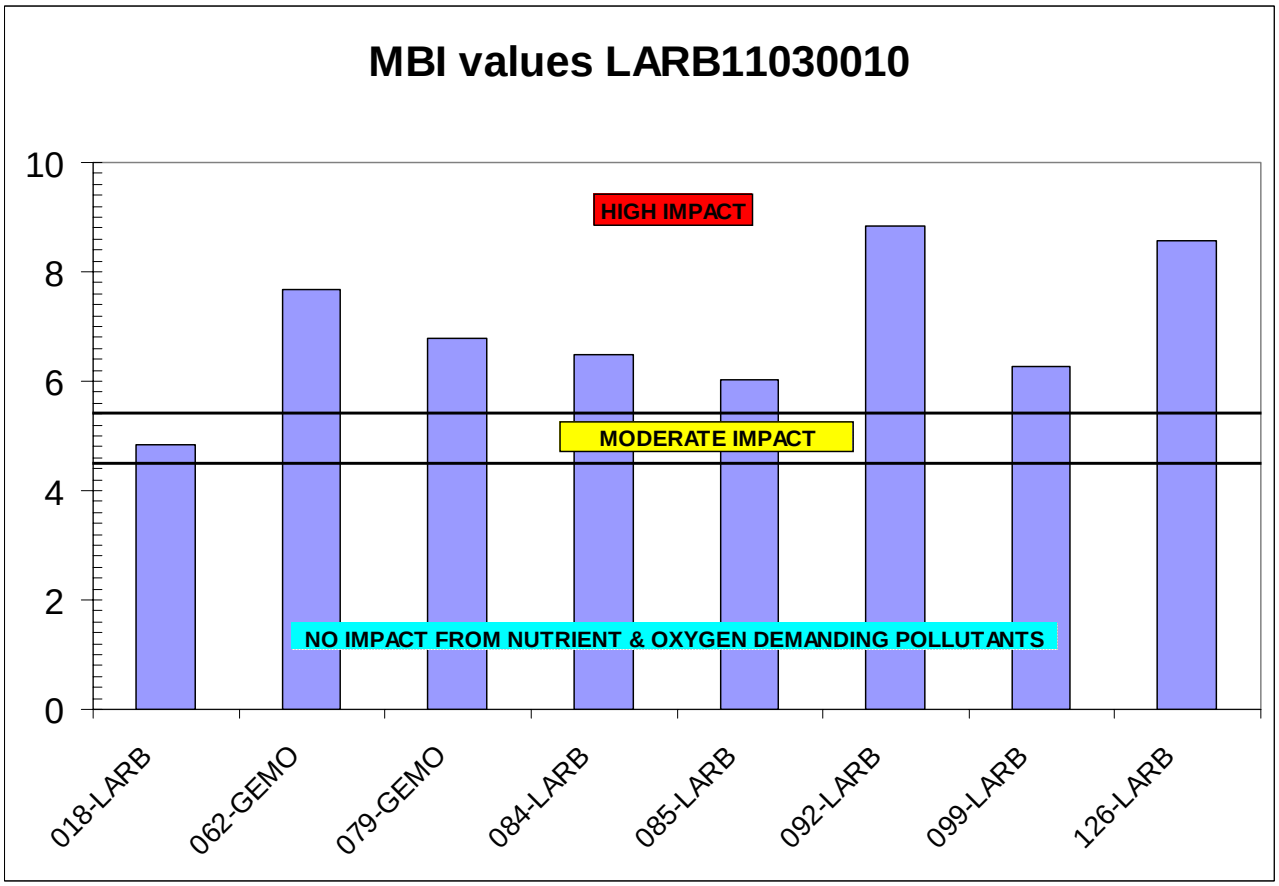


Figure 1. Graph of MBI values for HUC 11030010

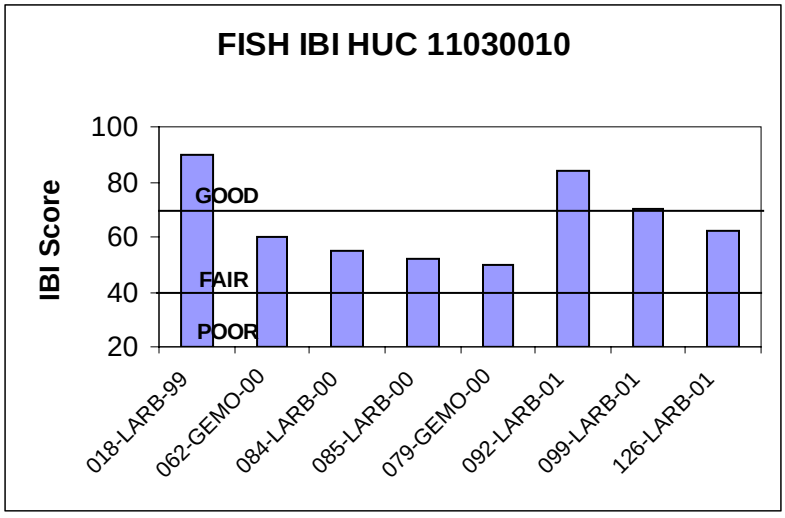
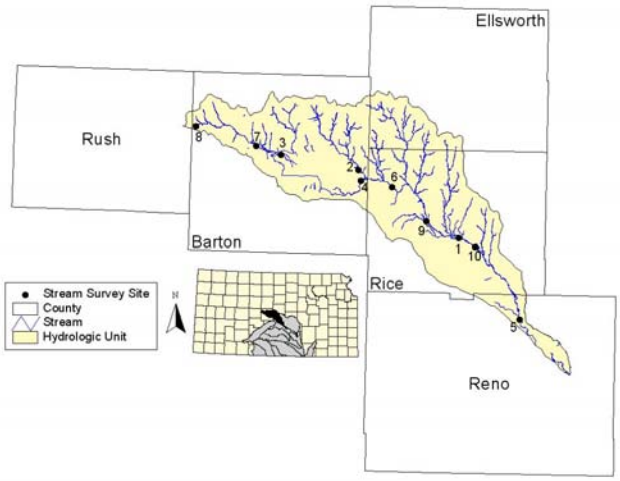


Figure 2. Graph of IBI values for HUC 11030010

Lower Arkansas River Basin
HUC 11030011

LOCATION



- This HUC consists of 10 sites (15 samples).
- Sites were surveyed between 1994-2001.

BIOLOGICAL HIGHLIGHTS

- 3 samples were not impacted from nutrient & oxygen demanding pollutants, 7 were moderately impacted, and 5 were highly impacted (see figure 1).
- The overall MBI value for this HUC is 5.58, indicating it is highly impacted.
- Site on Little Cheyenne Creek is physiographically unique to the rest of the HUC.
- 21 species of fish were surveyed. See fish species collected, page 2.
- 11 species of freshwater mussels were surveyed. See mussel species collected page 2.
    - SINC species - creeper

Image 1. Little Cheyenne Creek, Barton Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Cow	RC	99	6	*	4.67	3
1			00	9	*	5.27	9
2	Cow	BT	99	10	*	8.59	9
3	Blood	BT	99	5	0.032	10.52	8
4	Little Cheyenne	BT	99	7	0.913	4.51	14
4			00	21	0.386	4.62	15
4			01	22	0.198	7.61	16
5	Cow	RN	99	13	*	3.93	14
5			00	16	0.693	4.15	15
5			01	18	0.669	4.7	9
6	Cow	RC	00	18	0.664	4.54	12
7	Blood	BT	00	15	0.159	8.1	6
8	Blood Trib	BT	94	8	*	8.23	3
9	Cow	RC	95	3	*	3.75	7
10	Cow	RC	01	21	0.594	5.05	10

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair to good health overall, based on the information available at this time.

- Additional surveys should be performed as the opportunity arises to continue assessment of the biological integrity of this HUC
- High turbidity, conductivity, and chlorides for this HUC.
- A water quality table is presented on the next page.

Lower Arkansas River Basin
HUC 11030011

Water Quality Table

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	25	1679	157	824	5.4	3	204	429	0.23	0	1.04
1	24	1312	118	1037	4.5	NA	210	251	0.18	0	0.48
2	20	1026	146	497	8.3	8.3	112	201	0.18	7.9	0.21
3	25	1347	60	658	5.2	8.7	254	184	0.03	2.1	0.31
4	26	1142	163	556	7.5	8.7	250	5000	0.17	9	0.27
4	19	3280	149	1660	7.6	8.3	458	761	0.13	7.9	0.13
4	21	2140	129	1070	3.2	8.2	105	599	0.1	5.6	0.16
5	22	1076	125	518	5.7	8.6	155	152	0.27	6.1	0.37
5	22	992	119	486	6.3	8.2	259	196	0.05	5	0.27
5	24	898	94	432	6.8	8	220	129	0.09	3.8	0.27
6	24	3130	118	1590	2.9	8.5	381	729	0.02	6	0.29
7	18	1527	76	749	5.7	8.4	698	205	0.22	3.7	0.47
8	22	6100	157	3050	7.7	8.28	NA	NA	NA	NA	NA
9	20	2600	56	1300	4.5	7.13	NA	NA	NA	NA	NA
10	24	1125	95	546	5.8	7.8	191	206	0.27	2.8	0.32

TDS = total dissolved solids

Fish Species Collected

black bullhead
bluegill
bullhead minnow
channel catfish
common carp
fathead minnow
flathead catfish
gizzard shad
goldfish
green sunfish
longear sunfish
longear sunfish hybrid
orangespotted sunfish
plains killifish
red shiner
river carpsucker
sand shiner
smallmouth buffalo
suckermouth minnow
western mosquitofish
white crappie
yellow bullhead

Mussel Species Collected

Asian clam
creeper
fingernail clam
fragile papershell
giant floater
lilliput
mapleleaf
pimpleback
pink papershell
pondhorn
white heelsplitter

Lower Arkansas River Basin
HUC 11030011

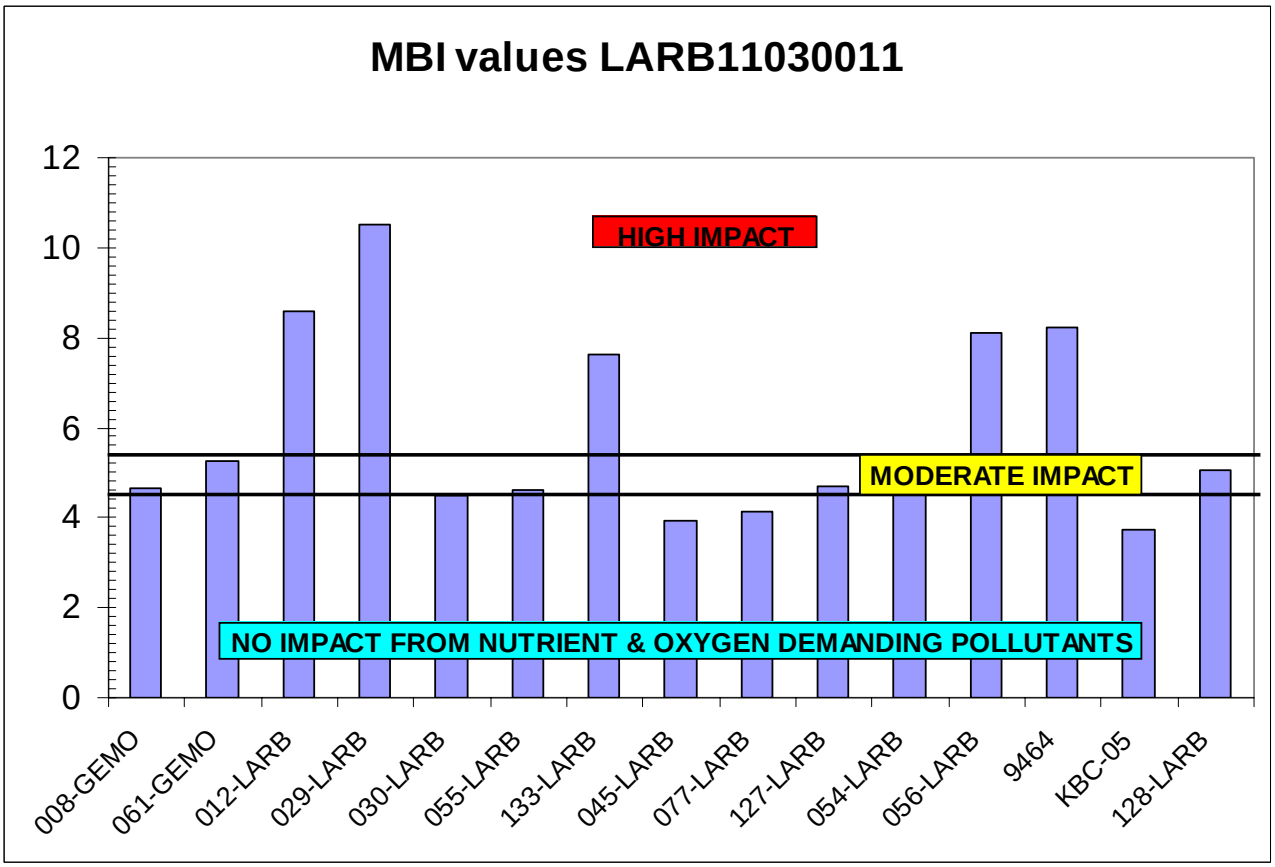


Figure 1. Graph of MBI values for HUC 11030011

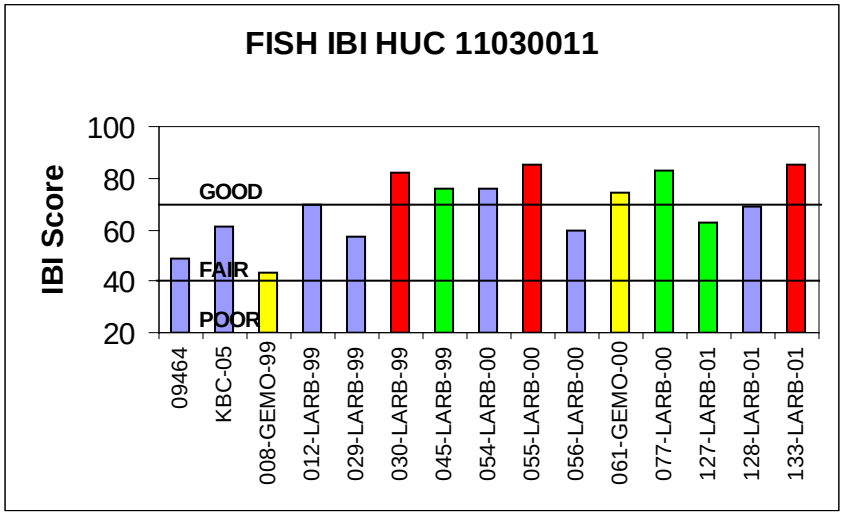
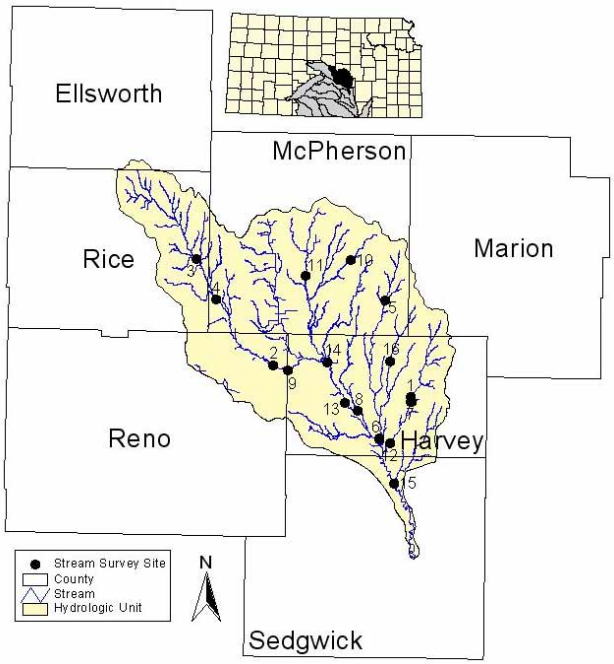


Figure 2. Graph of IBI values for HUC 11030011

Lower Arkansas River Basin

HUC 11030012

LOCATION



- This HUC consists of 16 sites (22 samples).
- Sites were surveyed between 1994-2001.

BIOLOGICAL HIGHLIGHTS

- 1 sample was not impacted from nutrient and oxygen demanding pollutants, 5 samples were moderately impacted category, and 15 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC is 7.16, indicating that the HUC is highly impacted by nutrient and oxygen demanding pollutants.
- 32 species of fish were surveyed within this HUC. See fish species collected, page 2.
- Recent collection of an emerald shiner is a noteworthy discovery.
- 17 species of freshwater mussels were surveyed. See mussel species collected, page 3.
- Mussel collections for the lower Little Arkansas River show westward populations of present day eastern mussel species.

Stream picture (see page 3)

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Sand	HV	99	5	*	11	16
1			00	15	0.383	7.96	14
1			01	13	0.373	7.02	18
2	Little Arkansas	RN	96	5	*	7.81	9
3	Little Arkansas	RC	99	13	0.031	5.97	12
4	Little Arkansas	MP	99	11	*	5.82	10
5	W Emma	MP	99	10	0.773	4.97	12
6	Emma	HV	94	6	*	7.79	12
6			00	19	0.296	6.47	13
7	Sand	HV	94	0	0.000	0	11
7			00	8	0.034	6.47	17
8	Little Arkansas	HV	99	9	*	4.13	17
9	Little Arkansas	HV	00	12	0.814	4.81	13
10	Running Turkey	MP	00	13	0.089	10.27	9
11	Dry Turkey	MP	00	11	0.078	9.66	9
11			01	18	0.041	6.82	7
12	Sand	HV	00	15	0.597	5.03	19
13	Little Arkansas	HV	00	12	0.399	5.04	12
14	Little Arkansas	HV	00	23	0.533	5.29	12
15	Little Arkansas	SG	00	18	0.404	7.12	16
15			01	22	0.432	7.16	16
16	Middle Emma	HV	01	21	0.247	5.81	11

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair to good health overall, based on the information available at this time.

- Additional surveys should be performed as the opportunity arises to continue assessment of the biological integrity of this HUC
- A water quality table is presented on the next page.

Lower Arkansas River Basin
HUC 11030012

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	20	704	73	337	8	8.6	204	15	0.55	3.5	0.19
1	22	723	57	345	7.3	8.9	330	61	0.25	1.1	0.26
1	23	272	109	128	6.3	7.8	157	39	0.14	5.7	0.22
2	22	1076	93	523	6.3	7.8	189	15.8	NA	NA	0.37
3	21	1023	85	496	6.4	8.6	229	101	0.13	3.3	0.19
4	20	1075	152	521	7.5	8.4	174	202	0.22	5.7	0.22
5	19	495	36	237	6.7	8.4	180	23	0.08	3.9	0.22
6	19	314	212	170.4	8	8.1	132	44	0.23	3.9	0.54
6	28	250	202	140	9.8	7.5	NA	NA	NA	NA	NA
7	21	512	39	271	6.6	8	160	55	0.13	5	0.27
7	24	700	70	360	8.9	7.59	NA	NA	NA	NA	NA
8	23	848	59	408	8.5	8.8	197	103	0.02	2.3	0.19
9	23	1392	64	680	7.7	8.4	468	541	0.08	2.2	0.34
10	18	6710	40	3570	6	8.1	421	2332	0.26	0.9	0.19
11	22	1983	92	981	5.5	8.1	165	495	0.17	4.5	0.32
11	24	2300	121	1140	3.2	7.4	1763	557	0.28	7.7	0.43
12	22	944	146	456	5.3	8.6	346	127	0.06	8.5	1.3
13	26	753	68	361	6.8	NA	198	103	0.1	3.1	0.37
14	24	1321	43	644	5.8	NA	275	228	0.09	1.2	0.32
15	25	727	40	349	6.8	8	258	125	0.06	0.3	0.31
15	27	724	47	349	5.5	8	225	57	0.08	0.9	0.27
16	23	682	22	326	4.8	7.8	279	81	0.09	3.8	0.68

TDS = total dissolved solids

Fish Species Collected

bigmouth buffalo
black bullhead
black crappie
bluegill
bluegill X green sunfish hybrid
bluntnose minnow
bullhead minnow
central stoneroller
channel catfish
common carp
emerald shiner
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden shiner
goldfish
green sunfish
largemouth bass
longear sunfish
orangespotted sunfish
plains killifish
quillback
red shiner
river carpsucker
sand shiner
slenderhead darter
smallmouth buffalo
suckermouth minnow
western mosquitofish
white bass
white crappie
yellow bullhead

Lower Arkansas River Basin
HUC 11030012

Mussel Species Collected

Asian clam	pimpleback
bleufer	pink papershell
creeper	pistolgrip
fingernail clam	pondhorn
fragile papershell	pondmussel
giant floater	threeridge
lilliput	white heelsplitter
mapleleaf	yellow sandshell
paper pondshell	

Image 1. Little Arkansas River, Sedgwick Co.

Lower Arkansas River Basin
HUC 11030012

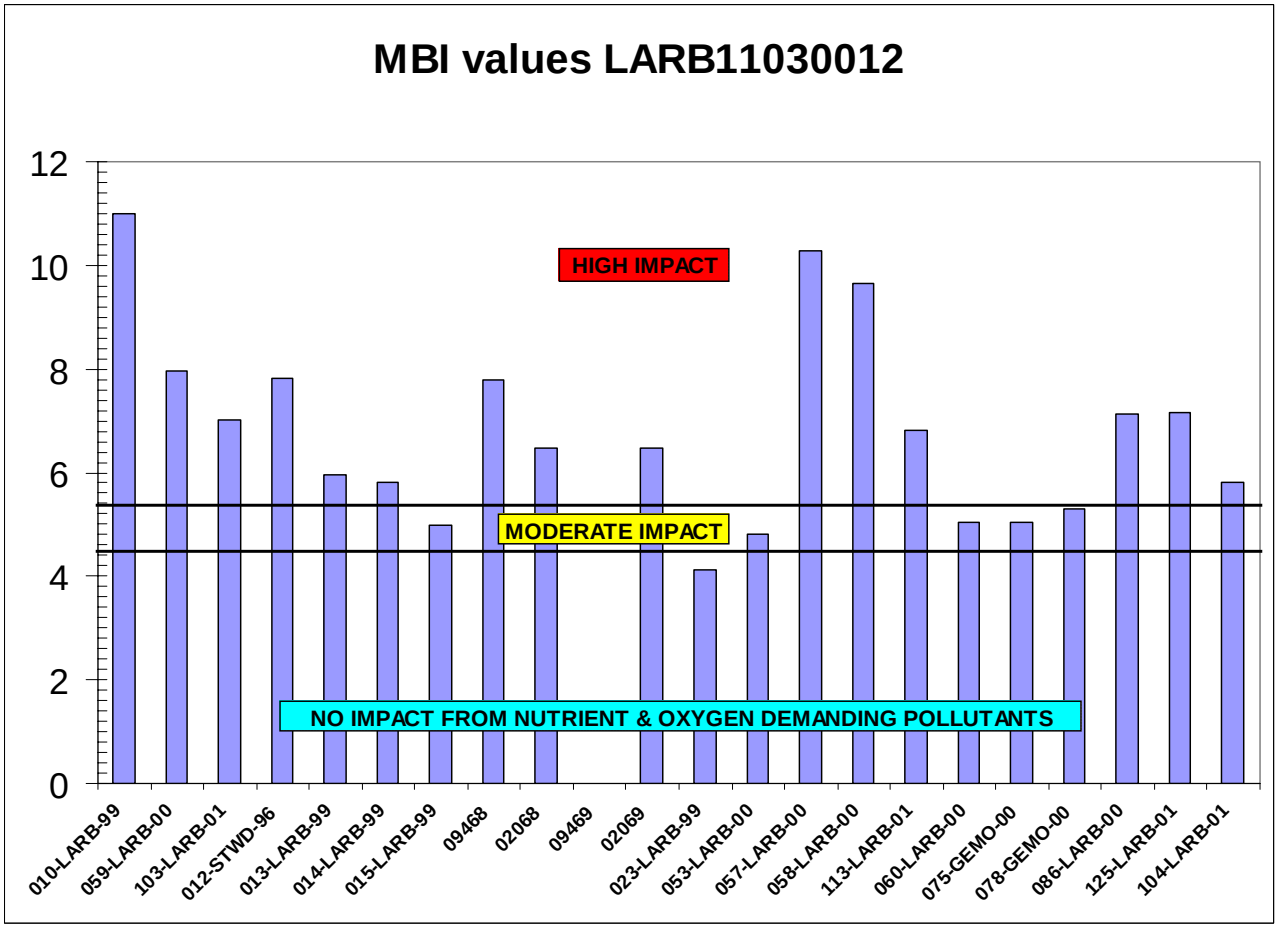


Figure 1. Graph of MBI values for HUC 11030012

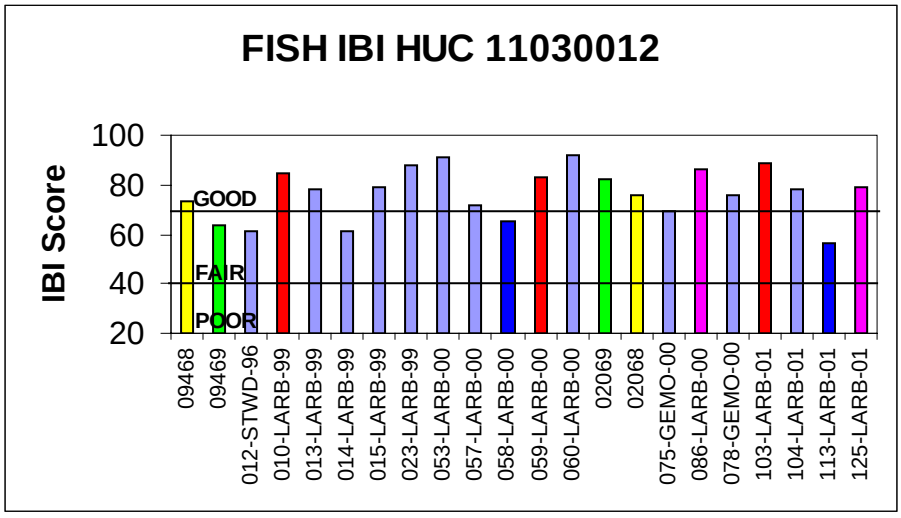
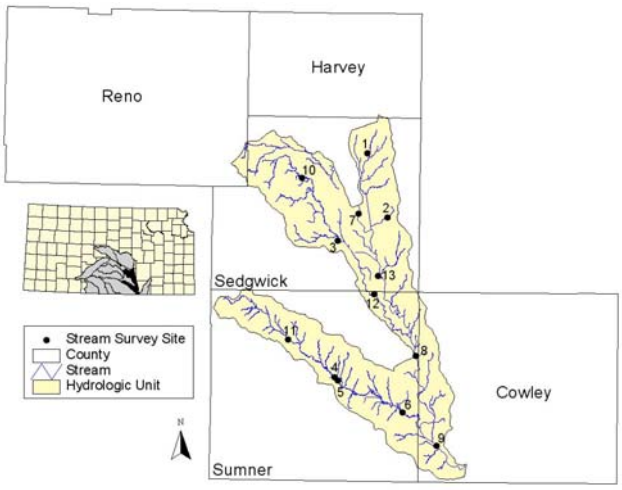


Figure 2. Graph of IBI values for HUC 11030012

Lower Arkansas River Basin
HUC 11030013

LOCATION



- This HUC consists of 13 sites (16 samples).
- Sites were surveyed between 1999-2001.

BIOLOGICAL HIGHLIGHTS

- 1 sample within this HUC was not impacted by nutrient and oxygen demanding pollutants, 4 sites were moderately impacted, and 11 sites were highly impacted (see figure 1).
- The overall MBI value for this HUC was 6.32, indicating that this HUC has been highly impacted by nutrient and oxygen demanding pollutants.
- 46 species of fish were surveyed. See fish species collected, page 2.
    - State endangered – silver chub, peppered chub (Arkansas river speckled chub)
    - IBI metric shows a good native fish species richness to stream width proportion.
    - Many sensitive species downstream of Lincoln St. dam on the Arkansas River.
    - New state collection record of an inland silverside from the Arkansas R.
- 14 species of freshwater mussels were surveyed.
    - SINC species – Wabash pigtoe, yellow sandshell

Stream photos (see page 3)

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Chisolm	SG	99	10	*	7.49	17
2	Gypsum	SG	99	16	0.169	7.9	
3	Cowskin	SG	99	11	0.088	5.36	22
3			00	18	0.546	5.91	21
3			01	28	0.338	6.18	22
4	Slate	SU	99	15	0.66	5.77	22
5	Slate	SU	00	17	*	4.27	15
6	Slate	SU	00	18	0.598	5.04	21
6			01	25	0.327	5.96	20
7	Arkansas	SG	00	15	0.062	7.74	31
8	Arkansas	SU	00	6	0.12	8.95	29
9	Arkansas	CL	00	14	0.159	8.8	26
10	Cowskin	SG	01	14	0.092	5.35	11
11	Slate	SU	01	28	0.401	6.15	14
12	Cowskin	SU	01	24	0.178	5.08	16
13	Arkansas	SG	01	14	0.154	7.91	24

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in good health overall, based on current information available.

- Protection efforts should be utilized to maintain the Arkansas river speckled chub and silver chub populations.
- Loss of sensitive fish diversity within the HUC upstream of Lincoln St. dam is noticeable.
- A water quality table is presented on the next page.

Lower Arkansas River Basin
HUC 11030013

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	26	349	165	166	9.1	8.2	179	12	0.17	9.8	0.18
2	23	2250	11	1130	7.9	8.4	257	248	0	0.6	0.1
3	26	400	596	191	6	8.6	33	26	0.55	35.8	0.37
3	26	738	30	356	4.5	8.5	248	85	0.07	0.1	0.18
3	24	714	31	350	5	7.9	219	60	0.12	2.7	0.11
4	25	1093	33	531	3.8	5.2	239	87	0.05	0.9	0.16
5	26	827	58	397	8.4	NA	301	84	0.07	2.6	0.19
6	23	4170	73	2140	4.7	8.1	244	1033	0.1	3.3	0.2
6	26	8560	35	4660	6.2	7.9	260	2869	0.04	0.4	0.13
7	20	1564	201	770	5.5	8	191	332	0.55	12	0.13
8	21	1493	30	732	6.6	8.3	246	275	0.02	2.2	0.34
9	23	1837	40	906	6.2	8.7	208	459	0.05	5.6	0.13
10	22	326	324	155	2.7	7.5	149	21	0.51	29.9	0.37
11	26	1072	28	521	4.8	8.1	265	111	0.09	0.3	0.17
12	25	1014	43	493	5.3	8	294	119	0.08	2.4	0.42
13	23	1266	28	616	5	8.1	1231	255	0.06	7	0.53

TDS = total dissolved solids

Fish Species Collected

black buffalo
black bullhead
black crappie
bluegill
bluntnose minnow
bullhead minnow
central stoneroller
channel catfish
common carp
emerald shiner
fathead minnow
flathead catfish
freckled madtom
freshwater drum
gizzard shad
golden shiner
goldfish
grass carp
green sunfish
inland silverside
largemouth bass
logperch
longear sunfish
longnose gar
orangespotted sunfish
orangethroat darter
peppered chub
plains killifish
plains minnow
quillback
red shiner
river carpsucker
sand shiner
shorthead redhorse
shortnose gar
silver chub
slenderhead darter
smallmouth buffalo
striped bass
suckermouth minnow
walleye
western mosquitofish
white bass
white crappie
white perch
yellow bullhead

Lower Arkansas River Basin
HUC 11030013

Mussel Species Collected

Asian clam	pink papershell
fingernail clam	pondhorn
fragile papershell	pondmussel
giant floater	threeridge
lilliput	Wabash pigtoe
mapleleaf	white heelsplitter
pimpleback	yellow sandshell


Image 1. Arkansas River, Sedgwick Co.

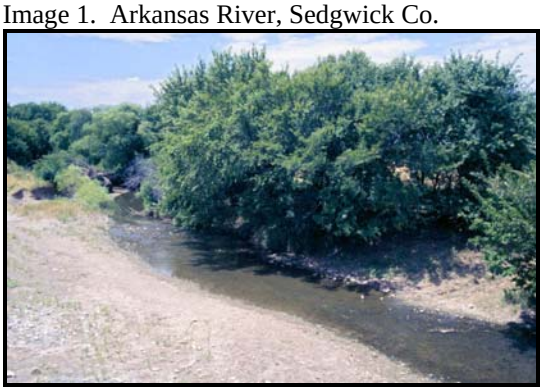


Image 2. Slate Creek, Sumner Co.


Image 3. Cowskin Creek, Sedgwick Co.

Lower Arkansas River Basin
HUC 11030013

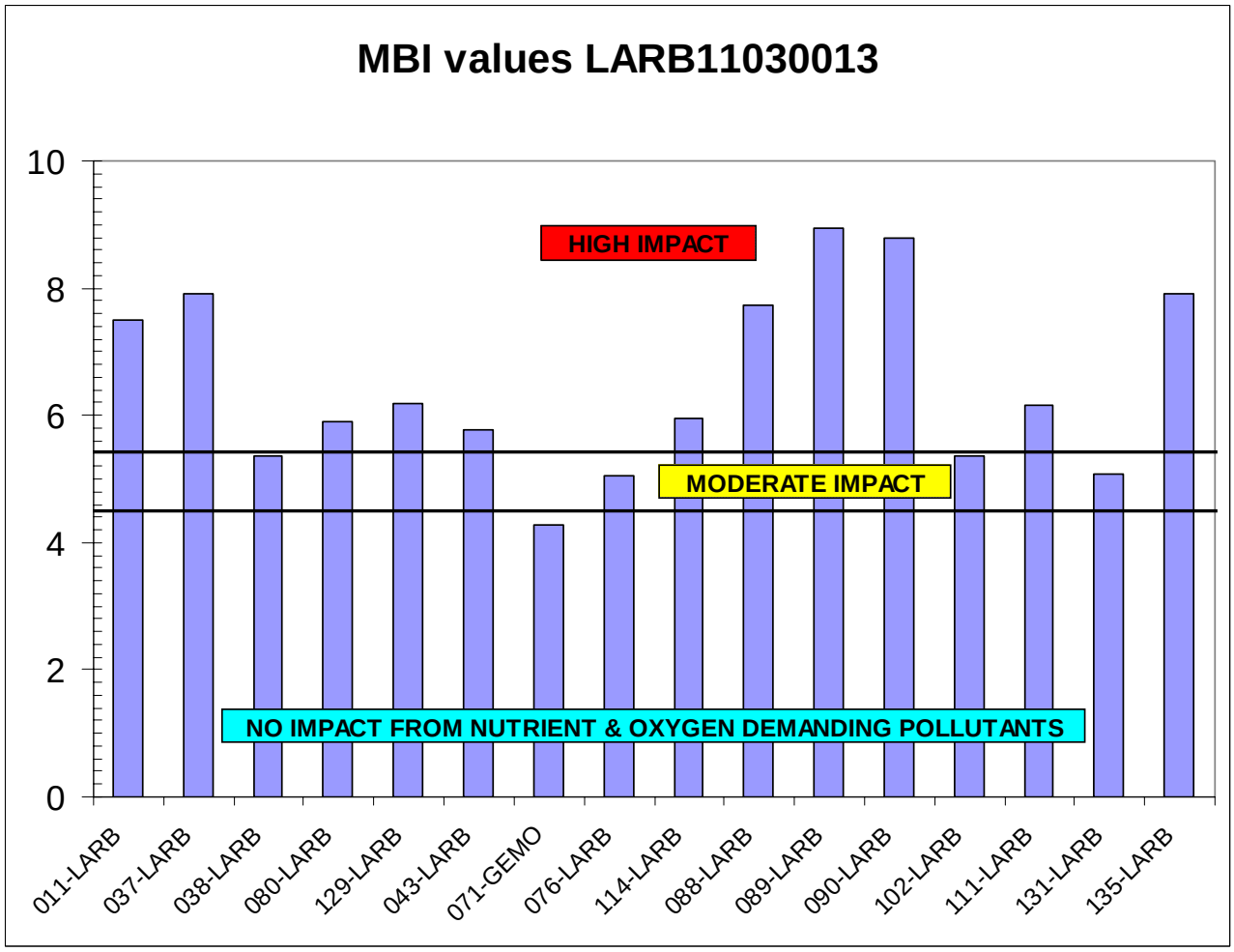


Figure 1. Graph of MBI values for HUC 11030013

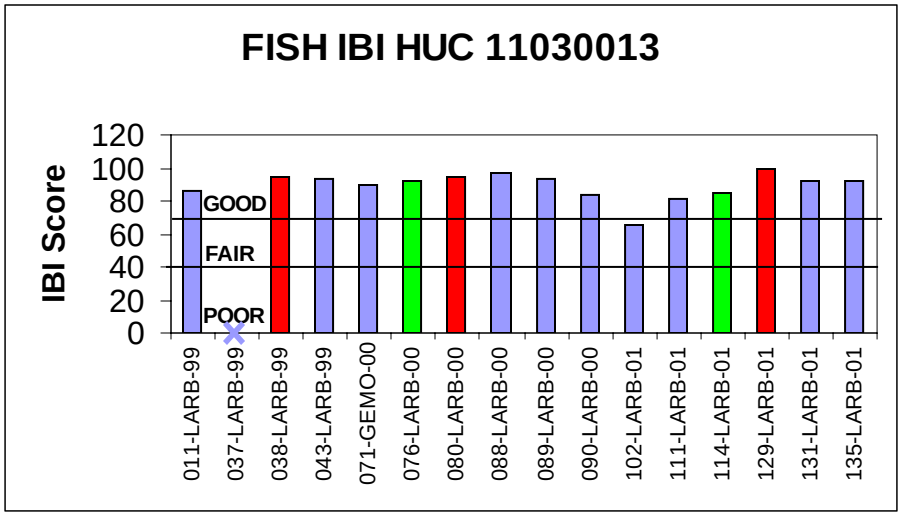
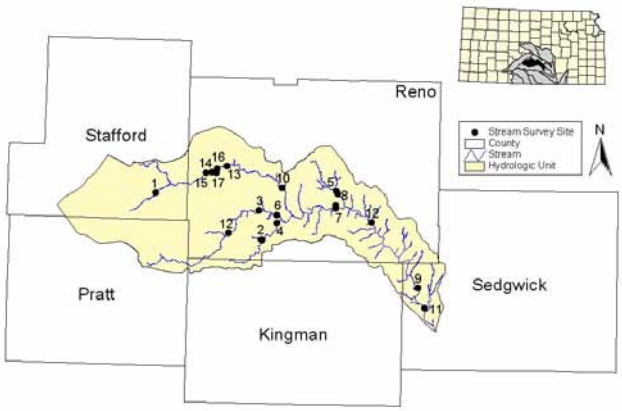


Figure 2. Graph of IBI values for HUC 11030013

Lower Arkansas River Basin
HUC 11030014



- This HUC consists of 18 sites (36 samples).
- Sites were surveyed between 1994-2003.

BIOLOGICAL HIGHLIGHTS

- 1 sample showed no impact from nutrient and oxygen demanding pollutants, 17 samples were moderately impacted, and 17 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 5.95, placing it in the highly impacted category.
- 42 species of fish were surveyed. See fish species collected, page 4.
    - State endangered – Silver chub
    - State threatened – Arkansas darter
    - Significant white perch population
    - Fish populations in upper North Fork Ninnescah River are influenced by Cheney Reservoir.
- 11 species of freshwater mussels were surveyed.
    - SINC species – creeper, yellow sandshell

SUMMARY

This HUC could be considered to be in good health given the current information available.

- Protection efforts should be utilized to maintain the Arkansas darter and silver chub populations.
- A water quality table is presented on page 3.

Image. 1 Silver Creek, Reno Co.

Image 2. North Fork Ninnescah River Reno Co.

Lower Arkansas River Basin
HUC 11030014

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	NF Ninnescah	SF	99	11	0.302	5.05	8
2	Goose	RN	99	19	0.160	6.33	15
2			03	26	0.239	5.74	13
3	Silver	RN	96	14	0.474	6.96	12
4	Goose	RN	99	6	*	5.91	12
5	Red Rock	RN	99	17	*	5.11	14
6	Silver	RN	99	10	*	4.63	12
7	NF Ninnescah	RN	99	8	*	3.98	20
7			02	19	0.832	4.54	13
7			02	30	0.471	4.92	15
8	Red Rock	RN	99	13	0.441	4.93	22
8			03	27	0.448	5.65	13
9	NF Ninnescah	SG	99	18	0.730	5.2	25
9			02	18	0.267	5.91	14
9			02	20	0.523	5	17
9			03	19	0.742	4.76	19
10	NF Ninnescah	RN	94	12	*	4.54	19
10			00	21	0.661	5.61	14
10			01	22	0.548	5.55	23
10			02	20	0.634	5.19	18
10			02	23	0.360	5.22	19
11	NF Ninnescah	SG	95	7	*	7.19	24
11			01	18	0.584	5.28	23
11			02	8	*	6.05	17
11			02	19	0.211	5.31	16
12	NF Ninnescah	RN	01	14	0.737	4.62	17
12			02	32	0.446	5.38	21
13	NF Ninnescah	RN	01	29	0.450	4.82	28
13			03	22	0.309	5.77	25
14	NF Ninnescah	RN	02	20	0.416	6.02	14
14			02	21	0.291	6.85	18
15	NF Ninnescah	RN	02	26	0.087	9.89	10
16	NF Ninnescah	RN	02	16	0.544	6.22	17
16			02	22	0.471	6.54	15
17	NF Ninnescah	RN	02	9	*	7.63	11
18	Silver	RN	01	0	0.000	0	20

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

Lower Arkansas River Basin
HUC 11030014

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	22	1027	10	497	7	8.4	231	162	0.01	1.4	0.13
2	19	627	29	301	6.7	8.4	182	43	0.12	4	0.14
2	18	694	53	339	4.06	6.9	131	48	0.11	1.5	0.01
3	23	1758	17	865	6.8	7.84	193	27.3	0.25	0.1	0.25
4	25	1050	55	507	6.1	1.4	19.5	193	0.19	0.9	1.32
5	24	642	46	306	4.6	2.1	251	36	0.2	0.2	1.27
6	25	1475	23	720	6.5	1.9	197	255	0.03	0.1	0.75
7	21	1223	32	604	5.7	8.9	162	2.55	0	0.1	0.01
7	26	1180	36	570	6.5	2	167	246	0.02	0.2	0.14
7	29	1072	45	528	10.23	9.5	276	23.2	0.14	3.4	0.12
8	24	654	21	313	8.2	8.6	267	16	0.06	2.9	0.21
8	18	818	46	400	4.8	6.8	17.8	1.9	0.09	0.8	0.3
9	23	796	23	388	3.4	8.1	162	8.5	0.15	0.8	0
9	25	715	8	344	6.9	8.6	70	61	0.05	1.8	0.08
9	30	577	7	280	5	9	147	3.7	0.06	3.5	0.07
9	17	955	17	469	4.8	6.9	24.5	2.9	0.07	1.5	0.06
10	23	1250	44	630	6.8	7.46	NA	NA	NA	NA	NA
10	24	1150	27	567	7.6	9	164	25	0	0.3	0.19
10	23	1182	40	583	5.9	8.8	218	32	0.05	2.8	0.42
10	24	1062	30	514	6.5	8.3	218	269	0.06	0.5	0.04
10	22	1105	59	536	7.5	8.1	161	337	0.03	1.2	0.08
11	26	691	8	336	5	8.1	151	72	0.09	2.1	0.02
11	22	740	13	380	5.8	7.8	NA	NA	NA	NA	NA
11	31	757	12	370	5.3	8.7	169	92	0	1.2	0.1
11	26	628	3	306	12.3	8.2	168	NA	0.04	2.9	0.06
12	22	1156	31	569	6.3	8.6	1609	27.2	0.04	0	0.01
12	24	1062	17	350	2.966	8.7	155	19.5	0.24	2.2	0.01
13	21	1677	33	836	6.1	6.9	13.2	26.8	0.02	10	0.02
13	20	1221	50	594	7.2	8	237	270	0.16	0.7	0.09
14	25	1784	15	893	5.6	9.3	169	395	0.03	1.8	1
14	22	1596	27	797	6.13	8.9	154	NA	0.15	1	0.13
15	20	1720	26	835	7.1	8.6	170	75.3	0.04	1.3	0.14
16	15	1539	17	765	4.6	8.2	197	33.8	0	0.7	0.1
16	18	1520	5	756	4.36	8.4	156	NA	0.05	2.2	0.09
17	25	1671	20	834	8.3	8.8	243	35.9	0	2.1	0.26
18	20	1476	33	722	6.6	7.9	247	340	0.02	0.6	0.07

TDS = total dissolved solids

Lower Arkansas River Basin
HUC 11030014

Fish Species Collected

Arkansas darter
bigmouth buffalo
black bullhead
black crappie
bluegill
bluntnose minnow
brook silverside
bullhead minnow
central stoneroller
channel catfish
common carp
emerald shiner
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden redhorse
goldfish
grass carp
green sunfish
largemouth bass
longear sunfish
longnose gar
orangespotted sunfish
orangethroat darter
plains killifish
quillback
red shiner
river carpsucker
sand shiner
shorthead redhorse
silver chub
slenderhead darter
smallmouth buffalo
suckermouth minnow
sunfish hybrid
walleye
western mosquitofish
white bass
white crappie
white perch
wiper
yellow bullhead

Mussel Species Collected

Asian clam
bleufer
creeper
fingernail clam
fragile papershell
giant floater
lilliput
paper pondshell
pink papershell
pondhorn
yellow sandshell

Lower Arkansas River Basin
HUC 11030014

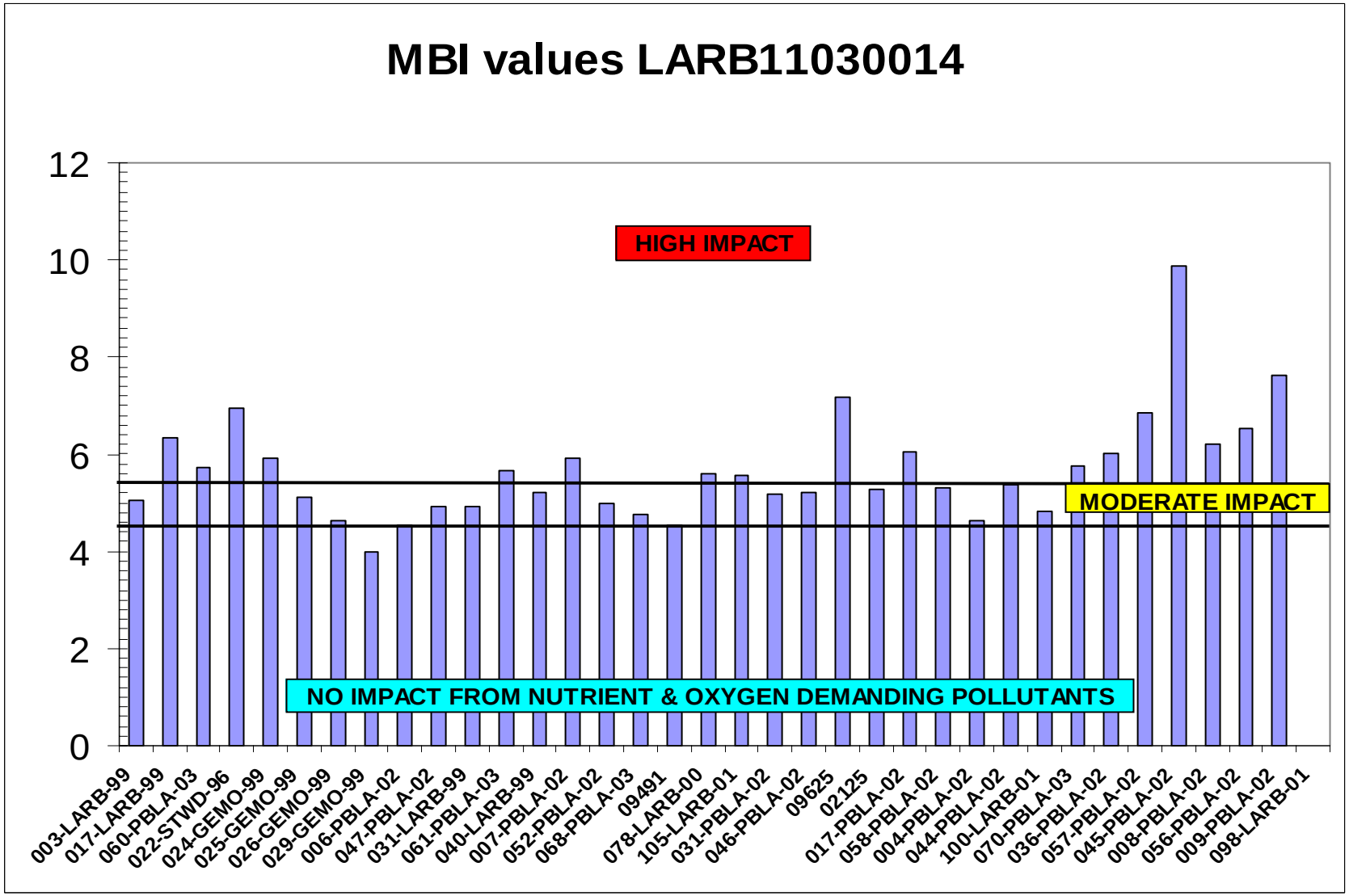


Figure 1. Graph of MBI values for HUC 11030014

Lower Arkansas River Basin
HUC 11030014

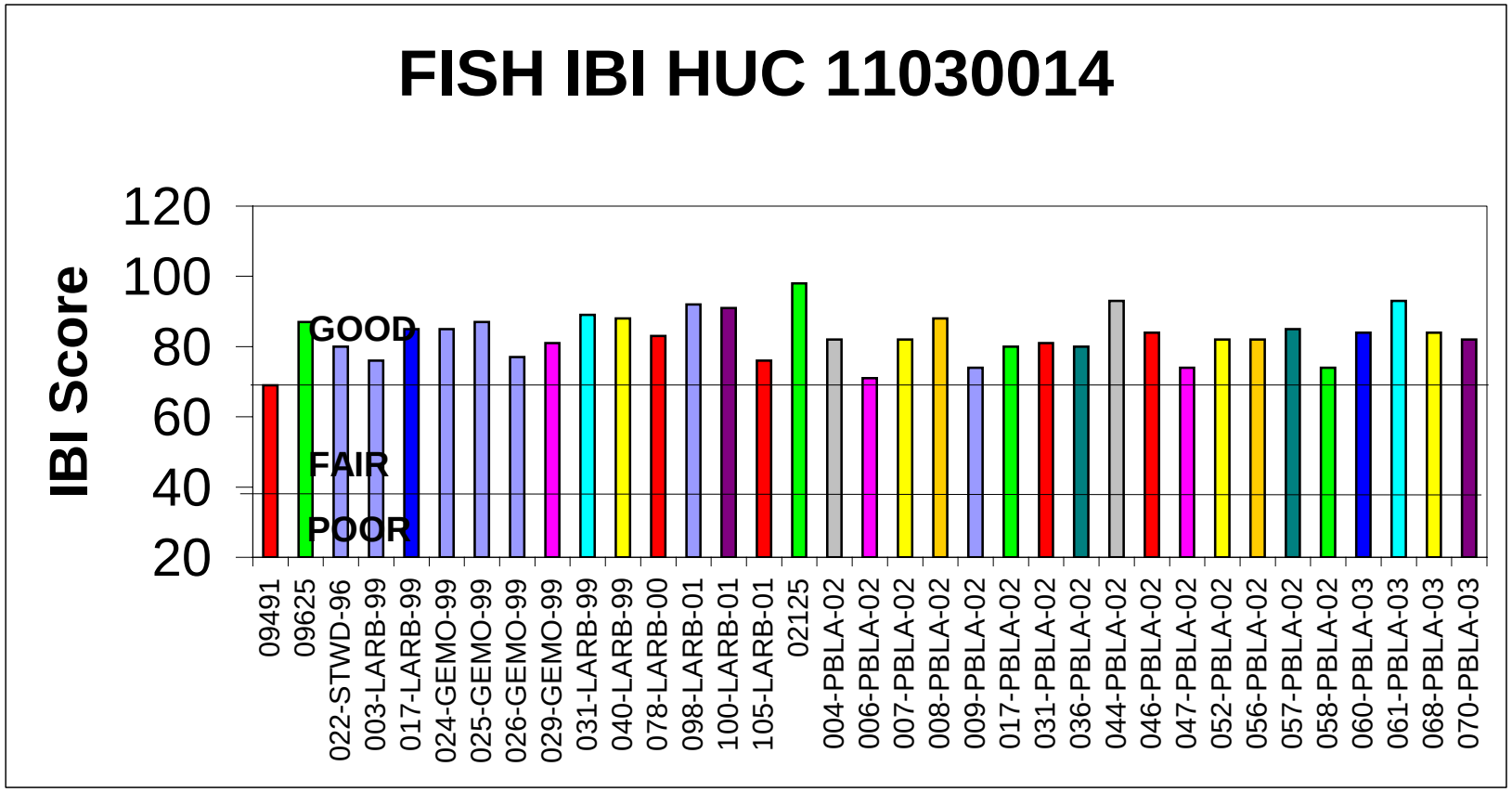
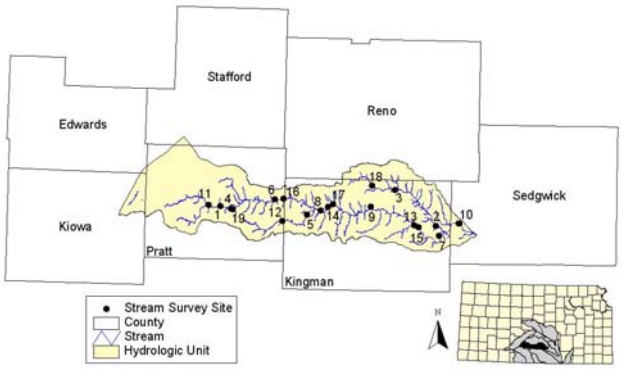


Figure 2. Graph of IBI values for HUC 11030014

Lower Arkansas River Basin
HUC 11030015



- This HUC consists of 19 sites (33 samples).
- Sites were surveyed between 1999-2003.

BIOLOGICAL HIGHLIGHTS

- 1 sample showed no impact from nutrient and oxygen demanding pollutants, 12 were moderately impacted, and 20 were highly impacted (see figure 1).
- The overall MBI value for this HUC was 6.36, indicating that overall the HUC is highly impacted from nutrient and oxygen demanding pollutants.
- 47 species of fish were surveyed. See fish species collected, page 4.
    - Arkansas darter – state threatened
    - Arkansas river speckled chub – state endangered
    - Silver chub – state endangered
    - Plains minnow – SINC
- 8 species of freshwater mussels were surveyed. See mussel species collected, page 4.

SUMMARY

This HUC could be considered in good health based on the information available at this time.

- Protection efforts should be utilized to maintain the Arkansas darter, Arkansas river speckled chub, and silver chub populations.
- White perch presence in this HUC
- Hatchery at Pratt affects fish fauna in the upper reaches of this HUC.
- A water quality table is presented on page 3.

Image 1. South Fork Ninnescah River, Pratt Co.

Image 2. Painter Creek, Pratt Co.

Image 3. South Fork Ninnescah, Sedgwick Co.

Lower Arkansas River Basin
HUC 11030015

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	SF Ninnescah	PR	99	9	0.005	10.43	14
2	Smoots	KM	96	9	0.114	10.07	16
3	Smoots	KM	99	17	0.534	5.35	25
4	SF Ninnescah	PR	99	10	0.335	8.23	21
5	Painter	KM	96	10	*	5.59	14
6	SF Ninnescah	PR	96	8	*	7.86	18
7	SF Ninnescah	KM	99	14	0.283	6.04	19
7			02	15	*	5.07	18
7			02	24	0.442	6.43	21
8	SF Ninnescah	KM	99	19	0.681	4.76	18
8			02	18	0.565	4.73	18
8			02	21	0.613	5.46	21
9	SF Ninnescah	KM	99	12	0.858	4.74	24
10	SF Ninnescah	SG	99	14	*	5.15	30
10			02	17	0.755	5.17	18
10			02	26	0.587	5.64	30
11	SF Ninnescah	PR	97	7	*	6.23	11
11			01	25	0.692	5.11	14
12	Painter	PR	00	20	0.123	7.31	10
12			01	13	0.006	9.75	7
13	SF Ninnescah	KM	00	18	0.527	6.83	29
13			01	29	0.347	7.28	28
14	SF Ninnescah	KM	94	6	*	10.27	15
14			00	11	0.496	5.34	11
14			02	18	0.68	4.49	15
14			02	17	0.615	5.03	16
15	SF Ninnescah	KM	95	3	*	5.8	27
15			01	22	0.684	5.74	24
16	SF Ninnescah	PR	01	17	0.605	5.63	18
17	SF Ninnescah	KM	02	16	0.57	4.54	18
17			02	17	0.765	4.85	21
18	Smoots	KM	03	16	0.197	6.35	16
19	SF Ninnescah	PR	03	15	0.425	6.25	22

Lower Arkansas River Basin
HUC 11030015

Water Quality Table

Site	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	26	508	15	243	4.2	8.4	159	43	0.46	2.6	1.76
2	16	398	81	189	11.3	8.3	178	1.8	NA	3.5	0.25
3	24	526	27	250	4.9	8.6	190	29	0.05	1	0.15
4	25	535	42	255	5.2	8.4	141	44	0.41	1.4	0.12
5	22	494	51	236	6.6	7.93	203	4.1	0.15	0.2	0.09
6	23	1529	24	749	9	7.93	183	36.5	0.05	1.5	0.14
7	24	1189	67	587	5.2	9.1	285	28.8	0.02	0.1	0.39
7	24	1308	13	638	6	1.8	146	271	0.04	0.9	1.87
7	24	1320	21	654	7.3	8.8	229	33.7	0.04	1.9	0.06
8	20	900	17	569	9.4	8.3	183.8	28.9	0.05	2.8	0.04
8	23	1527	23	748	7.3	9	98	355	0	3.2	0.08
8	23	1663	11	827	6.7	9.1	195	38.5	0	2.7	0.24
9	21	1428	28	696	7.8	8.9	100	296	0.03	2.3	0.03
10	22	1040	22	511	5.4	9.1	191	19.6	0	0.6	0.42
10	26	1076	31	522	7.2	8.9	93	252	0.03	0.1	0.05
10	24	1328	13	657	11.3	8.8	148	34	0.01	0.3	0.22
11	23	140	352	67	6	7.03	35	9	0.43	35.8	0.35
11	19	481	25	231	9.5	7.7	189	129	0.03	2.2	0.09
12	23	460	21	221	5.2	7.8	374	222	0.08	5.6	0.21
12	22	480	29	234	5.45	7.6	284	322	0.1	8.4	0.28
13	25	1218	26	592	6.6	8.4	195	272	0.02	1	0.68
13	26	1258	29	611	6.1	8.3	202	251	0.07	0.7	0.06
14	23	1510	36	760	7.2	7.58	NA	NA	NA	NA	NA
14	16	NA	29	NA	8.6	8.3	2128	NA	0.02	1.9	0.07
14	24	1639	11	816	7.1	9.1	217	39.2	0.03	2.4	0.48
14	24	1341	46	675	8	8.6	220	278	0.02	3.3	0.19
15	24	NA	17	NA	7.1	8.3	123	318	0.03	2.5	0.05
15	25	1320	28	670	5.8	8.09	NA	NA	NA	NA	NA
16	20	1524	18	749	8.8	8.1	149	395	0.01	3.6	0.1
17	20	1303	NA	644	7.1	8.5	1699	2.64	0	2.3	0.01
17	24	1629	9	807	7.1	8.9	198	36.8	0.07	2.8	0.15
18	26	707	22	344	5.4	6.9	17.9	2.5	0.05	3.4	0.11
19	21	770	32	376	4.43	6.9	18.9	6.1	0.21	2.2	0.36

TDS = total dissolved solids

Lower Arkansas River Basin
HUC 11030015

Fish Species Collected

Arkansas darter
bigmouth buffalo
black buffalo
black bullhead
black crappie
bluegill
bluntnose minnow
brook silverside
bullhead minnow
central stoneroller
channel catfish
common carp
emerald shiner
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden shiner
grass carp
green sunfish
largemouth bass
longnose gar
orangespotted sunfish
orangethroat darter
peppered chub
plains killifish
plains minnow
quillback
red shiner
river carpsucker
sand shiner
sauger
saugeye
saugeye hybrid
shorthead redhorse
silver chub
slenderhead darter
smallmouth buffalo
suckermouth minnow
walleye
walleye X saugeye hybrid
warmouth
western mosquitofish
white bass
white crappie
white perch
wiper
yellow bullhead

Mussel Species Collected

Asian clam
fingernail clam
giant floater
lilliput
mapleleaf
pimpleback
pondhorn
pondmussel

Lower Arkansas River Basin
HUC 11030015

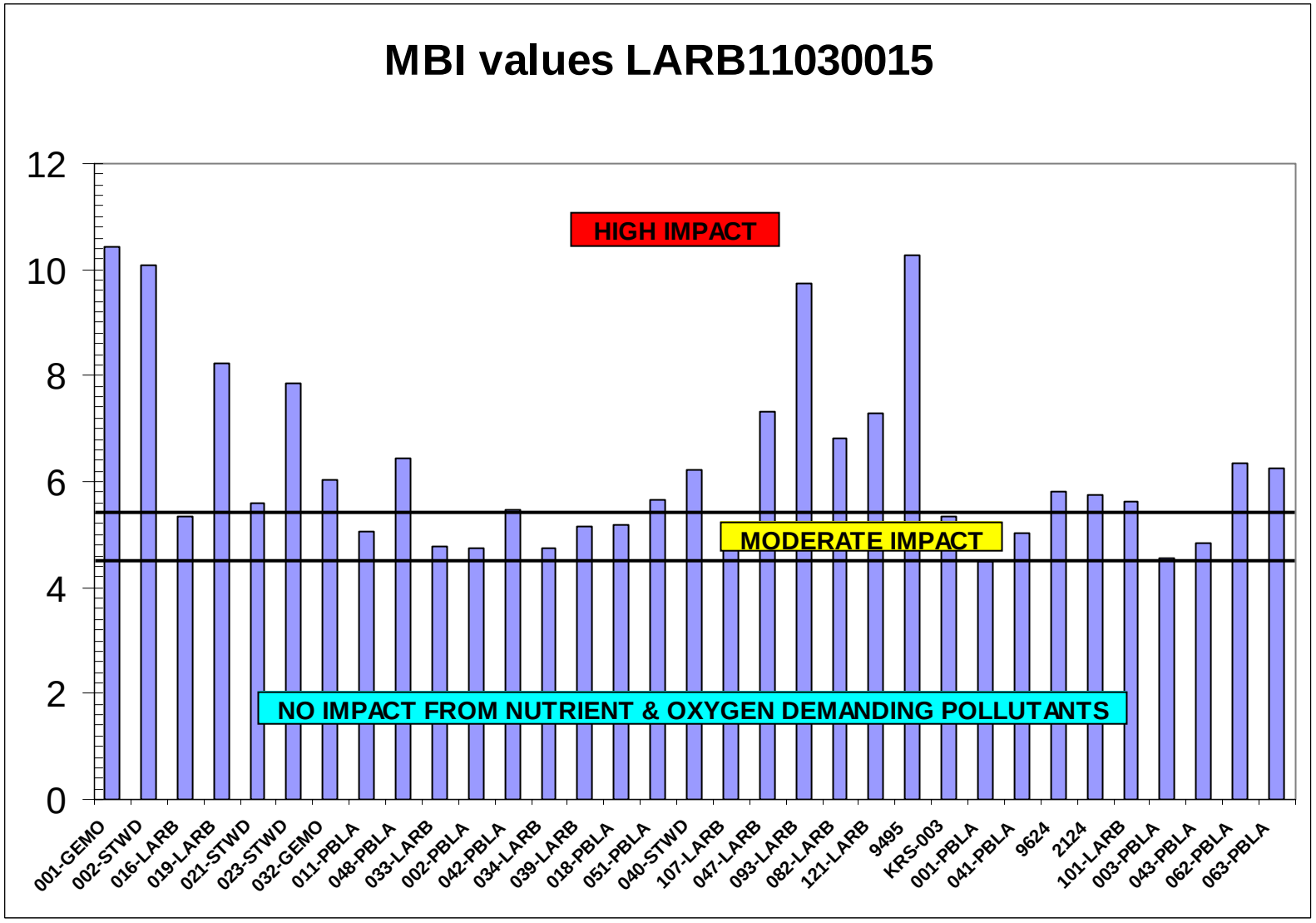


Figure 1. Graph of MBI values for HUC 11030015

Lower Arkansas River Basin
HUC 11030015

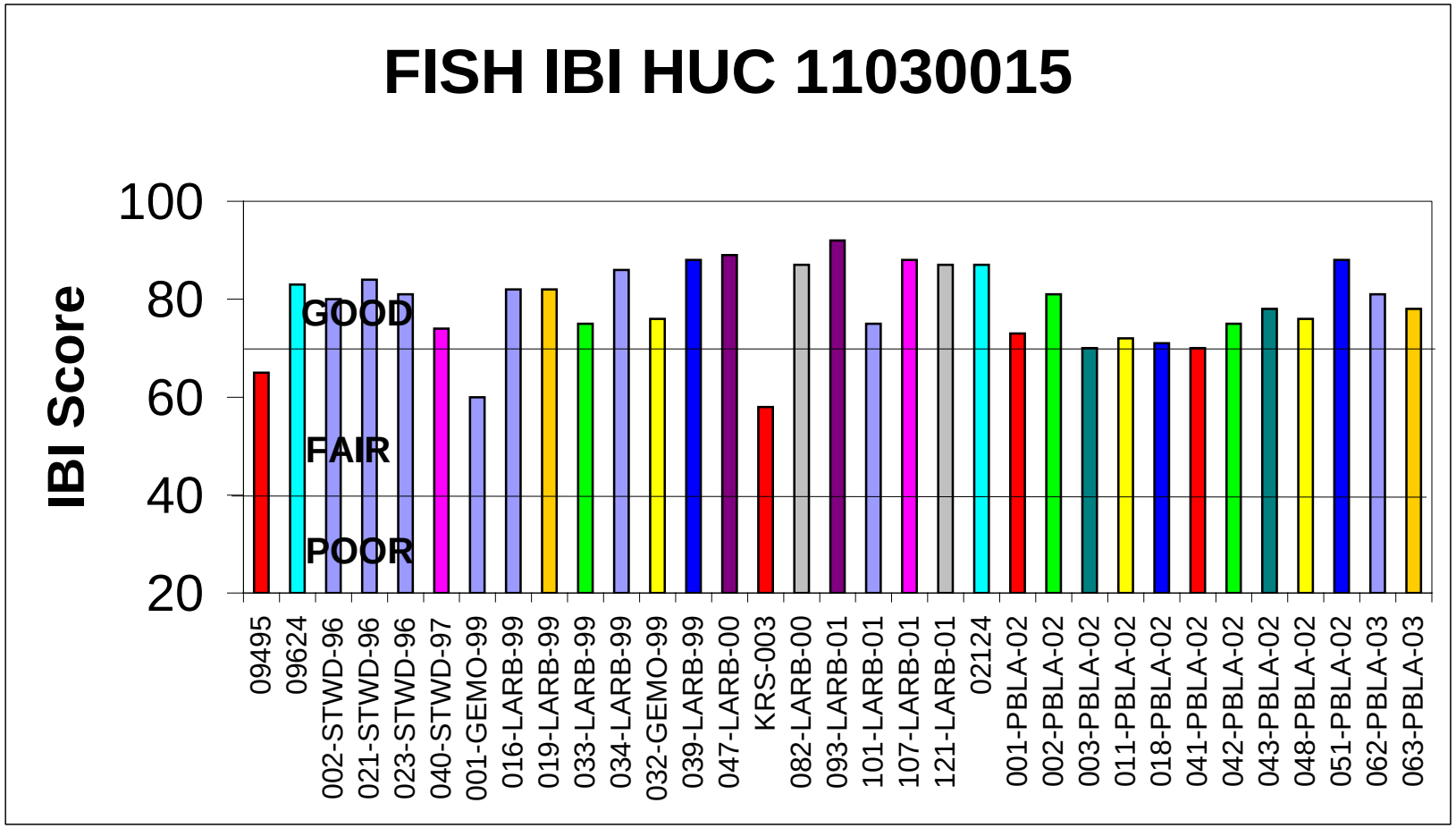
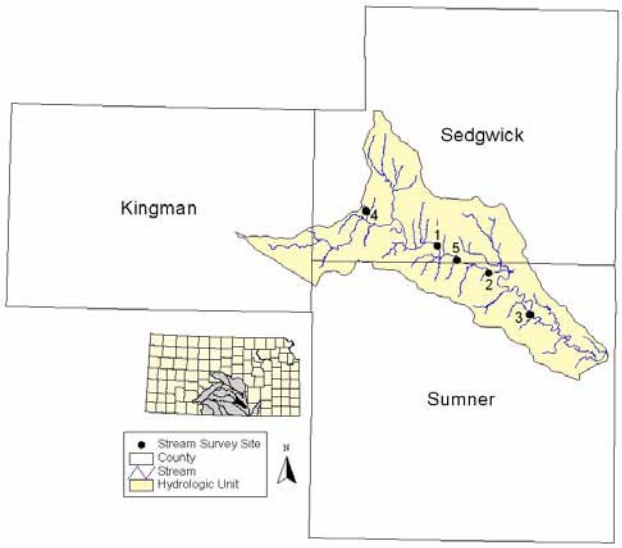


Figure 2. Graph of IBI values for HUC 11030015

Lower Arkansas River Basin
HUC 11030016

LOCATION



- This HUC consists of 6 sites (15 samples).
- Sites were surveyed between 1994-2003.

BIOLOGICAL HIGHLIGHTS

- 2 sites were moderately impacted by nutrient and oxygen demanding pollutants, 13 were highly impacted (see figure 1).
- The overall MBI value for this HUC was 6.96, indicating high impact from nutrient and oxygen demanding pollutants.
- 43 species of fish were surveyed. See fish species collected, page 2.
    - State endangered – Arkansas river speckled chub (pepper chub), Silver chub
    - Plains minnow – SINC
    - Native species richness and benthic fish metrics had high scores.
- 17 species of freshwater mussels were collected.
    - SINC species – creeper, fawnsfoot, Wabash pigtoe, yellow sandshell

Stream Picture (see page 3)

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Ninnescah	SG	94	10	*	8.17	25
1			00	19	0.521	5.42	21
2	Ninnescah	SU	99	16	0.104	9.68	23
3	Ninnescah	SU	00	22	0.364	5.1	21
3			01	21	0.139	9.51	28
4	Ninnescah Trib	SU	95	3	*	8.5	16
4			01	30	0.022	9.53	10
5	Ninnescah	SG	00	16	0.785	5.04	32
5			02	13	*	6.11	18
5			02	19	0.514	6.03	24
5			03	27	0.516	5.75	18
6	Ninnescah	SG	01	21	0.31	5.74	28
6			02	14	*	7.17	15
6			02	20	0.289	6.65	27
6			03	14	0.701	5.8	16

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in good health based on the information available at this time.

- Protection efforts should be utilized to maintain the Arkansas darter, Arkansas river speckled chub, and silver chub populations.
- Additional tributary surveys should be performed as the opportunities arise to continue assessment of this HUC.
- White perch presence in this HUC
- A water quality table is presented on page 2.

Lower Arkansas River Basin
HUC 11030016

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	25	840	145	410	6.8	8.4	105	167	0.14	2.6	0.22
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	23	1169	15	569	7.4	8.9	129	194	0.04	0.04	0.04
3	24	1034	34	500	1.5	8	224	163	0.54	2.7	0.12
3	26	650	85	330	4	7.85	NA	NA	NA	NA	NA
3	26	881	32	424	5.4	8.5	121	174	0.03	0.1	0.05
3	24	1188	27	576	6.8	8.1	178	258	0.2	2.4	0.06
4	24	987	61	486	5.4	9	281	17.5	0.03	1	0.19
4	24	1092	21	538	7.6	8.9	147	59.4	0.01	1.7	0.06
4	18	1160	27	572	6.5	7.2	158	234	0.17	0.3	0.05
4	25	1086	24	527	7	8.6	195	263	0.03	1	0.06
5	26	969	26	475	6.6	8.7	153	1.5	0	0.1	0.01
5	24	1050	21	515	7.2	8.8	213	24.3	0.01	0.2	0.04
5	23	1093	29	538	5.08	6.9	16.8	11.9	0.04	0.4	0.05
5	22	1218	23	595	6.3	7.7	101	279	0.03	3.8	0.03

TDS = total dissolved solids

Fish Species Collected

bigmouth buffalo
black buffalo
black bullhead
black crappie
bluegill
bluntnose minnow
bullhead minnow
central stoneroller
channel catfish
common carp
emerald shiner
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden shiner
grass carp
green sunfish
largemouth bass
logperch
longnose gar
orangespotted sunfish
peppered chub
plains killifish
plains minnow
quillback
red shiner
river carpsucker
sand shiner
saugeye
shorthead redhorse
shortnose gar
silver chub
slenderhead darter
smallmouth buffalo
suckermouth minnow
warmouth
western mosquitofish
white bass
white crappie
white perch
wiper
yellow bullhead

Lower Arkansas River Basin
HUC 11030016

Mussel Species Collected

Asian clam	paper pondshell
bleufer	pimpleback
creeper	pink papershell
fawnsfoot	plain pocketbook
fingernail clam	pondhorn
fragile papershell	pondmussel
giant floater	Wabash pigtoe
lilliput	yellow sandshell
mapleleaf	

Image 1. Ninnescah River, Sedgwick Co.

Lower Arkansas River Basin
HUC 11030016

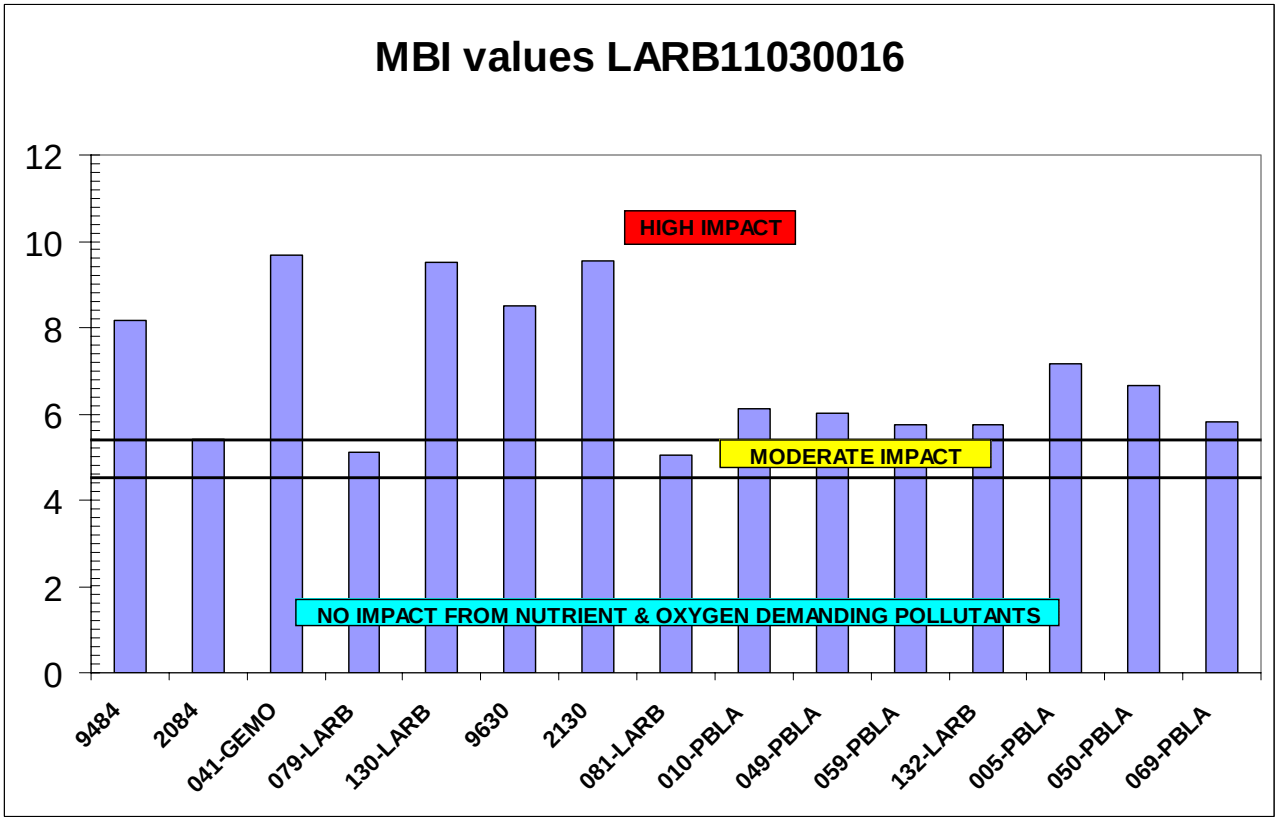


Figure 1. Graph of MBI values for HUC 11030016

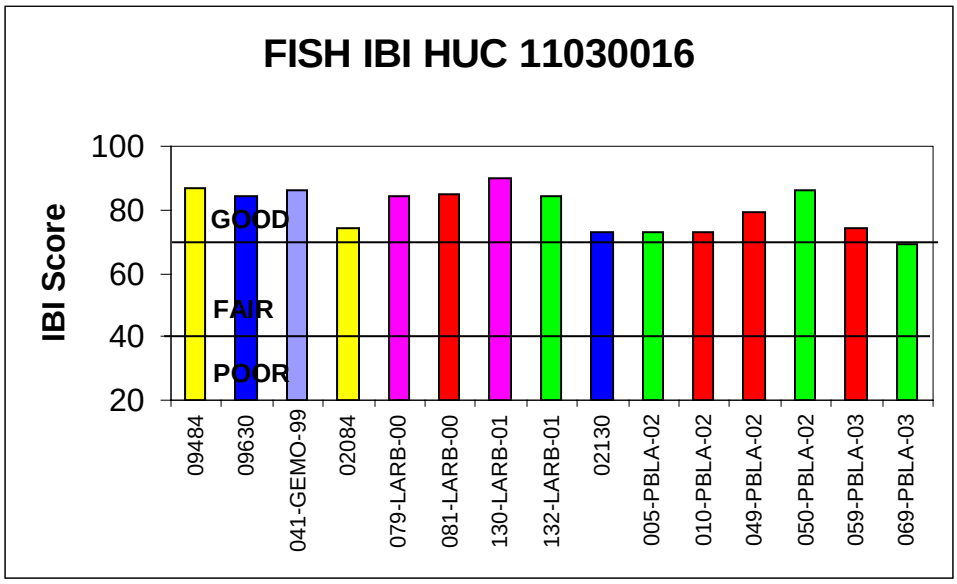
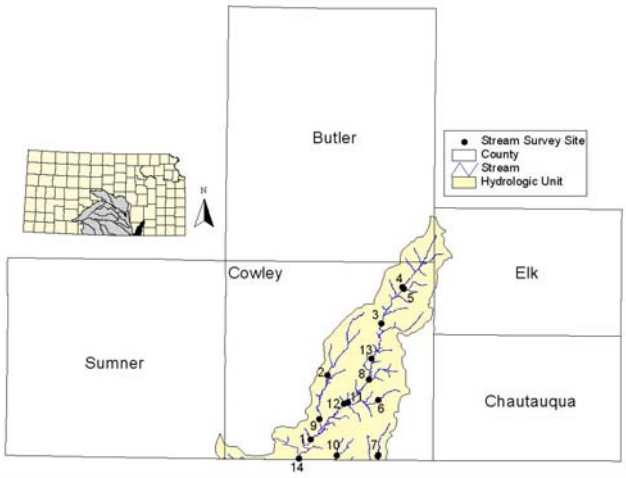


Figure 2. Graph of IBI values for HUC 11030016

Lower Arkansas River Basin
HUC 11060001

LOCATION



- This HUC consists of 14 sites (18 samples).
- Sites were surveyed between 1994-2001.

BIOLOGICAL HIGHLIGHTS

- 9 samples showed no impact from nutrient and oxygen demanding pollutants, 4 were moderately impacted, and 5 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 4.84, indicating moderate impact from nutrient and oxygen demanding pollutants.
- High IBI scores with strong metrics scores from native benthic fish and low introduced species to this HUC.
- 47 species of fish were surveyed. See fish species collected, page 3.
    - SINC species – spotted sucker
- 23 species of freshwater mussel were surveyed, see mussel species collected page 3.
    - State threatened – fluted shell
    - SINC species – creeper, deertoe, fatmucket, Wabash pigtoe, yellow sandshell.

Stream photos (see page 2)

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Grouse	CL	99	13	0.469	4.23	22
2	Silver	CL	99	13	0.658	4.35	22
3	Grouse	CL	99	18	0.751	3.67	25
3			00	15	0.703	4.08	24
3			01	28	0.458	4.56	22
4	Grouse	CL	99	13	0.625	4.61	26
5	Skull	CL	97	15	0.410	6.67	18
6	Crabb	CL	97	17	0.591	5.12	15
7	Beaver	CL	96	14	0.031	9.49	19
7			01	21	0.267	6.58	17
8	Plum	CL	97	14	0.682	9.49	17
9	Silver	CL	00	20	0.543	4.04	21
9			01	31	0.371	4.3	21
10	Little Beaver	CL	00	17	0.590	5.09	19
11	Grouse	CL	00	14	0.595	4.33	28
12	Grouse	CL	94	17	0.533	3.97	29
13	Grouse	CL	01	31	0.471	3.99	23
14	Arkansas	CL	01	15	0.008	10.42	23

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in good health based on the information available at this time.

- Grouse creek drainage represents more of a flint hills physiographic region compared to the rest of the Lower Arkansas River basin.
- Site # 14 is on the Arkansas River
- A water quality table is presented on page 2.

Lower Arkansas River Basin
HUC 11060001

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	26	517	27	246	7.3	8.7	230	11	0.01	0.04	0.06
2	25	517	15	247	6.4	8.6	246	7	0.01	2.4	0.09
3	27	463	23	220	5.8	8.6	249	3	0.04	0.4	0.03
3	32	433	17	207	7.9	8.2	239	8	0.01	0.5	0.1
3	27	400	62	188	6.9	7.9	192	24	0.1	2.2	0.03
4	27	435	13	207	6	8.7	109	1	0.05	0.04	0.02
5	23	368	13	179	6.2	7	36	1.4	0.02	0.2	0.01
6	22	467	13	225	6.2	7.12	109	0.3	0.01	0.1	0.02
7	24	233	90	110	7.5	7.64	31	12	0.11	4.8	0.08
7	29	377	37	179	4.1	7.8	162	18	0.07	0.7	0.16
8	22	914	8	442	NA	6.84	104	NA	0.01	0.3	0.02
9	26	514	16	244	5.8	8.2	295	49	0.05	1	0.08
9	28	444	35	210	5	7.9	217	14	0.07	1.1	0.06
10	24	488	12	233	6	8	292	24	0	1	0.04
11	27	468	21	222	5.9	8.1	246	37	0.03	0.7	0.11
12	24	490	30	250	12.1	7.2	NA	NA	NA	NA	NA
13	29	385	38	182	4.5	7.9	231	15	0.05	0.6	0.05
14	24	1354	59	659	3.6	9	108	292	0.05	4.1	0.11

TDS = total dissolved solids

Image 1. Grouse Creek, Cowley Co.

Image 2. Arkansas River, Cowley Co.

Lower Arkansas River Basin
HUC 11060001

Fish Species Collected

bigeye shiner
black buffalo
blackstripe topminnow
bluegill
bluntnose minnow
brook silverside
bullhead minnow
carmine shiner
central stoneroller
channel catfish
channel darter
common carp
emerald shiner
flathead catfish
freckled madtom
freshwater drum
gizzard shad
golden redhorse
golden shiner
green sunfish
inland silverside
largemouth bass
logperch
longear sunfish
longnose gar
mimic shiner
orangespotted sunfish
orangethroat darter
Ozark minnow
red shiner
redfin shiner
river carpsucker
rosyface shiner
shorthead redhorse
slenderhead darter
slim minnow
smallmouth buffalo
spotted bass
spotted sucker
stonecat
suckermouth minnow
western mosquitofish
white bass
white crappie
white perch
wiper
yellow bullhead

Mussel Species Collected

Asian clam
bleufer
creeper
deertoe
fatmucket
fingernail clam
fluted shell
fragile papershell
giant floater
lilliput
mapleleaf
paper pondshell
pimpleback
pink papershell
pistolgrip
plain pocketbook
pondhorn
pondmussel
threehorn wartyback
threeridge
Wabash pigtoe
white heelsplitter
yellow sandshell

Lower Arkansas River Basin
HUC 11060001

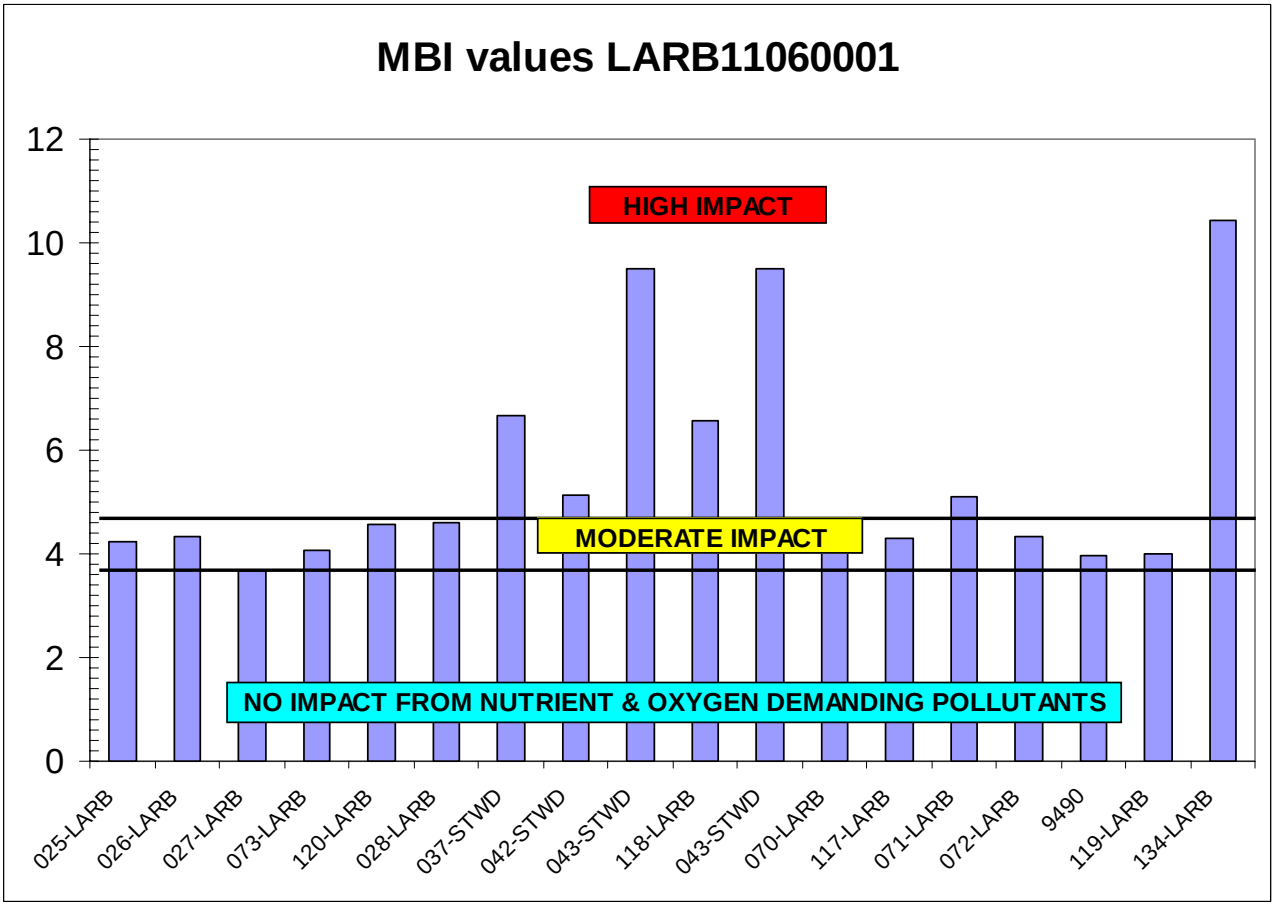


Figure 1. Graph of MBI values for HUC 11060001

Lower Arkansas River Basin
HUC 11060001

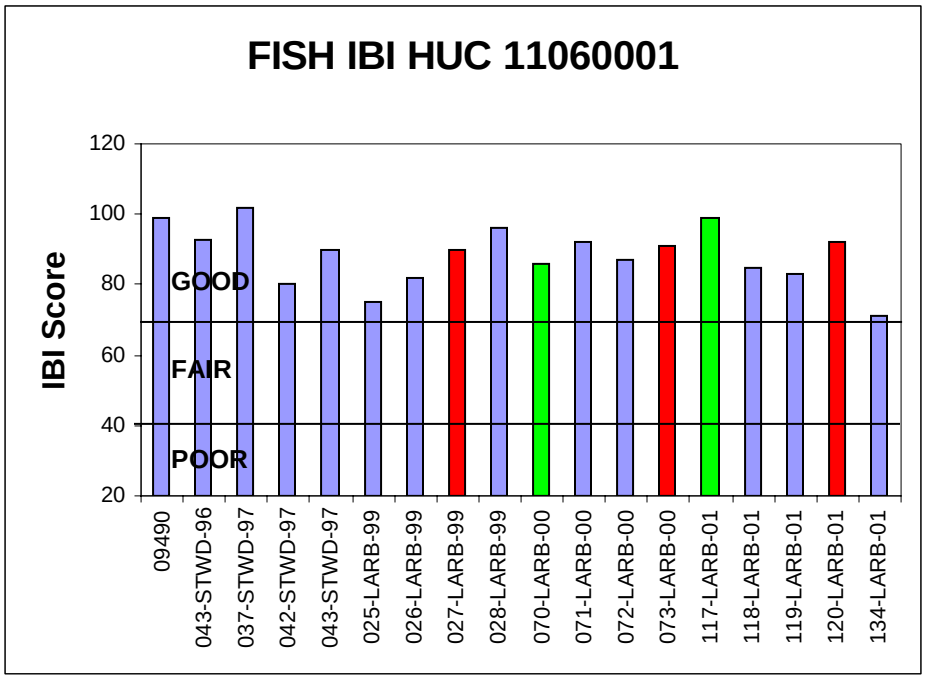
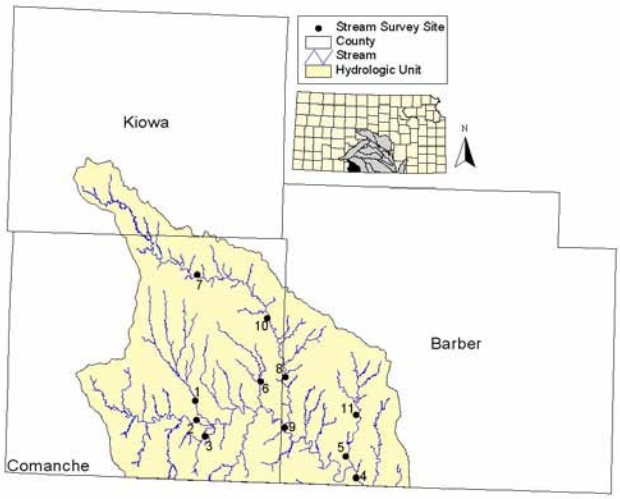


Figure 2. Graph of IBI values of HUC 11060001

Lower Arkansas River Basin
HUC 11060002

LOCATION



- This HUC consists of 11 sites (15 samples).
- Sites were surveyed between 1997-2001.

BIOLOGICAL HIGHLIGHTS

- 8 samples showed no impact from nutrient and oxygen demanding pollutants, 5 were moderately impacted, and 2 highly impacted (see figure 1).
- The overall MBI value for this HUC was 4.67 indicating that the HUC is moderately impacted by nutrient and oxygen demanding pollutants.
- IBI scores were good with sensitive fish species metric have higher scores.
- 22 species of fish were surveyed. See fish species collected, page 2.
    - State threatened – Arkansas darter
    - SINC species – plains minnow
- 5 species of freshwater mussels were collected, see mussel species collected page 2.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Nescatunga	CM	99	14	*	3.55	15
2	Salt Fork Arkansas	CM	99	10	0.581	3.58	18
2			00	17	0.294	5.92	13
2			01	23	0.424	6.34	12
3	Mustang	CM	99	12	*	4.38	9
4	Salt Fork Arkansas	BA	97	8	*	4.54	11
4			00	16	0.64	4.19	15
5	Big Sandy	CM	97	7	*	4.63	9
6	Indian	CM	00	16	*	5.03	12
7	Mule	CM	00	19	0.704	3.78	10
7			01	18	0.6	3.73	9
8	Mule	BA	00	17	0.347	4.69	13
9	Salt Fork Arkansas	BA	00	18	0.337	4.98	16
10	Mule	CM	01	7	*	3.63	10
11	Big Sandy	BA	01	8	*	4.14	9

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair to good health based on the information available at this time.

- Protection efforts should be utilized to maintain the Arkansas darter population.
- Majority of the HUC is rangeland with minimal human disturbance.
- High conductivity and alkalinity measurements in this HUC.
- A water quality table is presented on page 2.


Image 1. Salt Fork Arkansas River, Barber Co.


Image 2. Big Sandy, Barber Co.

Lower Arkansas River Basin
HUC 11060002

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	22	632	21	301	9	8.6	260	6	0.09	0.3	0.05
2	18	1421	32	696	9.6	8.5	226	84	0.04	0.5	0.09
2	20	817	876	394	7.2	8.2	104	145	0.38	70.8	0.16
2	23	2130	6	1060	6	8	156	94	0.03	1.3	0.09
3	17	1820	10	894	7.8	8.4	268	41	0.01	0.5	0.04
4	22	643	461	322	7.2	8.25	213	3	0.34	35.8	0.11
4	21	2200	24	1090	7	8.3	165	265	0.04	0.5	0.05
5	22	2480	30	1250	6.2	7.62	192	7.7	0.04	0.9	0.08
6	17	1794	19	882	7.5	8.3	422	340	0.05	0.5	0.02
7	16	475	15	227	7.9	8.4	336	151	0.03	0.7	0.11
7	17	506	9	243	6.8	8	188	230	0.06	1.2	0.09
8	23	649	172	311	7.1	8.8	197	11	0.1	10.7	0.22
9	20	1825	38	901	6	8.3	207	251	0.05	1	0.08
10	20	530	64	270	5.3	8.2	NA	NA	NA	NA	NA
11	21	2510	3	1250	8	7.9	228	130	0.03	3.5	0.01

TDS = total dissolved solids

Fish Species Collected

Arkansas darter
black bullhead
bluegill
central stoneroller
channel catfish
common carp
emerald shiner
fathead minnow
gizzard shad
green sunfish
largemouth bass
longear sunfish
orangethroat darter
plains killifish
plains minnow
red shiner
river carpsucker
sand shiner
suckermouth minnow
walleye
western mosquitofish
yellow bullhead

Mussel Species Collected

Asian clam
fingernail clam
giant floater
lilliput
pondmussel

Lower Arkansas River Basin
HUC 11060002

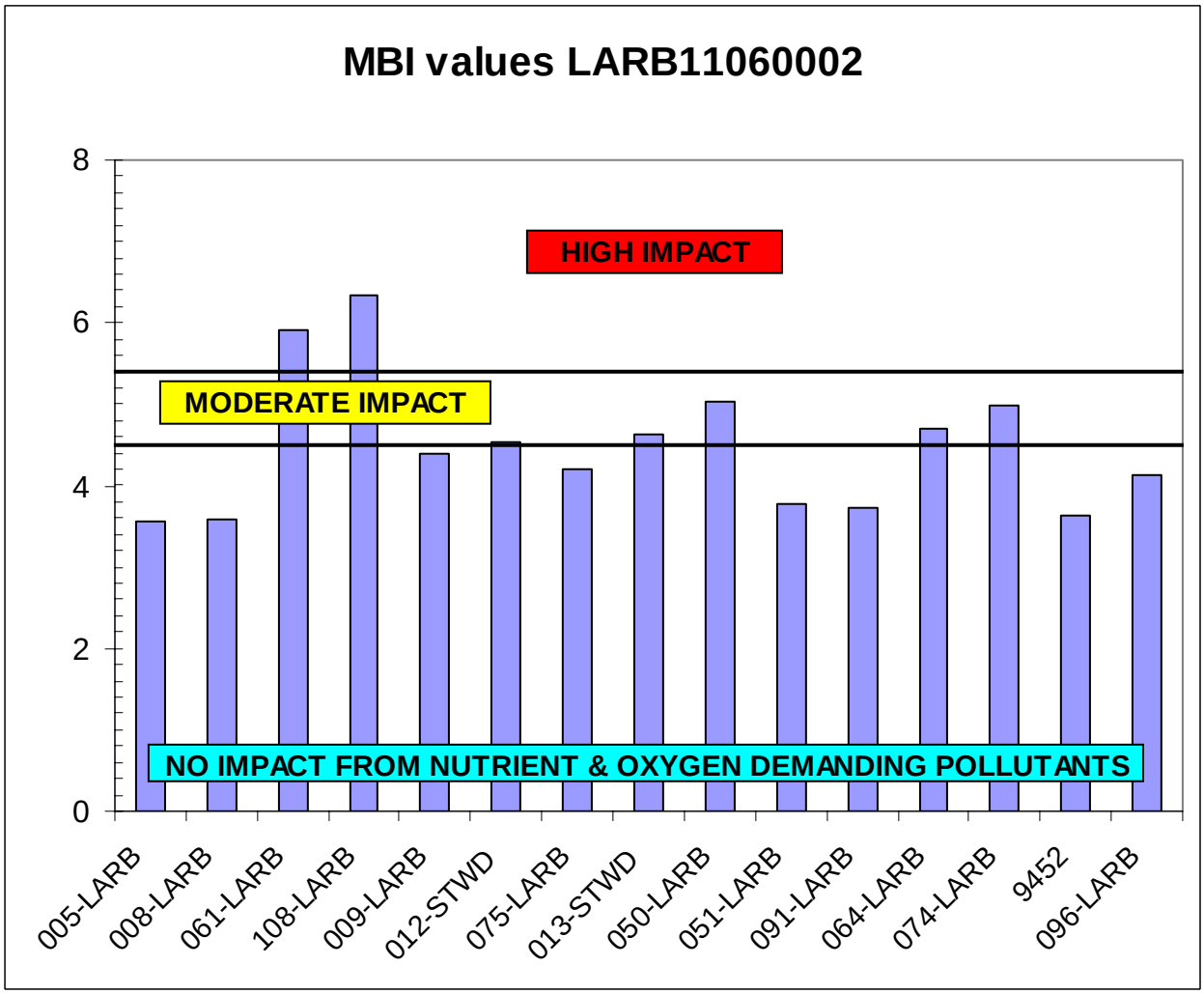


Figure 1. Graph of MBI values for HUC 11060002

Lower Arkansas River Basin
HUC 11060002

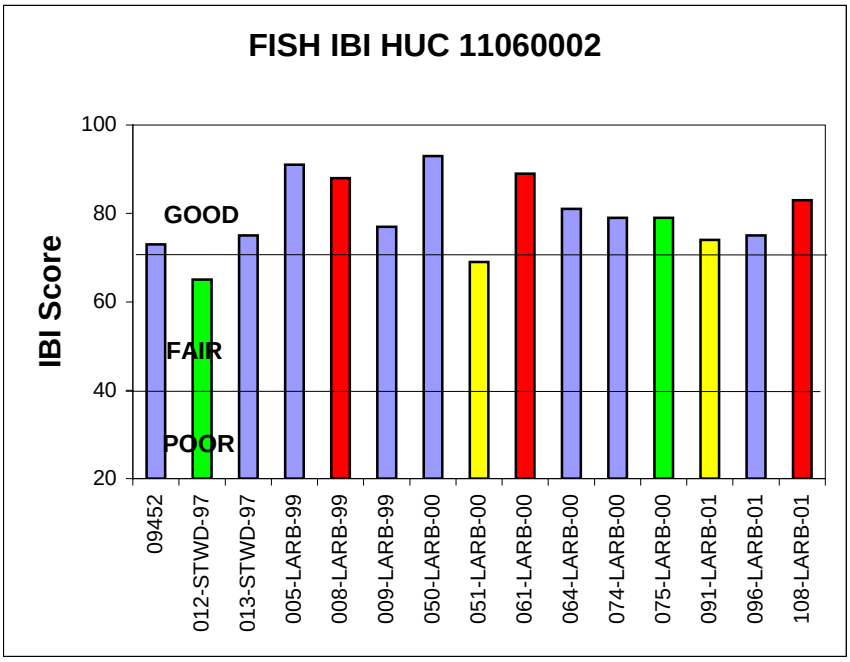
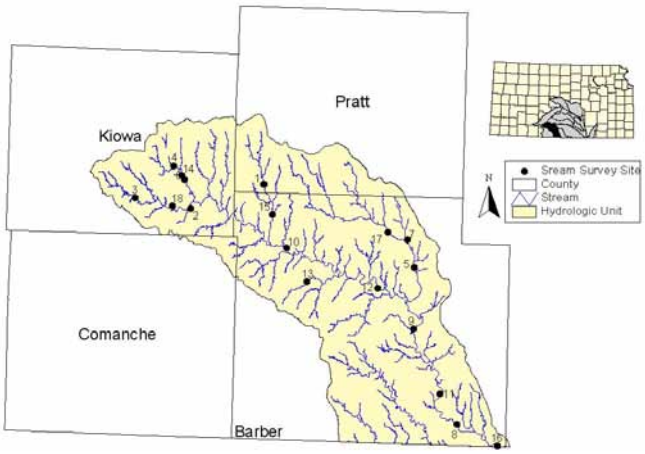


Figure 2. Graph of IBI values for HUC 11060002

Lower Arkansas River Basin

HUC 11060003

LOCATION



- This HUC consists of 18 sites (21 samples).
- Sites were surveyed between 1995-2001.

BIOLOGICAL HIGHLIGHTS

- 5 samples showed no impact from nutrient and oxygen demanding pollutants, 11 samples were moderately impacted, and 5 samples were in the high impact category (see figure 1).
- The overall MBI value for this HUC is 4.61 indicating that the HUC is moderately impacted by nutrient and oxygen demanding pollutants.
- 28 species of fish were surveyed. See fish species collected, page 2.
    - State threatened – Arkansas darter
    - SINC species – plains minnow
    - New state collection record of an inland silverside, Medicine Lodge R.
- 10 species of freshwater mussels were surveyed. See mussel species collected, page 3.

Image 1. Turkey Creek, Pratt Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Turkey	PR	96	9	0.778	5.18	12
1			99	13	0.828	5.46	14
1			00	17	0.925	4.35	15
1			01	17	0.401	4.95	15
2	Medicine Lodge	KW	99	16	0.487	5.21	17
3	Medicine Lodge	KW	99	14	0	5.84	6
4	Thompson	KW	99	12	0.636	4.72	11
5	Elm	BA	96	11	*	6.92	13
6	Thompson	KW	97	13	0.676	4.61	11
7	Amber	BA	99	13	0.577	4.26	13
8	Medicine Lodge	BA	99	7	*	4.54	17
9	Medicine Lodge	BA	99	15	0.621	4.62	17
10	Medicine Lodge	BA	00	23	0.779	4.46	19
11	Medicine Lodge	BA	00	16	0.495	4.83	15
12	Medicine Lodge	BA	95	10	*	4.81	13
13	Dog	BA	01	10	*	6.93	13
14	Thompson	KW	01	17	0.38	4.77	14
15	Turkey	BA	01	20	0.607	4.76	12
16	Medicine Lodge	BA	01	27	0.432	5.56	18
17	Elm	BA	01	30	0.751	4	11
18	Medicine Lodge	KW	01	34	0.627	4.27	14

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair to good health based on the information available at this time.

- Protection efforts should be utilized to maintain the Arkansas darter population.
- HUC is primarily rangeland with mainstem reaches containing some agriculture.
- A water quality table is presented on page 2.

Lower Arkansas River Basin
HUC 11060003

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	25	395	3	186	7.9	8.2	156	21	0.09	5.3	0.08
1	19	392	4	188	7.8	8.02	80	6.3	NA	3.4	0.07
1	23	416	6	203	4.7	8	91	7	0.03	3.8	0.15
1	24	419	4	197	7.4	7.8	446	310	0.03	4.1	0.17
2	23	1518	12	745	5.4	8.3	176	70	0	1	0.05
3	21	1214	9	592	8	8.1	197	200	0.02	0.06	0.04
4	18	418	26	199	8	8.5	200	11	0.1	1.4	0.06
5	21	505	19	248	7.3	8.2	179	6.3	0.08	1.9	0.08
6	21	525	32	253	6.5	8.08	356	99	0.02	1.4	0.05
7	25	383	25	182	5.8	8.5	198	8	0.02	1.3	0.04
8	25	1638	18	809	11.2	1.7	188	83	0.05	0.1	0.34
9	22	1368	27	664	3.5	8.9	130	46	0.03	0.4	0.09
10	22	973	27	472	5.4	8.4	223	127	0.03	0.2	0.1
11	25	1183	28	574	6	8.2	247	117	0.01	0.2	0.08
12	25	1510	8	760	5.4	7.95	NA	NA	NA	NA	NA
13	30	2190	28	1130	6.5	8	604	74	0.08	0.5	0.09
14	20	NA	29	NA	8.3	8.6	223	20	0.04	2.9	0.1
15	19	NA	3	NA	6.5	8.8	246	31	0	2.9	0.07
16	24	1314	6	644	7.4	8.1	202	111	0.07	1	0.07
17	23	508	11	243	7	8.2	248	44	0.02	1.1	0.08
18	21	1172	25	569	4.7	8.1	174	63	0.06	2.3	0.06

TDS = total dissolved solids

Fish Species Collected

Arkansas darter
black bullhead
bluegill
bluegill X green sunfish hybrid
central stoneroller
channel catfish
common carp
emerald shiner
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden redhorse
green sunfish
inland silverside
largemouth bass
longear sunfish
orangespotted sunfish
orangethroat darter
plains killifish
plains minnow
red shiner
river carpsucker
sand shiner
southern redbelly dace
suckermouth minnow
western mosquitofish
white crappie
yellow bullhead

Lower Arkansas River Basin
HUC 11060003

Mussel Species Collected

Asian clam	pimpleback
fingernail clam	plain pocketbook
giant floater	pondhorn
lilliput	pondmussel
mapleleaf	threeridge

Lower Arkansas River Basin
HUC 11060003

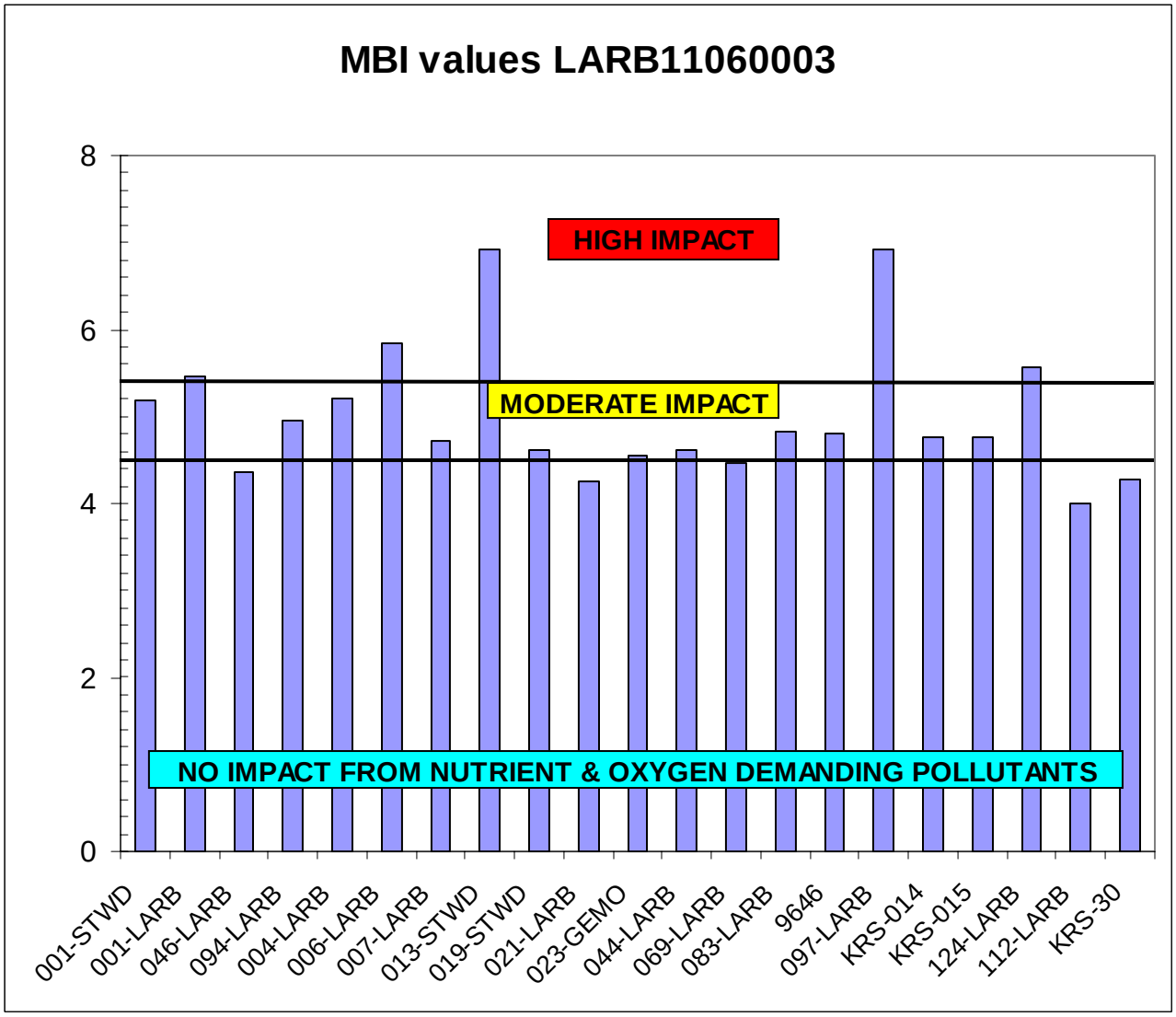


Figure 1. Graph of MBI values for HUC 11060003

Lower Arkansas River Basin
HUC 11060003

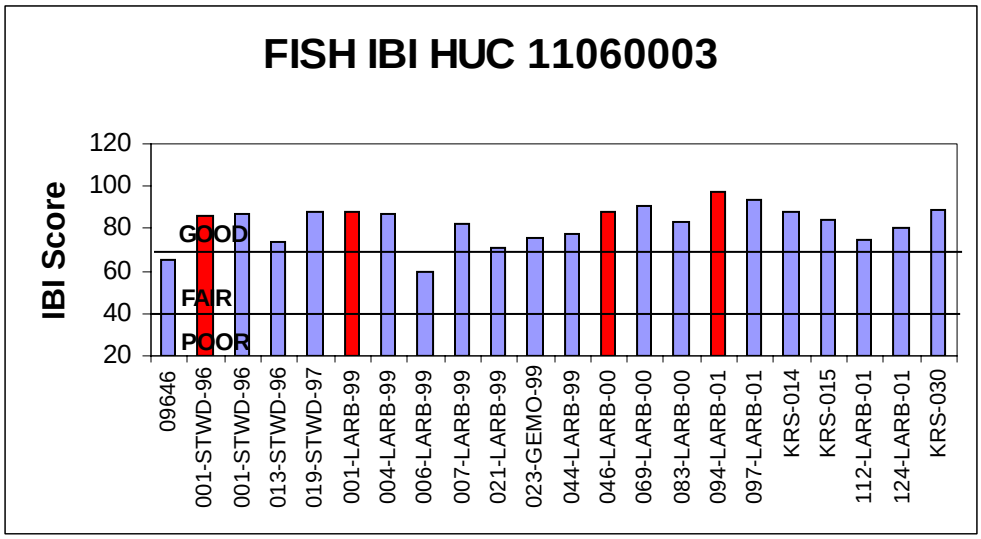
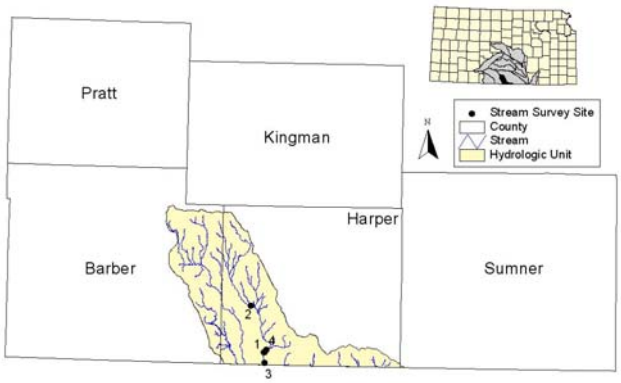


Figure 2. Graph of IBI values of HUC 11060003

Lower Arkansas River Basin
HUC 11060004

LOCATION



- This HUC consists of 4 sites (7 samples).
- Sites were surveyed between 1994-2001.

BIOLOGICAL HIGHLIGHTS

- 2 samples showed no impact from nutrient and oxygen demanding pollutants, 4 samples were moderately impacted, 1 sample was showed high impact (see figure1).
- The overall MBI value for this HUC was 5.11 indicating that the HUC was moderately impacted by nutrient and oxygen demanding pollutants.
- All sites had good IBI scores
- 22 species of fish were surveyed. See fish species collected, page 2.
- 7 species of freshwater mussels were surveyed. See mussel species collected, page 2.

Image 1. Sandy Creek, Harper Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Sandy	HP	94	9	*	4.78	11
1			00	14	*	4.02	16
2	W Sandy	HP	99	13	*	5.66	15
3	Sandy	HP	00	18	0.625	5.37	16
3			01	26	0.647	5.29	11
4	Sandy	HP	95	14	*	4.18	16
4			01	27	0.672	5	14

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in good health based on the information available at this time.

- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC.
- A water quality table is presented on page 2.

Lower Arkansas River Basin
HUC 11060004

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	23	749	15	381	10	8.4	260	74	0.04	1.8	0.04
1	23	820	35	49	7.2	7.75	NA	NA	NA	NA	NA
2	25	700	28	336	7.2	8.8	239	44	0.01	1.4	0.21
3	24	744	13	359	5	8.3	290	119	0.01	0.5	0.07
3	24	738	12	356	6.6	8.2	237	57	0.05	0.7	0.04
4	25	NA	9	NA	6.2	8.2	261	21	0.11	1.3	0.06
4	24	970	15	490	4.9	8.05	NA	NA	NA	NA	NA

TDS = total dissolved solids

Fish Species Collected

black bullhead
bluegill
central stoneroller
channel catfish
common carp
emerald shiner
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden shiner
green sunfish
largemouth bass
longear sunfish
orangespotted sunfish
plains killifish
red shiner
sand shiner
suckermouth minnow
western mosquitofish
white crappie
yellow bullhead

Mussel Species Collected

Asian clam
fingernail clam
giant floater
lilliput
mapleleaf
pimpleback
pondhorn

Lower Arkansas River Basin
HUC 11060004

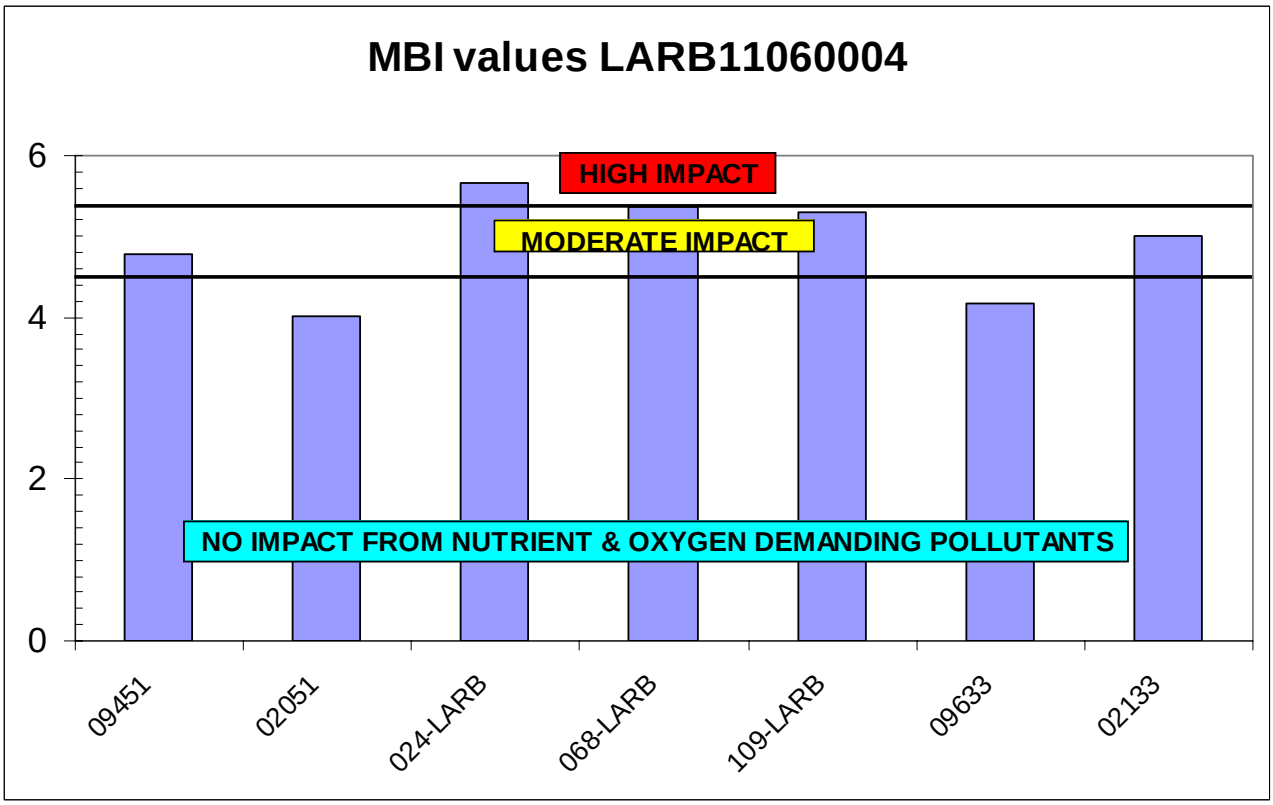


Figure 1. Graph of MBI values for HUC 11060004

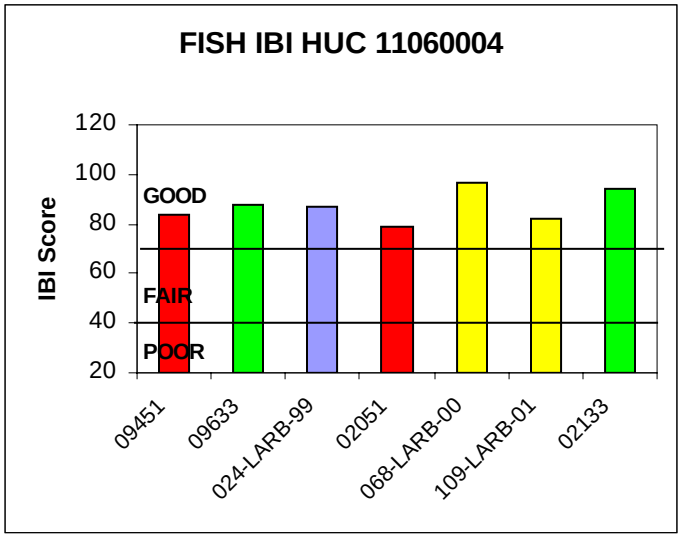
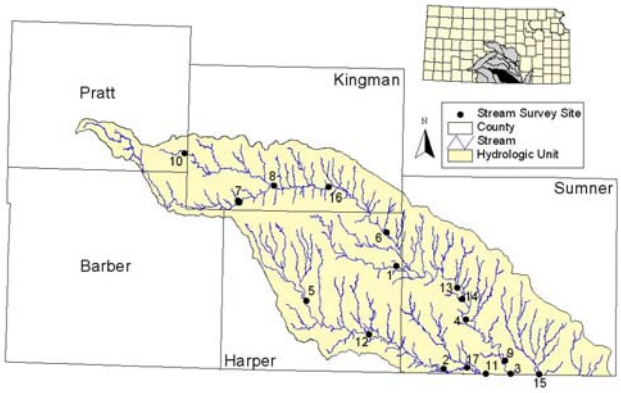


Figure 2. Graph of IBI values for HUC 11060004

Lower Arkansas River Basin

HUC 11060005

LOCATION



- This HUC consists of 17 sites (23 samples).
- Sites were surveyed between 1996-2001.

BIOLOGICAL HIGHLIGHTS

- 2 samples showed no impact from nutrient and oxygen demanding pollutants, 8 were moderately impacted, and 13 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 7.1, indicating that this HUC was highly impacted from nutrient and oxygen demanding pollutants.
- 37 species of fish were surveyed. See fish species collected, page 3.
    - Threatened species – Arkansas darter
    - Western record of the freckled madtom from Sand Creek
    - Western record of spotted bass from Chikaskia River
    - Bluntface shiner collected in this HUC
    - Good IBI scores with high native fish richness
- 17 species of freshwater mussels were surveyed, see mussel species collected, page 3.
    - SINC species – creeper, fatmucket, Wabash pigtoe, yellow sandshell

Stream pictures (see page 3)

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	E Sand	HP	96	7	0.003	10.95	17
2	Bluff	SU	96	15	0.808	5.08	20
2			99	17	0.598	5.29	20
2			00	18	0.717	5.05	17
2			01	27	0.368	5.81	18
3	Chikaskia	SU	96	12	0.169	9.68	19
4	Chikaskia	SU	99	22	*	5.77	20
5	Bluff	HP	99	17	0.509	5.82	20
6	Chikaskia	HP	99	15	*	5.59	21
7	Sand	KM	99	18	0.454	4.5	17
7			00	16	0.72	4.56	16
7			01	23	0.433	5.94	17
8	Chikaskia	KM	97	14	*	4.57	17
8			01	24	0.484	5.08	19
9	Chikaskia	SU	99	15	0.493	4.59	24
10	Chikaskia	PR	00	18	0.224	7	8
11	Bluff	SU	00	16	0.854	4.35	19
12	Bluff	HP	00	19	0.557	6.6	20
13	Chikaskia	SU	00	23	0.456	6.14	25
14	Chikaskia	SU	00	20	0.182	7.78	22
15	Shoo Fly	SU	01	17	0.323	6.76	15
16	Chikaskia	KM	01	29	0.4	5.78	16
17	Bluff	SU	01	28	0.6	5.03	23

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in good health based on the information available at this time.

- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC.
- A water quality table is presented on page 2.

Lower Arkansas River Basin
HUC 11060005

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	23	779	19	376	4.5	8	186	1.9	0.16	1.1	0.26
2	25	842	60	406	5.8	8.1	244	8.9	0.15	NA	0.43
2	25	807	47	389	6.6	9	230	40	0.07	0.1	0.15
2	26	803	29	385	5.4	8.2	322	60	0.09	0.4	0.11
2	27	752	39	360	5.5	8.1	295	53	0.08	0.4	0.12
3	26	560	36	267	5.3	8.43	192	2.5	0.01	0	0.09
4	25	576	30	278	6.4	1.1	150	29	0	0.5	0.25
5	24	617	13	298	6.7	8.6	68	37	0.02	1.9	0.09
6	24	402	29	191	7.4	8.9	58	8	0.02	0.3	0.06
7	27	284	83	135	5.6	8.6	16	127	0.12	1.9	0.14
7	17	387	15	185	7.7	8.4	449	83	0.04	2.1	0.17
7	22	395	14	187	6.5	7.9	193	22	0.08	3.2	0.32
8	23	455	51	218	6.2	7.31	100	9.1	0.08	0.3	0.09
8	23	593	19	285	6.9	8	201	38	0.01	1.9	0.08
9	26	546	35	261	7	9	166	261	0.01	0.3	0.04
10	23	519	24	248	5.6	7.9	411	202	0.04	0.9	0.15
11	25	829	38	398	7.2	9.1	292	390	0.01	1.1	0.14
12	25	782	11	376	5.8	8.2	283	59	0.02	2.1	0.1
13	24	493	17	234	7	8.3	170	52	0.05	0.4	0.03
14	23	559	18	270	6.3	8.2	156	43	0.06	0.6	0.04
15	27	1116	26	541	6.6	8.2	238	81	0.07	1.9	0.06
16	25	531	14	255	5.4	8.2	203	33	0.05	1.7	0.23
17	28	731	32	351	6.5	8.3	250	39	0.07	0.7	0.02

TDS = total dissolved solids

Lower Arkansas River Basin
HUC 11060005

Fish Species Collected

Arkansas darter	flathead catfish	plains killifish
black bullhead	freckled madtom	quillback
black crappie	freshwater drum	red shiner
bluegill	ghost shiner	river carpsucker
bluegill X green sunfish hybrid	gizzard shad	sand shiner
bluntface shiner	golden redhorse	shorthead redhorse
bluntnose minnow	golden shiner	slenderhead darter
brook silverside	green sunfish	spotted bass
bullhead minnow	largemouth bass	suckermouth minnow
central stoneroller	longear sunfish	western mosquitofish
channel catfish	longnose gar	white crappie
common carp	orangespotted sunfish	yellow bullhead
fathead minnow	orangethroat darter	

Mussel Species Collected

Asian clam	lilliput	pondmussel
bleufer	mapleleaf	threeridge
creeper	pimpleback	Wabash pigtoe
fatmucket	pistolgrip	white heelsplitter
fingernail clam	plain pocketbook	yellow sandshell
giant floater	pondhorn	

Image 1. Sand Creek, Kingman Co.

Image 2. Chikaskia River, Kingman Co.

Image 3. Bluff Creek, Sumner Co.

Lower Arkansas River Basin
HUC 11060005

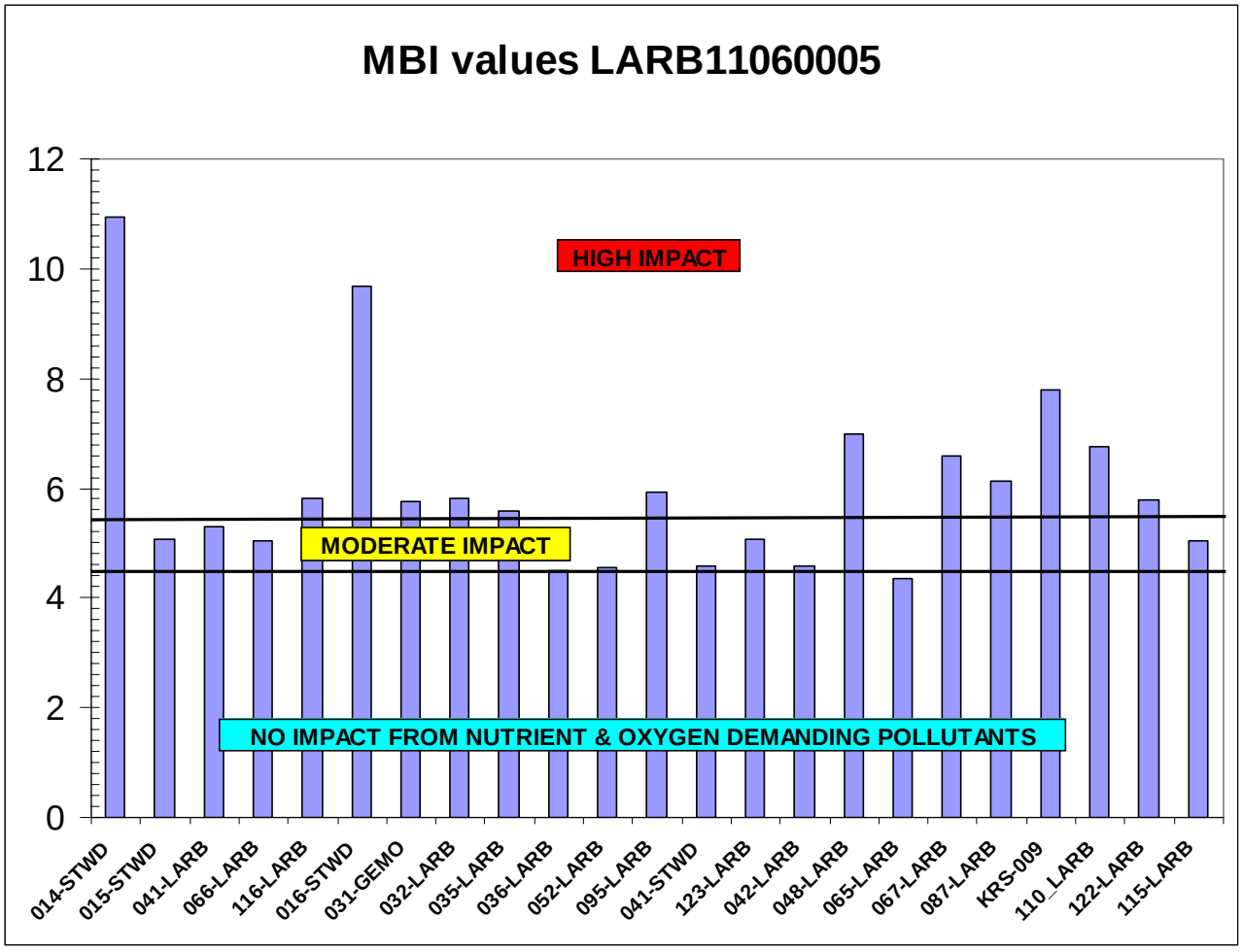


Figure 1. Graph of MBI values for HUC 11060005

Lower Arkansas River Basin
HUC 11060005

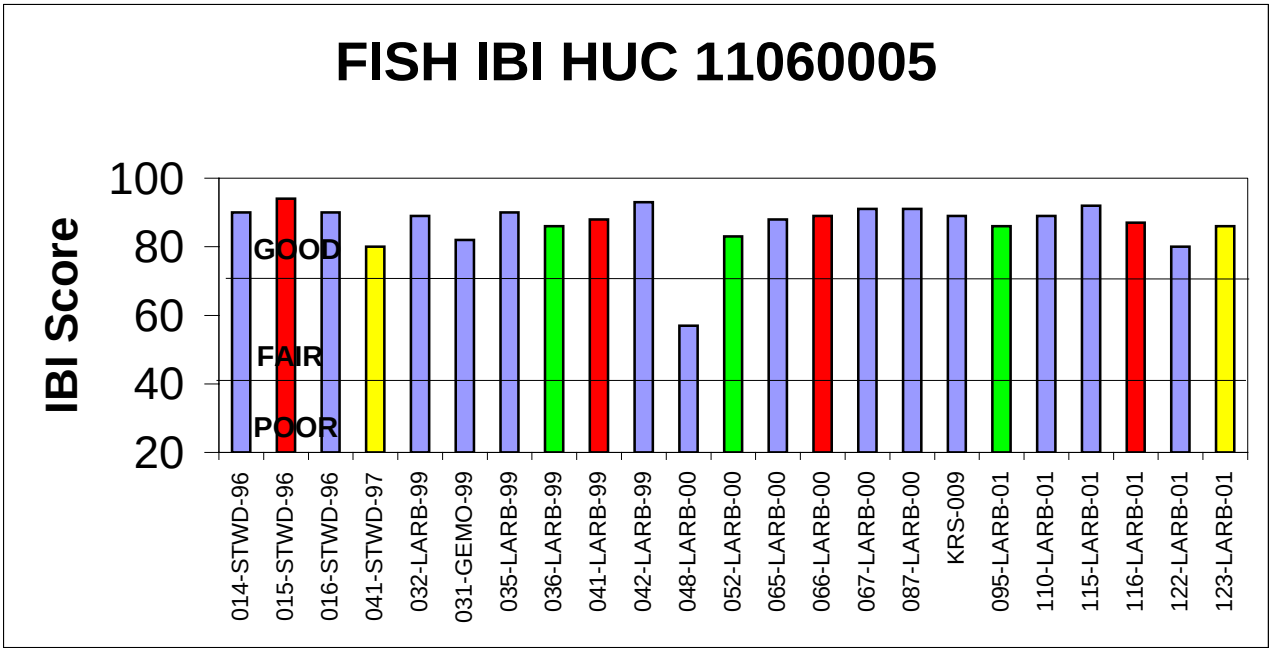
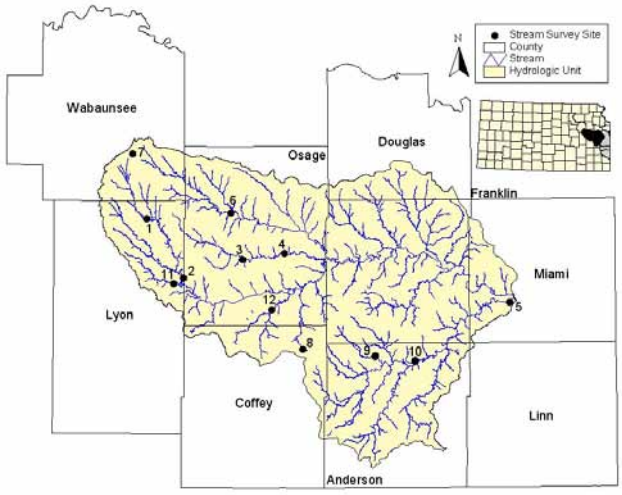


Figure 2. Graph of IBI values of HUC 11060005

Marais des Cygnes River Basin
HUC 10290101

LOCATION



- This HUC consists of 12 sites (16 samples).
- Sites were surveyed between 1994-2001.

BIOLOGICAL HIGHLIGHTS

- 3 samples showed no impact from nutrient and oxygen demanding pollutants, 1 was moderately impacted, and 11 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 6.35 indicating that this HUC was highly impacted by nutrient and oxygen demanding pollutants.
- 43 species of fish were surveyed. See fish species collected, page 2.
    - State threatened – hornyhead chub
- 24 species of freshwater mussels were surveyed, see mussel species collected, page 3.
    - State endangered – elktoe, mucket
    - SINC species – creeper, deertoe, fatmucket, fawnsfoot, spike, Wabash pigtoe, yellow sandshell

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Elm	LY	96	15	0.237	3.95	22
2	Marais des Cygnes	OS	96	12	*	5.78	25
3	Salt	OS	96	14	0.509	6.24	19
4	Salt	OS	00	11	0.385	7.61	22
5	Pottawatomie	MI	94	16	0.814	4.24	28
6	Dragoon	OS	94	15	0.529	4.26	25
7	Dragoon	WB	95	14	0.154	9.17	1
7			01	10	0.003	8.71	2
8	Rock Trib	CF	95	7	*	8.2	
8			01	0	0		
9	Iantha	AN	95	9	*	5.45	21
9			01	26	0.249	7.83	21
10	Pottawatomie	AN	95	8	*	9.23	13
10			01	20	0.122	8.97	10
11	Duck	LY	95	12	*	4.96	16
12	Long	OS	01	24	0.182	7.82	24

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair to good health based on the information available at this time.

- Protection efforts should be utilized to maintain the hornyhead chub population as well as the endangered and SINC mussel species present.
- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC.
- A water quality table is presented on page 2.

Image 1. Cedar Creek, Anderson Co.

Marais des Cygnes River Basin
HUC 10290101

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	24	444	18	212	6.3	8.04	168	6.9	0.04	0.6	0.02
2	26	345	49	164	7.6	8.21	146	8.8	0.01	1.4	0.04
3	26	376	48	175	10.9	8.44	93	19.5	0.47	1.1	0.03
4	27	458	21	219	4.1	7.9	154	16	0.11	0	0.07
5	26	420	81	220	8.8	7.64	NA	NA	NA	NA	NA
6	23	520	46	540	5.4	7.68	NA	NA	NA	NA	NA
7	20	478	114	229	1.8	7.7	201	26	0.45	1.7	0.02
7	19	800	2	410	4.8	7.64	NA	NA	NA	NA	NA
8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8	22	600	21	310	4.3	7.89	NA	NA	NA	NA	NA
9	28	NA	15	NA	3.4	8	490	276	0.03	2.1	0.02
9	22	130	461	70	5.1	7.53	NA	NA	NA	NA	NA
10	24	NA	15	NA	5.5	8.1	220	8	0.07	5.8	0.12
10	23	420	37	220	4.6	7.64	NA	NA	NA	NA	NA
11	13	530	11	270	6.4	7.45	NA	NA	NA	NA	NA
12	26	395	14	189	3.6	7.9	142	17	0.01	0.9	0.02

TDS = total dissolved solids

Fish Species Collected

bigmouth buffalo
black bullhead
black crappie
blackstripe topminnow
bluegill
bluntnose minnow
brook silverside
central stoneroller
channel catfish
common carp
creek chub
emerald shiner
fathead minnow
flathead catfish
freshwater drum
ghost shiner
gizzard shad
golden redhorse
golden shiner
green sunfish
green sunfish X bluegill hybrid
hornyhead chub
largemouth bass
logperch
longear sunfish
longnose gar
mimic shiner
orangespotted sunfish
orangethroat darter
paddlefish
red shiner
redfin shiner
river carpsucker
sand shiner
shortnose gar
slender madtom
slenderhead darter
smallmouth buffalo
stonecat
suckermouth minnow
western mosquitofish
white crappie
white sucker
yellow bullhead

Marais des Cygnes River Basin
HUC 10290101

Mussel Species Collected

Asian clam	giant floater	pondhorn
creeper	mapleleaf	pondmussel
deertoe	mucket	spike
elktoe	pimpleback	threehorn wartyback
fatmucket	pink heelsplitter	threeridge
fawnsfoot	pink papershell	Wabash pigtoe
fingernail clam	pistolgrip	white heelsplitter
fragile papershell	plain pocketbook	yellow sandshell

Marais des Cygnes River Basin
HUC 10290101

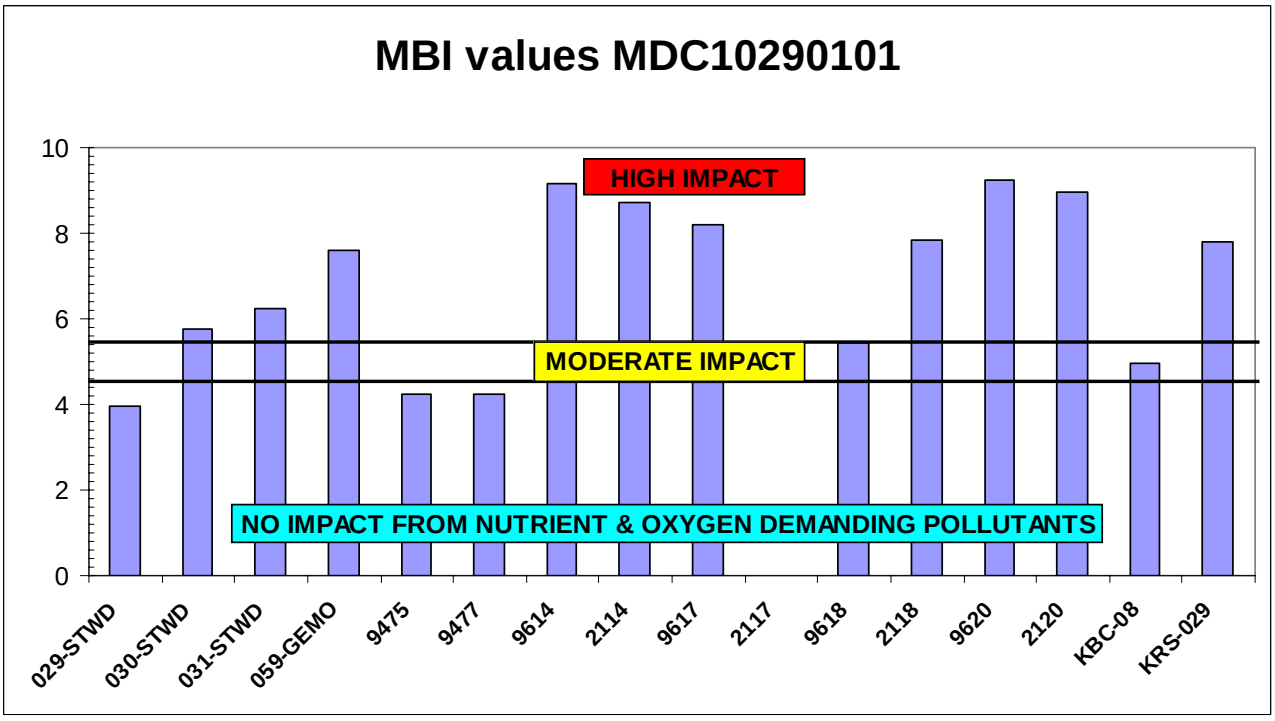


Figure 1. Graph of MBI values for HUC 10290101

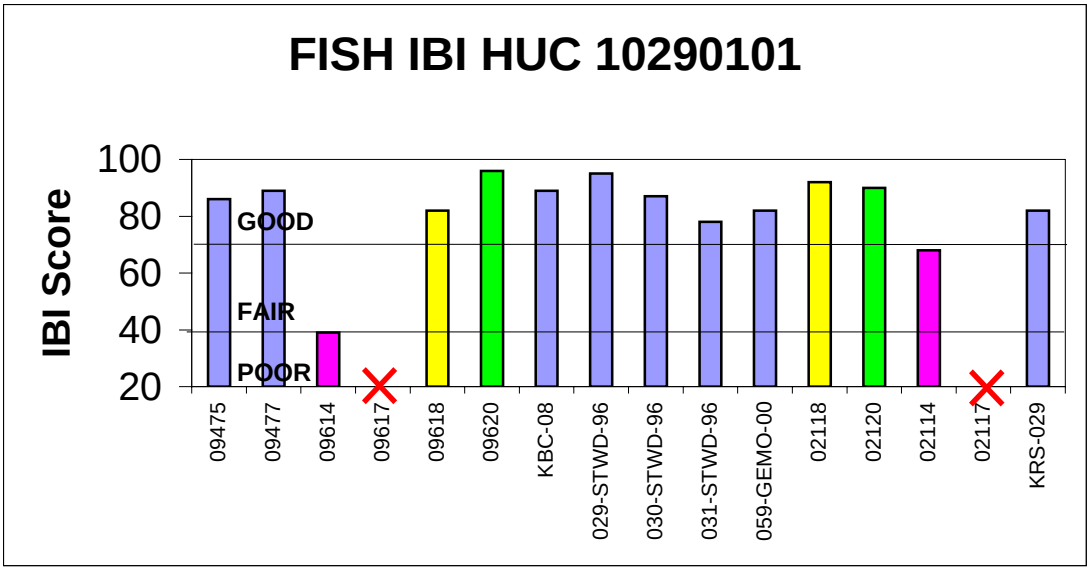
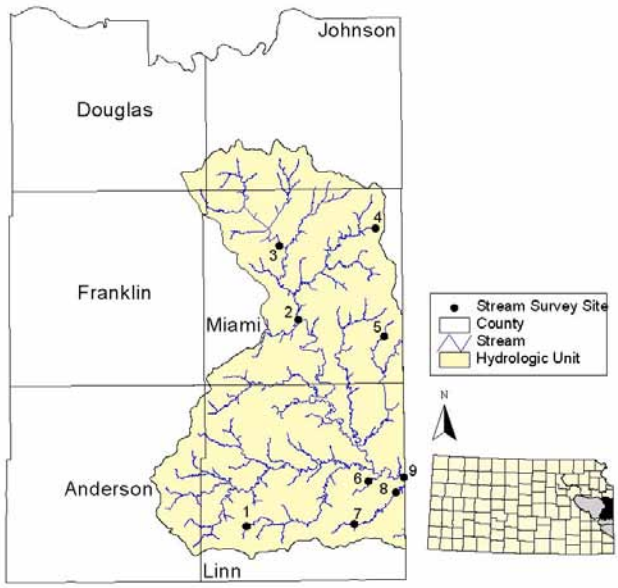


Figure 2. Graph of IBI values for HUC 10290101

Mar
ais des Cygnes River Basin
HUC 10290102

LOCATION



- This HUC consists of 9 sites (12 samples).
- Sites were surveyed between 1994-2003.

BIOLOGICAL HIGHLIGHTS

- 1 sample showed no impact from nutrient and oxygen demanding pollutants, 2 samples were moderately impacted, and 9 samples were highly impacted (see figure1).
- The overall MBI value for this HUC was 6.38 indicating that this HUC was highly impacted by nutrient and oxygen demanding pollutants.
- 43 species of fish were surveyed. See fish species collected, page 2.
- 29 species of freshwater mussels were surveyed. See mussel species collected, page 2.
    - State endangered – mucket
    - SINC species – deertoe, fat mucket, round pigtoe, spike, Wabash pigtoe, wartyback, washboard, yellow sandshell.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	NF Little Sugar	LN	94	10	0.328	4.58	16
1			00	13	0.068	8.73	14
2	Marais des Cygnes	MI	97	13	0.573	5.23	15
3	Bull	MI	00	6	*	8.08	16
4	N Wea Trib	MI	95	3	*	10.82	6
4			01	13	0.039	7.34	5
5	Elm	MI	95	9	*	7.26	17
5			01	13	0.354	7.99	13
6	Muddy	LN	02	8	*	7.68	14
7	Mine	LN	02	18	0.32	7.65	22
8	Mine	LN	02	12	*	8.33	17
9	Marais des Cygnes	LN	03	22	0.826	4.33	26

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair to good health based on the information available at this time.

- Protection efforts should be utilized to maintain the endangered and SINC mussel species.
- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC.
- A water quality table is presented on page 2.

Image 1. Marais des Cygnes River, Miami Co.

Marais des Cygnes River Basin
HUC 10290102

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	21	276	19	143	5.9	8.1	114	32	0.08	2.7	0.03
1	25	290	28	150	2.6	7.71	NA	NA	NA	NA	NA
2	28	338	81	157	5.9	7.85	14	13.3	0.05	4.7	0.06
3	26	292	23	140	5.3	8.3	117	32	0.09	0	0.01
4	18	NA	34	NA	7	8.3	260	46	0.12	4.9	0.08
4	21	500	11	260	4.6	7.88	NA	NA	NA	NA	NA
5	26	NA	32	NA	4.7	7.8	271	6	0.15	2.8	0.04
5	23	400	33	210	4.5	7.35	NA	NA	NA	NA	NA
6	23	299	82	145.3	3.9	8.2	115	6.6	0.25	2.9	0.3
7	23	239	35	114.7	2.33	8.3	113	1.2	0.14	0.8	0.45
8	25	328	76	157.6	4.16	8.8	159	5.3	0.08	NA	0.26
9	28	426	55	206	4.7	8.2	130	7	0.11	2	0.03

TDS = total dissolved solids

Fish Species Collected

black bullhead
blackstripe topminnow
blue catfish
bluegill
bluegill X green sunfish hybrid
bluntnose minnow
brook silverside
bullhead minnow
central stoneroller
channel catfish
common carp
creek chub
emerald shiner
fathead minnow
flathead catfish
freshwater drum
ghost shiner
gizzard shad
golden shiner
grass carp
green sunfish
Johnny darter
largemouth bass
logperch
longear sunfish
longnose gar
orangespotted sunfish
orangethroat darter
red shiner
redfin shiner
sand shiner
shorthead redhorse
shortnose gar
slender madtom
slenderhead darter
smallmouth buffalo
spotted bass
stonecat
suckermouth minnow
western mosquitofish
white bass
white crappie
white sucker
yellow bullhead

Marais des Cygnes River Basin
HUC 10290102

Mussel Species Collected

Asian clam	mucket	round pigtoe
black sandshell	paper pondshell	spike
deertoe	pimpleback	threehorn wartyback
fatmucket	pink heelsplitter	threeridge
fingernail clam	pink papershell	Wabash pigtoe
fragile papershell	pistolgrip	wartyback
giant floater	plain pocketbook	washboard
lilliput	pondhorn	white heelsplitter
mapleleaf	pondmussel	yellow sandshell
monkeyface	purple wartyback	

Marais des Cygnes River Basin
HUC 10290102

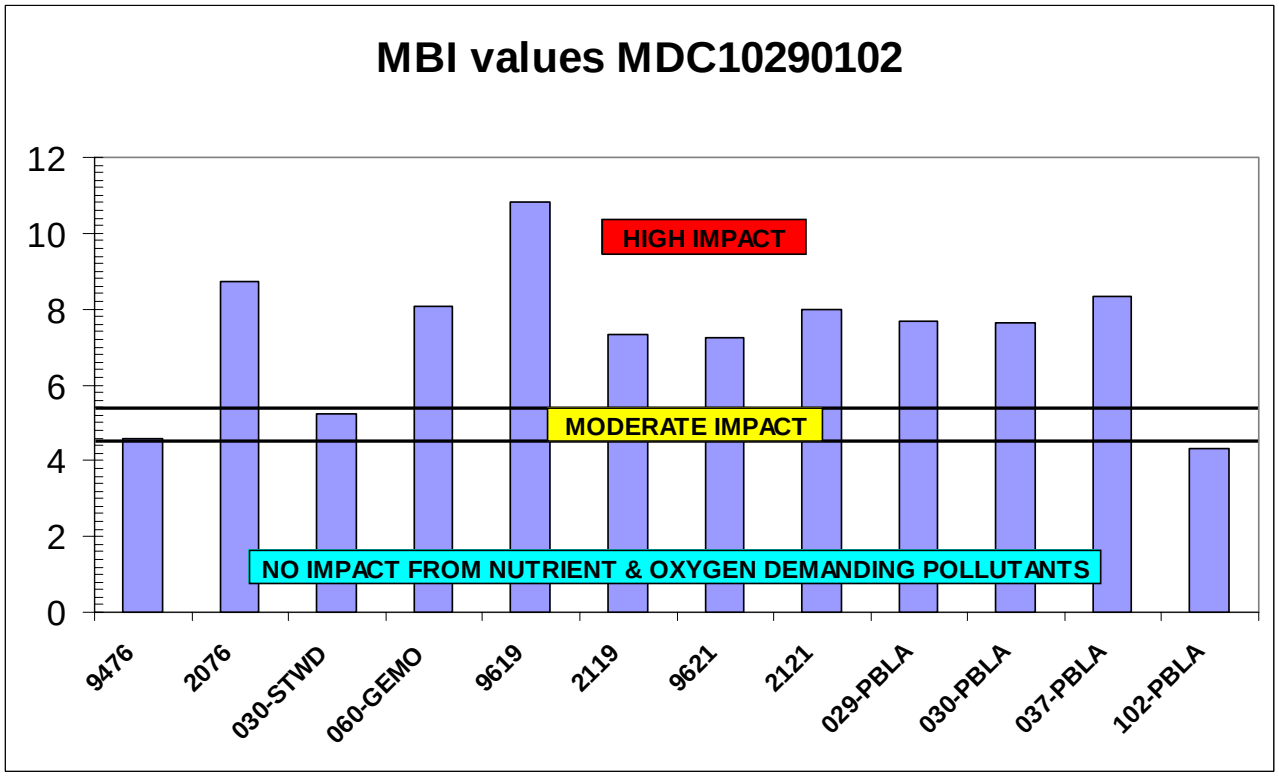


Figure 1. Graph of MBI values for HUC 10290102

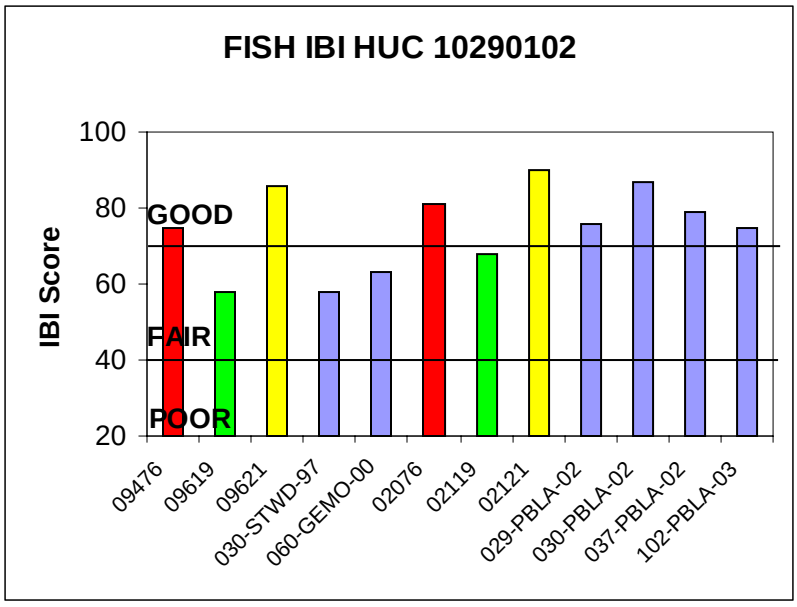
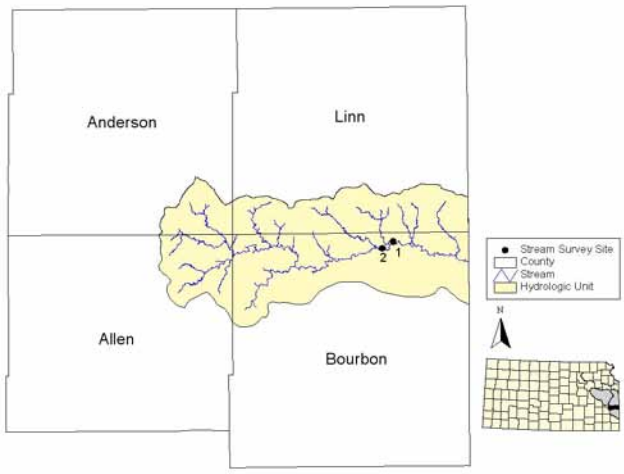


Figure 2. Graph of IBI values for HUC 10290102

Marais des Cygnes River Basin
HUC 10290103

LOCATION



- This HUC consists of 2 sites (2 samples).
- Sites were surveyed between 1996-2001.

BIOLOGICAL HIGHLIGHTS

- 1 sample showed moderate impact from nutrient and oxygen demanding pollutants, one site was highly impacted.
- The overall MBI value for this HUC was 5.86, indicating it has been highly impacted.
- Two surveys conducted on this river, five years apart with similar IBI scores.
- 32 species of fish were surveyed. See fish species collected, page 2.
    - SINC species – greenside darter
- 18 species of freshwater mussels were surveyed.
    - SINC species – creeper, deertoe, fatmucket, spike, Wabash pigtoe, yellow sandshell

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Little Osage	BB	96	20	0.561	5.18	25
2	Little Osage	BB	01	34	0.3	6	26

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in good health based on the information available at this time.

- Protection efforts should be utilized to maintain the endangered and SINC mussel species.
- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC and contribute more information to baseline data since it has not been surveyed as extensively.
- A water quality table is presented on page 2.

Marais des Cygnes River Basin
HUC 10290103

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	24	432	20	205	7.2	7.97	211	7.2	0.09	0.6	0.03
2	24	380	19	182	4.6	8.1	191	60	0.03	2.2	0.04

TDS = total dissolved solids

Fish Species Collected

blackstripe topminnow
bluegill
bluntnose minnow
brook silverside
central stoneroller
channel catfish
common carp
fantail darter
flathead catfish
freshwater drum
golden redhorse
green sunfish
greenside darter
largemouth bass
logperch
longear sunfish
longnose gar
orangespotted sunfish
orangethroat darter
red shiner
redfin shiner
sand shiner
shorthead redhorse
slender madtom
slenderhead darter
smallmouth buffalo
spotted bass
stonecat
suckermouth minnow
western mosquitofish
white crappie
yellow bullhead

Mussel Species Collected

Asian clam
black sandshell
creeper
deertoe
fatmucket
fragile papershell
giant floater
mapleleaf
pimpleback
pink heelsplitter
pistolgrip
plain pocketbook
pondmussel
spike
threeridge
Wabash pigtoe
white heelsplitter
yellow sandshell

Marais des Cygnes River Basin
HUC 10290103

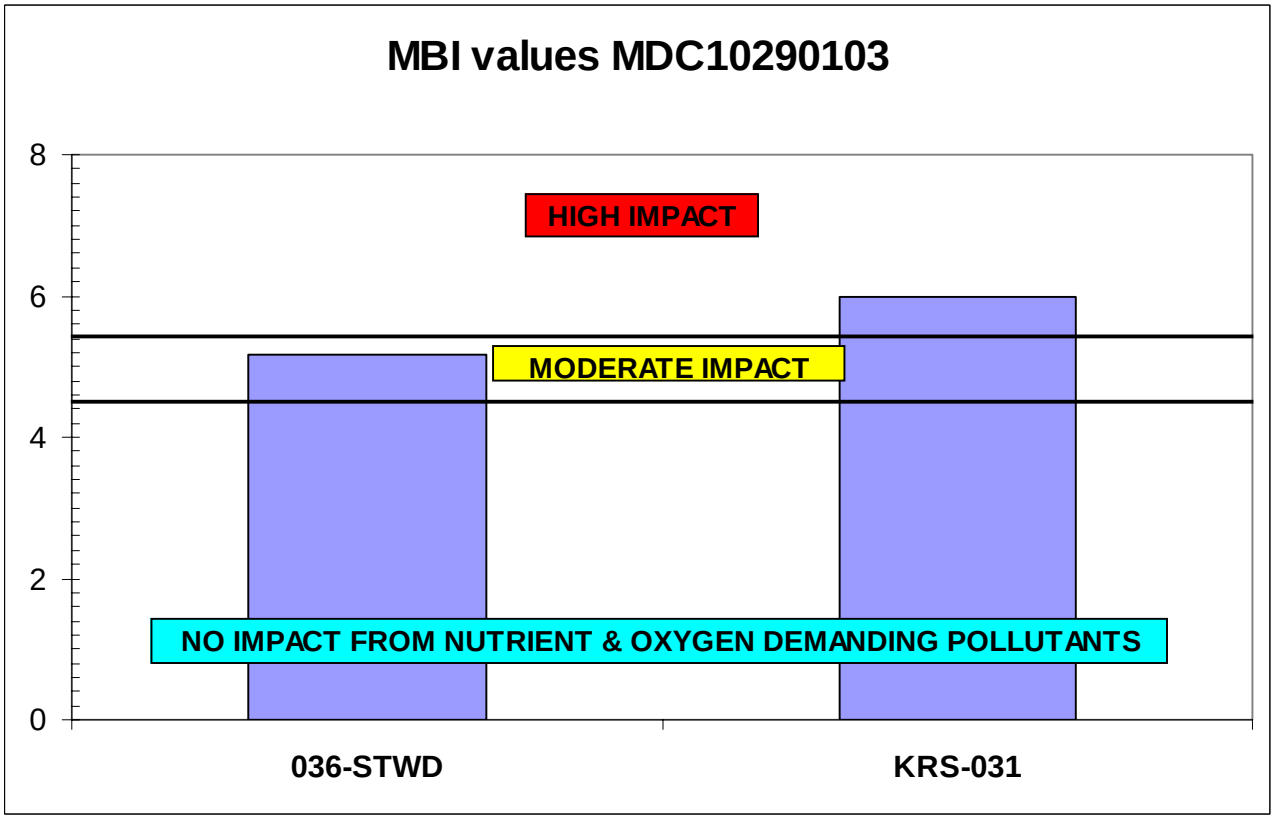


Figure 1. Graph of MBI values for HUC 10290103

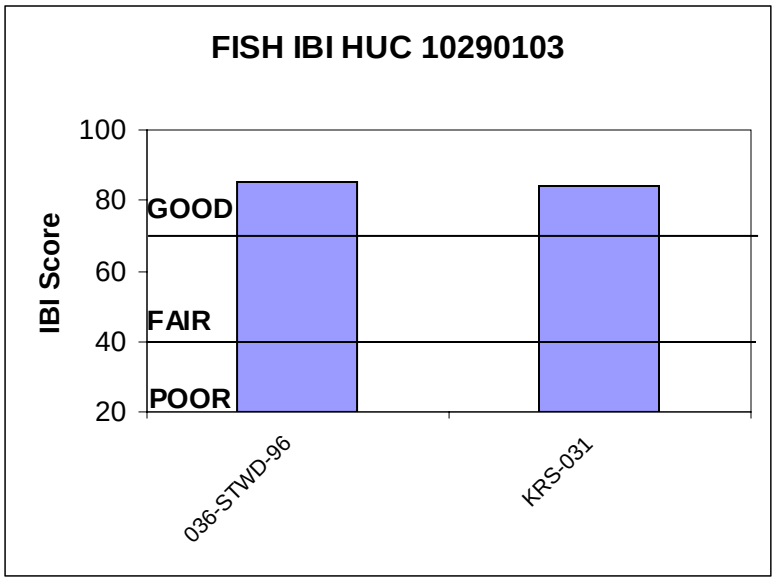
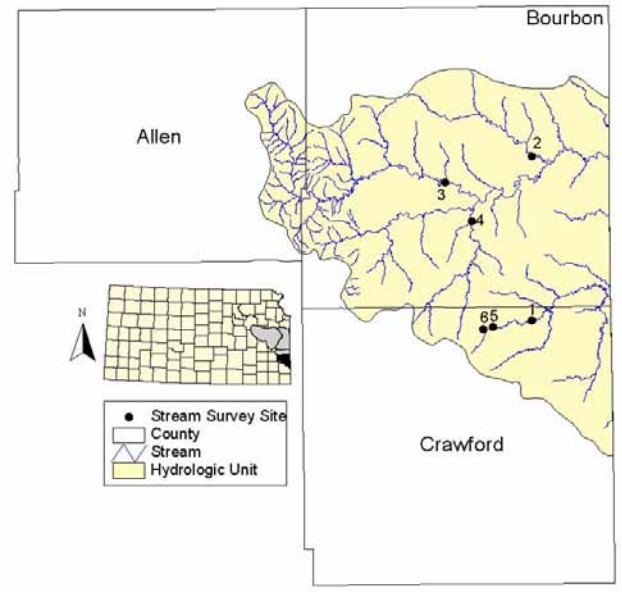


Figure 2. Graph of IBI values for HUC 10290103

Marais des Cygnes River Basin
HUC 10290104

LOCATION



- This HUC consists of 6 sites (7 samples).
- Sites were surveyed between 1995-2003.

BIOLOGICAL HIGHLIGHTS

- 2 samples were moderately impacted from nutrient and oxygen demanding pollutants, 5 were highly impacted (see figure 1).
- The overall MBI value for this HUC is 6.73, indicating it has been highly impacted by nutrient and oxygen demanding pollutants.
- 43 species of fish were surveyed. See fish species collected, page 2.
    - SINC species – greenside darter
- 16 species of freshwater mussels were surveyed. See mussel species collected, page 3.
    - SINC species – creeper, fatmucket, Wabash pigtoe

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Drywood	CR	97	19	0.472	5.81	24
2	Mill	BB	96	15	*	8.14	25
3	Marmaton	BB	96	21	*	6.21	30
4	Pawnee	BB	95	7	*	4.75	17
4			01	21	*	5.03	16
5	WF Drywood	CR	03	25	0.328	6.29	22
6	WF Drywood	Cr	03	12	0.061	10.13	16

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair to good health based on the information available at this time.

- Protection efforts should be utilized to maintain the endangered and SINC mussel species as well as SINC populations of greenside darter.
- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC and contribute more information to baseline data since it has not been surveyed as extensively.
- A water quality table is presented on page 2.


Image 1. Marmaton River, Bourbon Co.


Image 2. Paint Creek, Bourbon Co.

Marais des Cygnes River Basin
HUC 10290104

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	28	376	20	178	5.8	6.19	112	0.2	0.12	0.2	0.02
2	24	255	23	121	6.7	7.81	81	2.4	0.03	0	0.07
3	23	388	18	184	7.1	7.89	113	11.4	0.01	0.3	0.02
4	28	490	14	200	4.2	7.68	NA	NA	NA	NA	NA
4	25	NA	16	NA	5.5	8.4	183	12	0.13	3.2	0.04
5	24	279	31	133.8	2.4	7.6	101	2	0.19	0.3	0.14
6	21	439	47	212	2.7	7.6	154	20	0.01	1.4	0

TDS = total dissolved solids

Fish Species Collected

black bullhead
black crappie
blackstripe topminnow
bluegill
bluegill X green sunfish hybrid
bluntnose minnow
brook silverside
bullhead minnow
central stoneroller
channel catfish
common carp
common shiner
creek chub
fantail darter
fathead minnow
flathead catfish
gizzard shad
golden redhorse
golden shiner
green sunfish
green sunfish X bluegill hybrid
greenside darter
hornyhead chub
Johnny darter
largemouth bass
logperch
longear sunfish
longnose gar
orangespotted sunfish
orangethroat darter
red shiner
redear sunfish
redfin shiner
sand shiner
sauger X walleye hybrid
slender madtom
slenderhead darter
spotted bass
stonecat
suckermouth minnow
walleye
walleye X sauger hybrid
warmouth
western mosquitofish
white bass X striped bass hybrid
white crappie
white sucker
yellow bullhead

Marais des Cygnes River Basin
HUC 10290104

Mussel Species Collected

Asian clam	pink heelsplitter
creeper	pink papershell
fatmucket	pistolgrip
fragile papershell	pondhorn
giant floater	pondmussel
mapleleaf	threeridge
paper pondshell	Wabash pigtoe
pimpleback	white heelsplitter

Marais des Cygnes River Basin
HUC 10290104

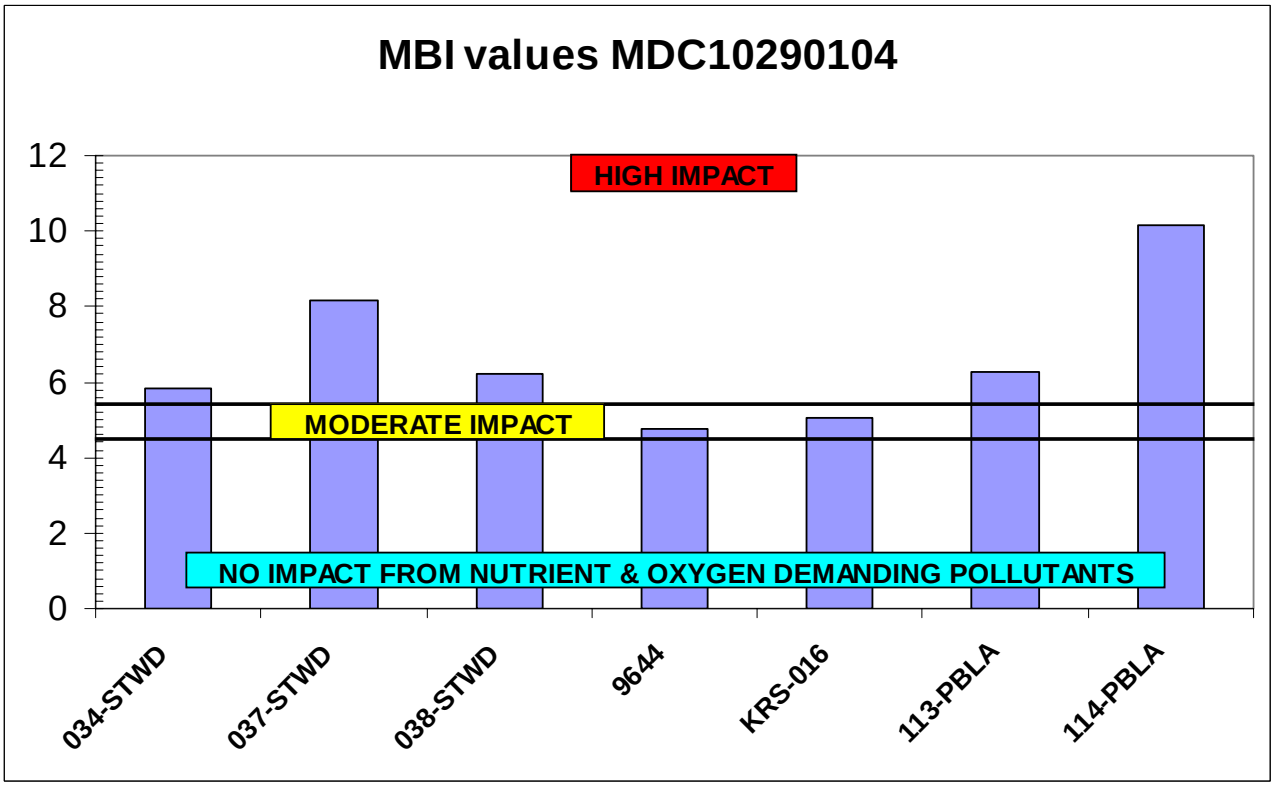


Figure 1. Graph of MBI values for HUC 10290104

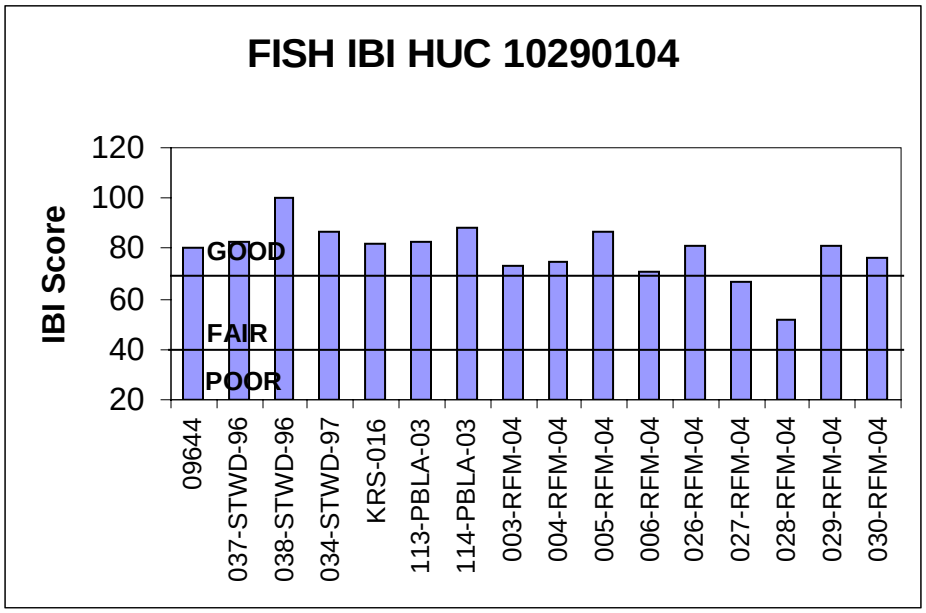
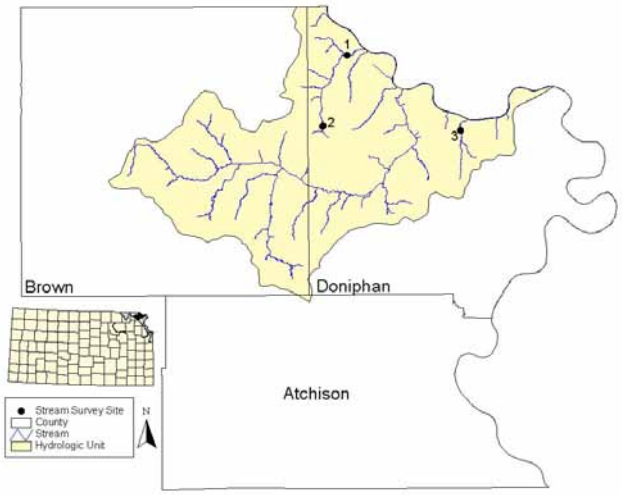


Figure 2. Graph of IBI values for HUC 10290104

Missouri River Basin
HUC 10240005

LOCATION



- This HUC consists of 3 sites (4 samples).
- Sites were surveyed between 1994-2001.

BIOLOGICAL HIGHLIGHTS

- All 4 samples were highly impacted by nutrient and oxygen demanding pollutants (see figure 1).
- The overall MBI value for this HUC was 9.31, indicating high impact.
- 31 species of fish were surveyed within this HUC.
    - State endangered – silver chub
- No mussels were collected within this HUC.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Cedar	DP	96	4	*	10.22	16
2	Cedar	DP	94	4	0	10.98	1
2			00	11	0.095	8.61	5
3	Mosquito	DP	01	12	0.528	5.77	25

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair health overall, based on current information available.

- Protection efforts should be utilized to maintain the silver chub population.
- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC and gain more baseline data since this area has not been sampled extensively.
- A water quality table is presented on page 2.

Missouri River Basin
HUC 10240005

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	22	371	135	177	6.9	7.95	120	2.9	0.12	0	0.27
2	21	346	61	181.9	6.1	8.2	170	15	0.1	0.6	0.12
2	16	440	16	230	6.2	7.43	NA	NA	NA	NA	NA
3	26	NA	33	NA	7	8.7	204	10	0.08	6	0.16

TDS = total dissolved solids

Fish Species Collected

bigmouth buffalo
bigmouth shiner
black bullhead
bluegill
central stoneroller
channel catfish
common carp
creek chub
emerald shiner
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden shiner
goldeye
goldfish
green sunfish
orangespotted sunfish
plains minnow
red shiner
river carpsucker
river shiner
sand shiner
shorthead redhorse
shortnose gar
silver chub
smallmouth buffalo
suckermouth minnow
white bass
white crappie
white sucker

Mussel Species Collected

No mussels were collected in this HUC

Missouri River Basin
HUC 10240005

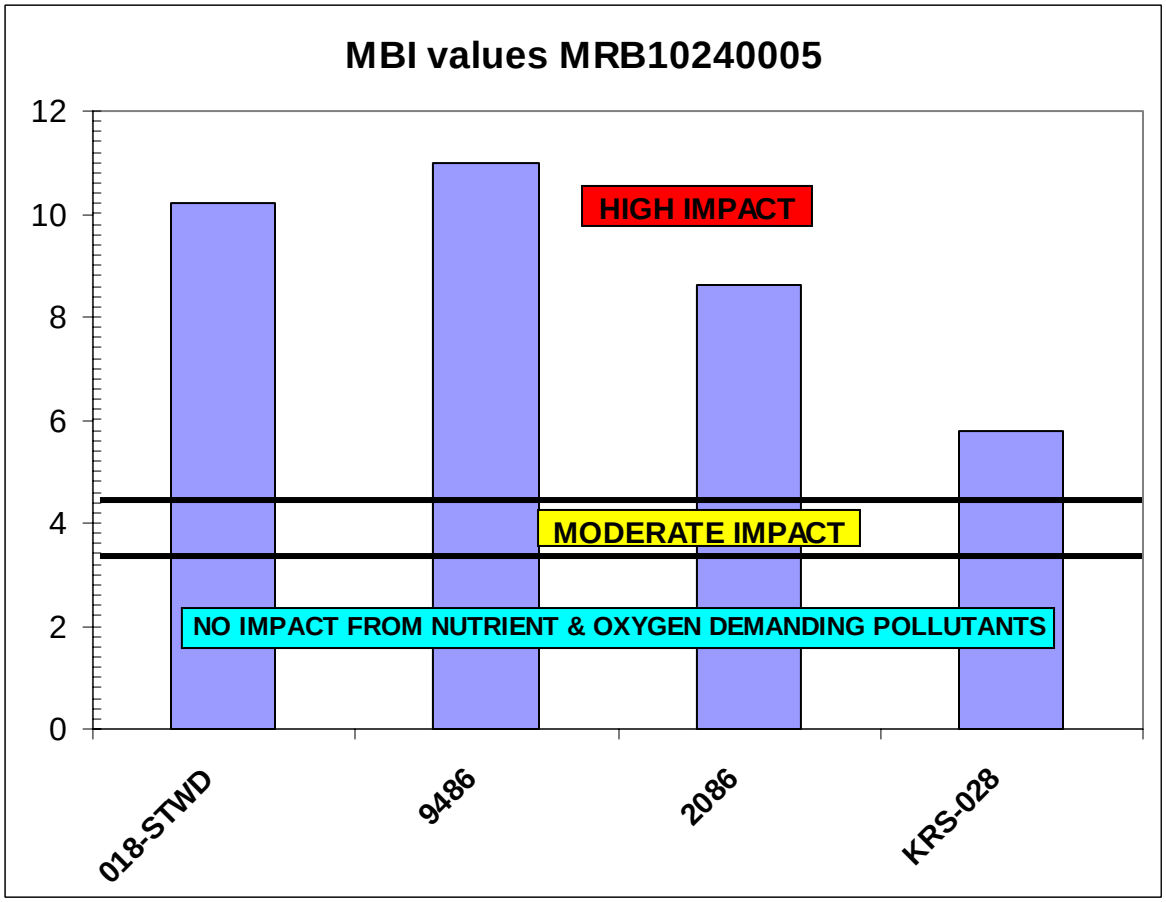


Figure 1. Graph of MBI values for HUC 10240005

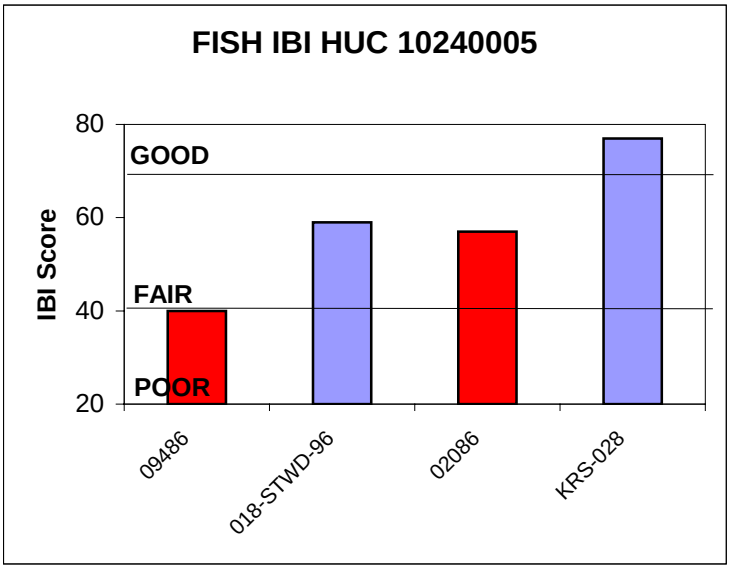
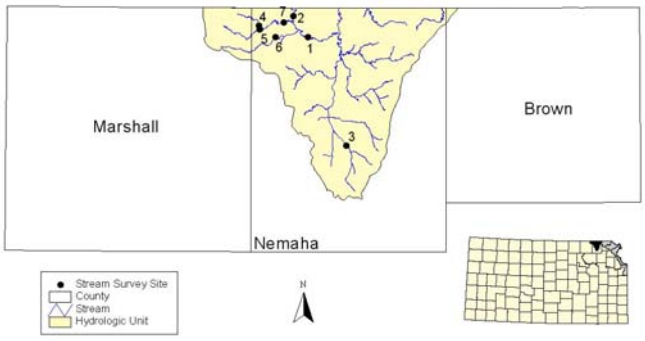


Figure 2. Graph of IBI values for HUC 10240005

Missouri River Basin
HUC 10240007

LOCATION



- This HUC consists of 7 sites (7 samples).
- Sites were surveyed between 1994-2003.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Turkey	NM	00	16	0.535	5.6	12
2	Turkey	NM	94	5	*	9.89	12
3	SF Big Nemaha	NM	03	17	0.566	6.53	3
4	Pole	NM	03	17	0.62	6.2	13
5	Manley	NM	03	14	0.588	4.84	12
6	Clear	NM	03	22	0.31	5.4	12
7	Pole	NM	03	13	0.502	6.67	6

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

BIOLOGICAL HIGHLIGHTS

- 2 samples were moderately impacted by nutrient and oxygen demanding pollutants, 5 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC is 5.79, indicating that this HUC is highly impacted.
- 18 species of fish were surveyed (see fish species collected on page 2).
    - SINC species – blacknose dace
- 8 species of freshwater mussels were surveyed (see mussel species collected, page 2).
    - SINC species – creeper, Wabash pigtoe

SUMMARY

This HUC could be considered in fair to good health overall, based on current information available.

- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC and gain more baseline data since this area has not been sampled extensively.
- A water quality table is presented on page 2.

Missouri River Basin

HUC 10240007

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	21	405	242	194	6.5	8.2	155	20	0.38	1	0.26
2	22	560	155	290	4.5	7.23	NA	NA	NA	NA	NA
3	20	888	10	434	5.4	7.2	32.9	0.1	0.15	1.5	0.15
4	22	1019	73	500	2.1	7.2	35.7	0.1	0.03	0.6	0.06
5	30	829	12	405	6.3	8.9	27.8	0.2	0.01	0.9	0.23
6	21	975	18	478	5	8	33.7	0.1	0.06	1.7	0.03
7	25	1006	11	494	3.2	8.2	33.5	0.1	0.12	1.2	0.11

TDS = total dissolved solids

Fish Species Collected

bigmouth shiner
black bullhead
blacknose dace
bluegill
central stoneroller
central stoneroller X blacknose dace hybrid
channel catfish
common carp
creek chub
emerald shiner
fathead minnow
green sunfish
Johnny darter
largemouth bass
red shiner
river carpsucker
sand shiner
suckermouth minnow
yellow bullhead

Mussel Species Collected

creeper
fingernail clam
giant floater
lilliput
pondhorn
pondmussel
threeridge
Wabash pigtoe

Missouri River Basin
HUC 10240007

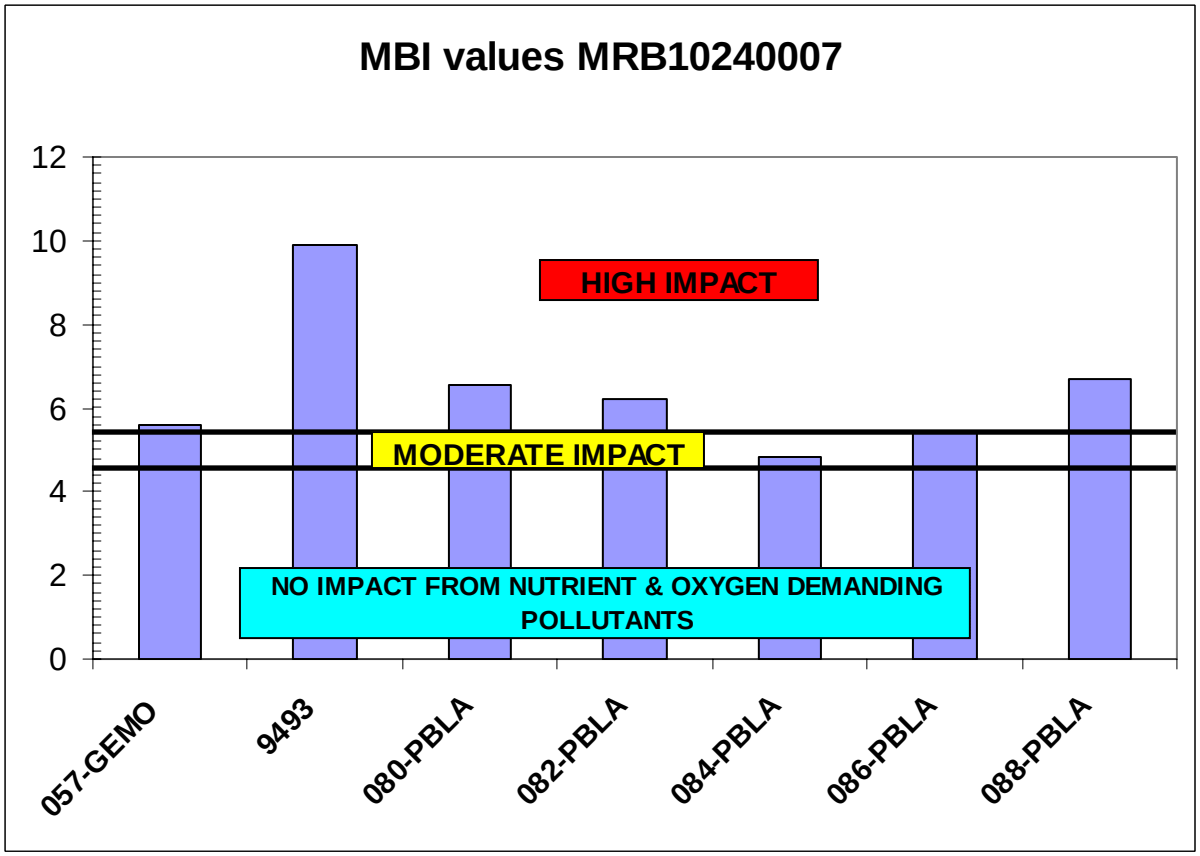


Figure 1. Graph of MBI values for HUC 10240007

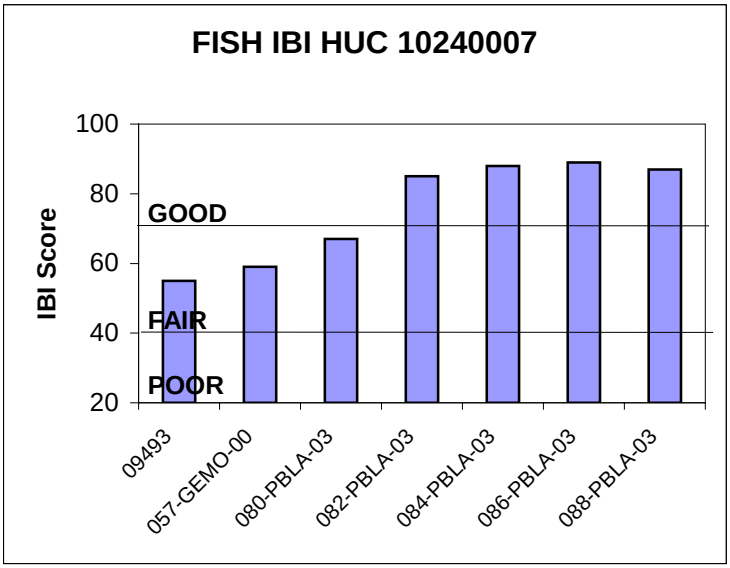
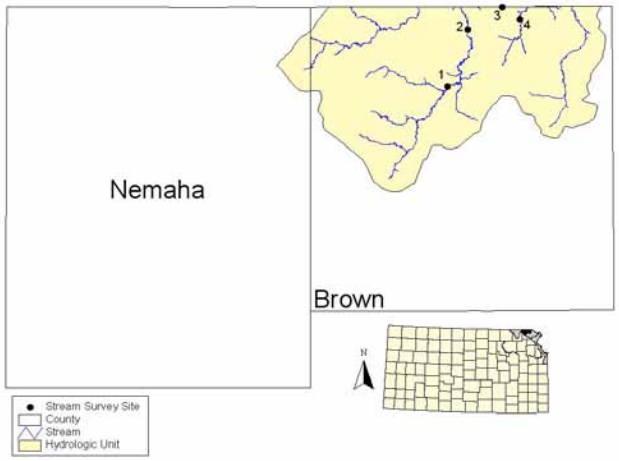


Figure 2. Graph of IBI values for HUC 10270007

Missouri River Basin
HUC 10240008

LOCATION



- This HUC consists of 4 sites (4 samples).
- Sites were surveyed between 1996-2003.

BIOLOGICAL HIGHLIGHTS

- 2 samples showed moderate impact from nutrient and oxygen demanding pollutants, 2 samples showed high impact (see figure 1).
- The overall MBI value for this HUC was 5.61 indicating it is highly impacted.
- 25 species of fish were surveyed (see fish species collected, page 2).
    - SINC species – brassy minnow, tadpole madtom.
- 10 species of freshwater mussels were surveyed (see mussel species collected, page 2).
    - SINC species – Wabash pigtoe

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Walnut	BR	96	7	*	8.1	11
2	Walnut	BR	03	26	0.201	6.77	23
3	Noharts Trib	BR	03	23	0.186	4.77	1
4	Noharts	BR	03	26	0.435	4.99	14

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair to good health overall, based on current information available.

- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC and gain more baseline data since this area has not been sampled extensively.
    - Assess SINC fish and mussel species distribution and current condition
- A water quality table is presented on page 2.

Missouri River Basin

HUC 10240008

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	24	725	59	347	7.8	8.1	208	0.9	0.05	0.7	0.19
2	23	767	29	374	1.5	8	235	8	0.14	0.1	0.17
3	24	487	NA	236	4.3	7.6	169	1	0.11	3.8	0.07
4	22	496	24	240	5.9	8.3	163	4	0.08	6	0.08

TDS = total dissolved solids

Fish Species Collected

bigmouth shiner
bluegill
brassy minnow
central stoneroller
channel catfish
common carp
creek chub
emerald shiner
fathead minnow
flathead catfish
goldeye
green sunfish
largemouth bass
red shiner
river carpsucker
sand shiner
smallmouth buffalo
spotted bass
stonecat
suckermouth minnow
tadpole madtom
white crappie
white perch
white sucker
yellow bullhead

Mussel Species Collected

fingernail clam
fragile papershell
giant floater
mapleleaf
pimpleback
pondhorn
pondmussel
threeridge
Wabash pigtoe
white heelsplitter

Missouri River Basin
HUC 10240008

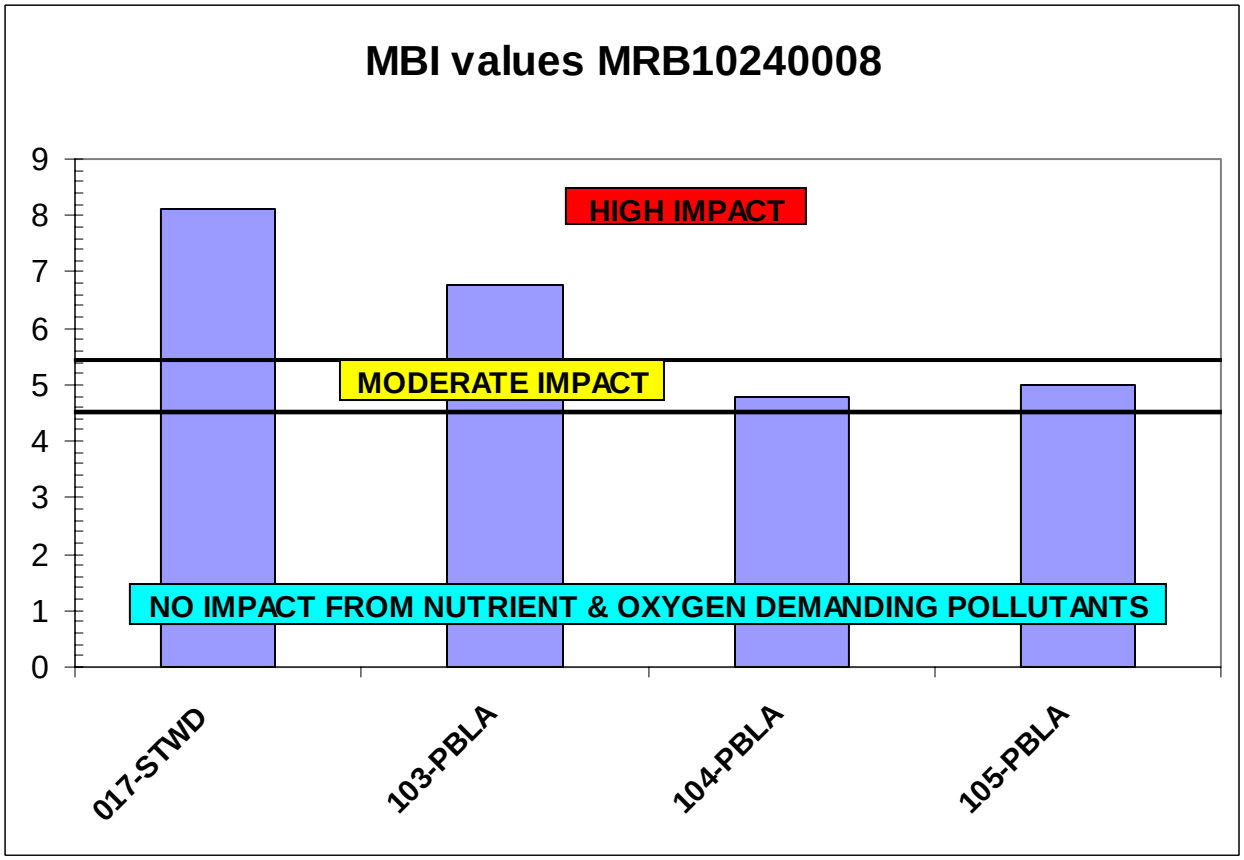


Figure 1. Graph of MBI values for HUC 10240008

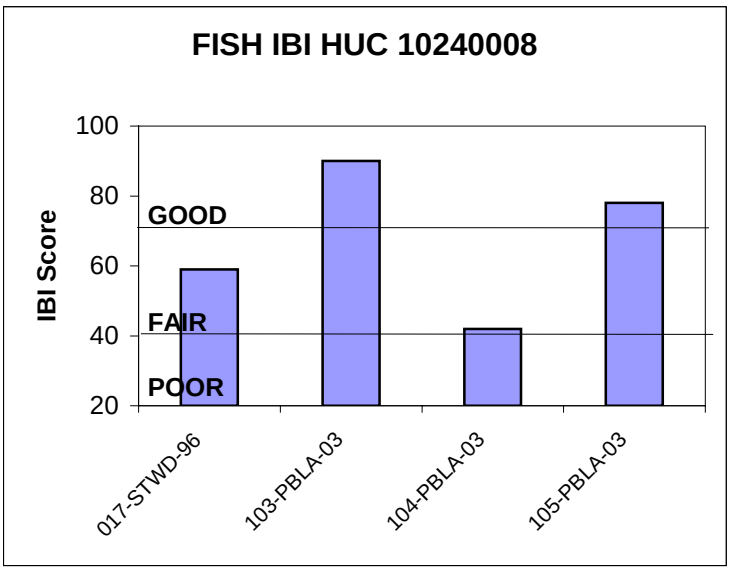
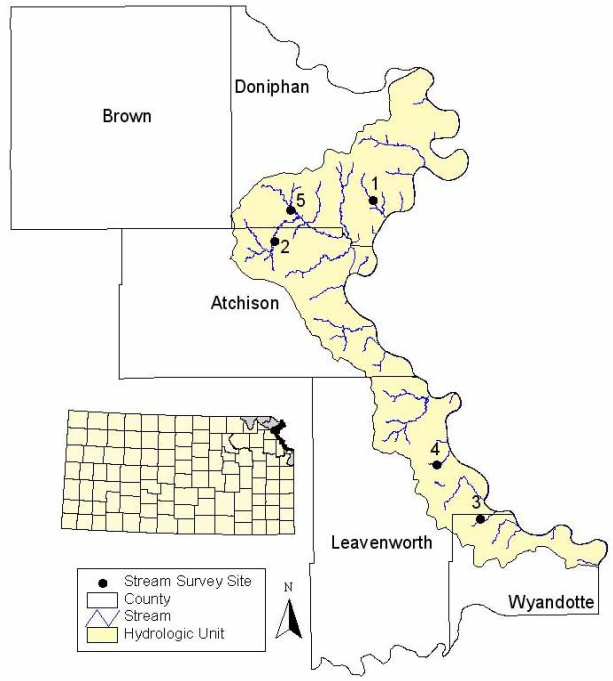


Figure 2. Graph of IBI values for HUC 10240008

Missouri River Basin

HUC 10240011

LOCATION



- This HUC consists of 5 sites (6 samples).
- Sites were surveyed between 1995-2001.

BIOLOGICAL HIGHLIGHTS

- 2 samples showed no impact from nutrient and oxygen demanding pollutants, 1 sample was moderately impacted, 2 samples were highly impacted.
- The overall MBI value for this HUC was 4.53, indicating that it was moderately impacted
- 26 species of fish were surveyed (see fish species collected, page 2).
- 5 species of freshwater mussels were surveyed (see mussel species collected, page 2)
    - SINC species – fatmucket, Wabash pigtoe

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Brush	DP	96	1	*		15
2	Independence	AT	96	5	*	8.85	13
3	Island	WY	97	9	0.021	7.29	14
4	Five Mile	LV	97	16	*	5.25	6
5	NB Independence	DP	95	11	*	3.6	14
5			01	25	0.762	4.4	15

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in fair health overall, based on current information available.

- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC and gain more baseline data since this area has not been sampled extensively.
    - Assess SINC mussel species
- A water quality table is presented on page 2.

Image 1. Five Mile Creek, Leavenworth Co.

Missouri River Basin
HUC 10240011

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	22	490	56	238	7.6	7.97	205	0.2	0.46	1.9	0.13
2	23	448	72	241	11.1	7.93	180	10.2	0.1	2.3	0.11
3	25	460	48	220	4	7.8	69	1	0.09	1.7	0.04
4	24	399	86	190	4	7.99	109	16.1	0.08	5.1	0.01
5	25	480	34	250	4.4	8.05	NA	NA	NA	NA	NA
5	25	NA	42	NA	6.6	8.6	192	16	0.08	7.1	0.12

TDS = total dissolved solids

Fish Species Collected

bigmouth buffalo
bigmouth shiner
black bullhead
bluegill
central stoneroller
channel catfish
common carp
creek chub
emerald shiner
fathead minnow
freshwater drum
gizzard shad
golden shiner
goldfish
green sunfish
largemouth bass
orangespotted sunfish
plains minnow
red shiner
river carpsucker
sand shiner
shortnose gar
smallmouth buffalo
stonecat
suckermouth minnow
yellow bullhead

Mussel Species Collected

fatmucket
pondhorn
pondmussel
threeridge
Wabash pigtoe

Missouri River Basin
HUC 10240011

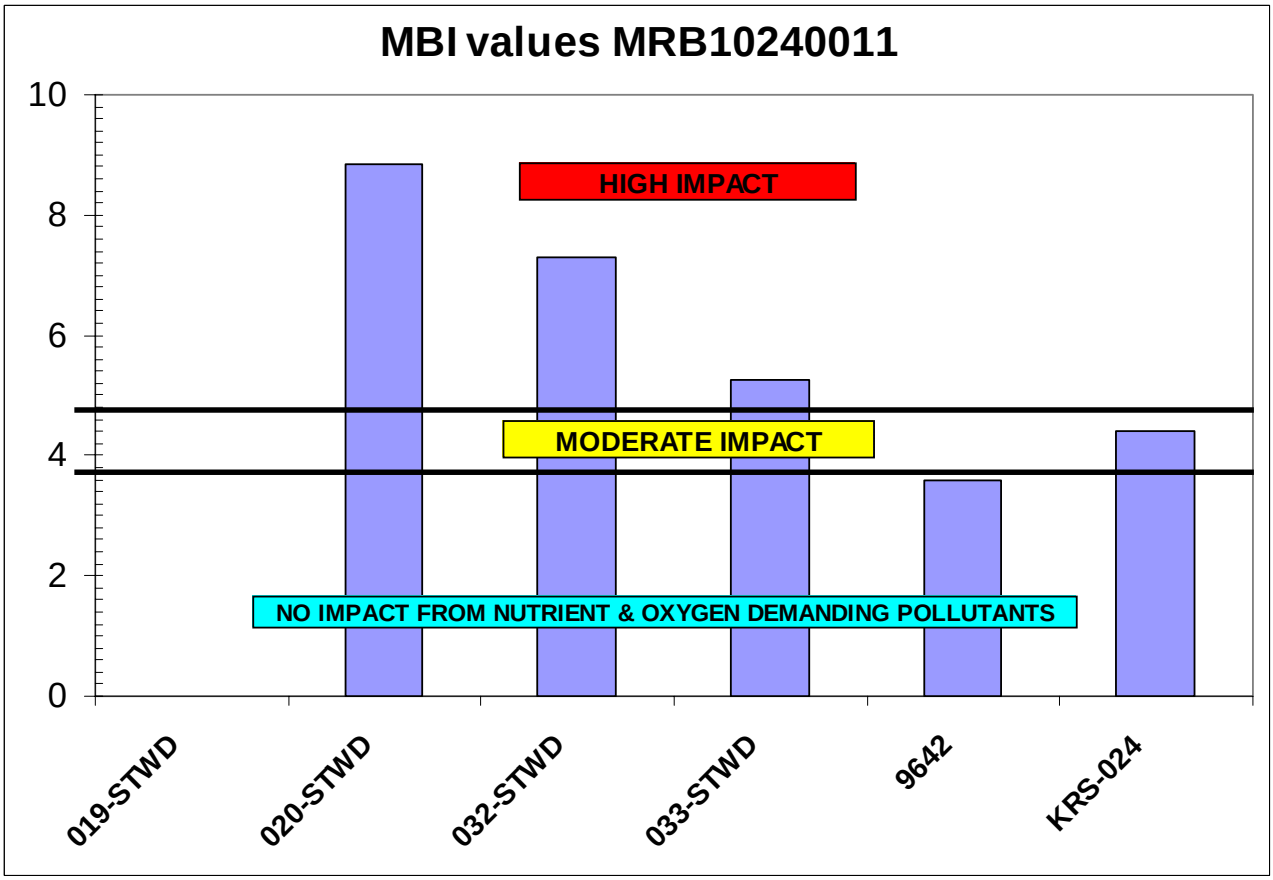


Figure 1. Graph of MBI values for HUC 10240011

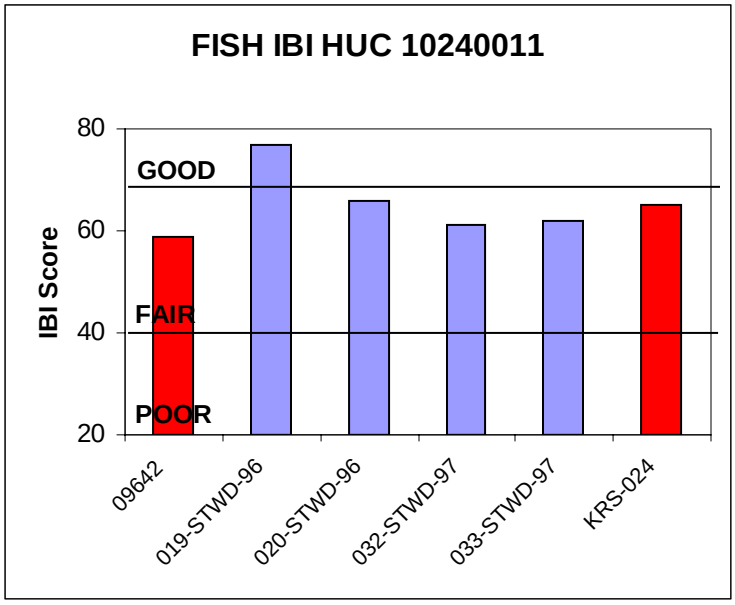
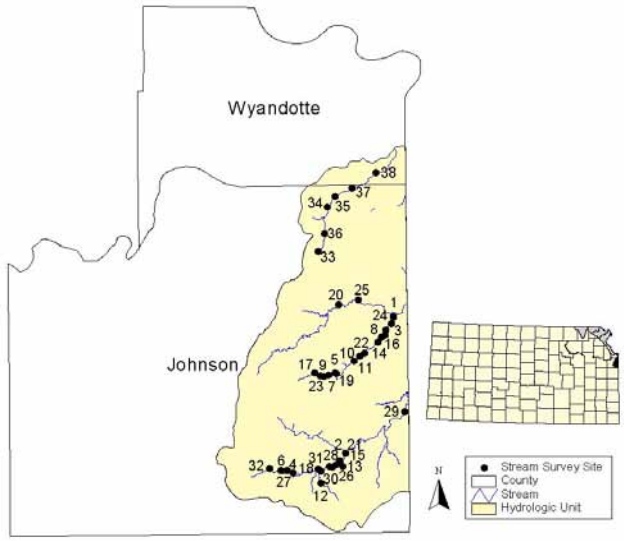


Figure 2. Graph of IBI values for HUC 10240011

Missouri River Basin

HUC 10300101



- This HUC consists of 38 sites (42 samples).
- Sites were surveyed between 1994-2003.

BIOLOGICAL HIGHLIGHTS

- 8 samples were not impacted by nutrient and oxygen demanding pollutants, 5 samples were moderately impacted, and 28 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 9.01, indicating high impact by nutrient and oxygen demanding pollutants.
- 28 species of fish were surveyed (see fish species collected, page 4).
- High proportion of tolerant individuals
- High proportion of carnivorous individuals is affecting proportion of insectivore and omnivore individuals.
- 10 species of freshwater mussels were surveyed (see mussel species collected, page 4).
    - SINC species – creeper, cylindrical papershell

SUMMARY

This HUC could be considered in fair health overall, based on current information available.

- Assess SINC mussel species
- One of the highest human populated HUCs
- A water quality table is presented on page 2.

Image 1. Tomahawk Creek, Johnson Co.

Missouri River Basin
HUC 10300101

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Tomahawk	JO	96	9	*	5.09	11
1		JO	97	5	*	9.74	12
2	Wolf	JO	96	9	0.711	4.31	17
2		JO	97	13	0.608	5.62	12
2		JO	98	11	0.112	9.82	16
3	Tomahawk	JO	96	6	*	5.65	10
4	Wolf	JO	96	8	*	3.87	9
5	Tomahawk	JO	96	9	0.537	7.08	7
6	Wolf	JO	96				
7	Tomahawk	JO	96	7	*	5.7	9
8	Tomahawk	JO	96	8	*	7.22	11
9	Tomahawk	JO	96	6	*	4.68	11
10	Tomahawk	JO	96	6	*	5.25	10
11	Tomahawk	JO	96	8	0.278	8.19	9
12	Wolf Trib	JO	96	11	*	6.16	10
13	Wolf Trib	JO	96	9	*	4.75	8
14	Tomahawk	JO	96	6	*	5.7	9
15	Wolf	JO	96	9	0.479	3.58	18
16	Tomahawk Trib	JO	96	2	*	8.86	8
17	Tomahawk	JO	96	6	*	8.17	7
18	Wolf	JO	96	9	0.504	2.97	10
19	Tomahawk	JO	96	7	*	7.32	13
20	Indian Trib	JO	94	4	*	10.57	9
20		JO	00	6	*	9.68	4
21	Wolf	JO	96	9	*	4.19	19
22	Tomahawk	JO	96	9	0.618	7.08	9
23	Tomahawk	JO	96	7	*	5.69	9
24	Tomahawk	JO	96	6	0.553	5.51	10
25	Indian	JO	96	6	0.658	6.05	7
26	Wolf	JO	96	10	0.429	7.13	12
27	Wolf	JO	96	5	*	9.92	15
28	Wolf	JO	96	12	0.358	4.01	15
29	Big Blue	JO	97	12		4.97	17
30	Wolf Trib	JO	96	8	*	3.69	14
31	Wolf	JO	96	10	*	4.36	17
32	Wolf	JO	96	10	*	6.4	13
33	Turkey	JO	03	10	0.051	9.25	3
34	Turkey	JO	03	8	0.006	9.01	6
35	Turkey	JO	03	12	0.141	7.06	5
36	Turkey	JO	03	8	0.188	8.29	4
37	Turkey	JO	03	12	0.061	8.84	4
38	Turkey	WY	03	16	0.006	10.63	4

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

Missouri River Basin
HUC 10300101

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	17	640	67	330	4.1	7.99	158	140	NA	0	0.11
1	24	397	187	207	5.2	7.86	72	27	0.15	20	0.11
2	16	480	36	240	6.8	7.85	195	92	NA	2.8	0.23
2	27	404	11	192	3.1	7.95	152	14	0.07	0.1	0.07
2	22	515	33	245	6.3	7.81	243	11.3	0.06	0.7	0.17
3	18	660	87	330	5	7.96	180	48	NA	0	0.27
4	19	290	182	150	5.4	8.27	115	21.1	0.21	4.4	0.23
5	18	470	91	240	3.3	7.92	138	23.8	0.18	15.4	0.08
6	19	0.36	96	180	6.5	9.81	123	16.8	0.317	0.88	0.17
7	21	640	35	320	6.2	9.55	178	24.5	0.15	1.3	0.1
8	23	750	17	380	5.9	9.12	157	21.6	0.18	0	0.03
9	26	530	43	270	6.3	9.04	147	3.8	0.57	1.76	0.06
10	20	540	46	270	5.9	9.38	177	11	0.12	0	0.06
11	27	640	32	320	5.2	8.89	165	2.9	0.04	0	0.03
12	24	510	64	260	6.2	8.04	182	24.5	0.13	3.08	0.11
13	22	590	7	290	5.1	9.61	207	3	0.01	0	0.03
14	26	580	44	290	5.1	8.72	145	10	0.13	1.32	0.05
15	24	420	58	210	6.4	9.31	136	8.2	0.03	0	0.13
16	24	490	5	250	5.3	9.64	258	2.3	0.01	3.52	0.05
17	27	680	27	340	5.5	9.3	195	24.5	0.08	0	0.06
18	27	330	60	170	6	6.51	130	21.6	0.1	0	0.1
19	26	690	28	340	4.8	8	181	13.2	0	0	0.03
20	25	339	39	164.8	6.1	7.8	96	48	0.55	1.5	0.17
20	22	260	13	130	3.3	7.59	NA	NA	NA	NA	NA
21	25	460	26	230	5.3	8.2	167	3.3	0.06	0	0.06
22	24	680	25	340	5.4	8.5	177	24.5	0.05	0	0.03
23	20	570	23	290	5	8.3	164	NA	0.05	0	0.03
24	22	740	19	370	5.2	8.3	182	NA	0.04	0	0.03
25	22	930	12	460	5.2	8.3	95	10.2	0.11	54.6	0.91
26	25	450	10	220	4.8	8.3	168	3	0.05	1.32	0.02
27	25	390	12	190	5.1	8.2	144	6.9	0.01	13.6	0.02
28	24	350	88	170	5.3	8.3	120	8.2	0	0	0.12
29	25	506	6	241	4.2	7.69	111	21.8	0.08	0	0.07
30	21	470	17	230	5.7	8.6	164	11.6	0	1.76	0.03

TDS = total dissolved solids

Missouri River Basin
HUC 10300101

Water Quality Table (continued)

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
31	22	310	133	160	5.8	8.6	120	16.6	0.13	7.48	0.03
32	22	340	66	170	5.3	8.6	102	1.8	0.06	2.64	0.13
33	26	1545	14	768	5	8.7	16	15.2	0.01	1	0
34	30	1196	17	590	5	8.8	6.3	15.2	0.1	0.7	0.01
35	26	1114	5	584	3.2	7	9.7	14.8	0.01	1.3	0.32
36	30	1293	19	639	6.9	8.1	13.1	15	0.01	0.6	0.01
37	28	1121	13	552	2.8	7.9	10.3	16.1	0.02	1.1	0.29
38	24	679	65	330	2.8	7.8	7.2	7.4	0.55	1.7	0.34

TDS = total dissolved solids

Fish Species Collected

black bullhead
black crappie
bluegill
bluegill X green sunfish hybrid
bluntnose minnow
central stoneroller
channel catfish
common carp
creek chub
fathead minnow
gizzard shad
golden shiner
green sunfish
green sunfish X bluegill hybrid
green sunfish X longear sunfish
Johnny darter
largemouth bass
logperch
longear sunfish
orangespotted sunfish
orangethroat darter
red shiner
redfin shiner
sand shiner
slender madtom
suckermouth minnow
walleye
western mosquitofish
white crappie
white sucker
yellow bullhead

Mussel Species Collected

Asian clam
creeper
cylindrical papershell
giant floater
lilliput
mapleleaf
paper pondshell
pistolgrip
plain pocketbook
pondhorn
pondmussel
threeridge
Wabash pigtoe
white heelsplitter

Missouri River Basin
HUC 10300101

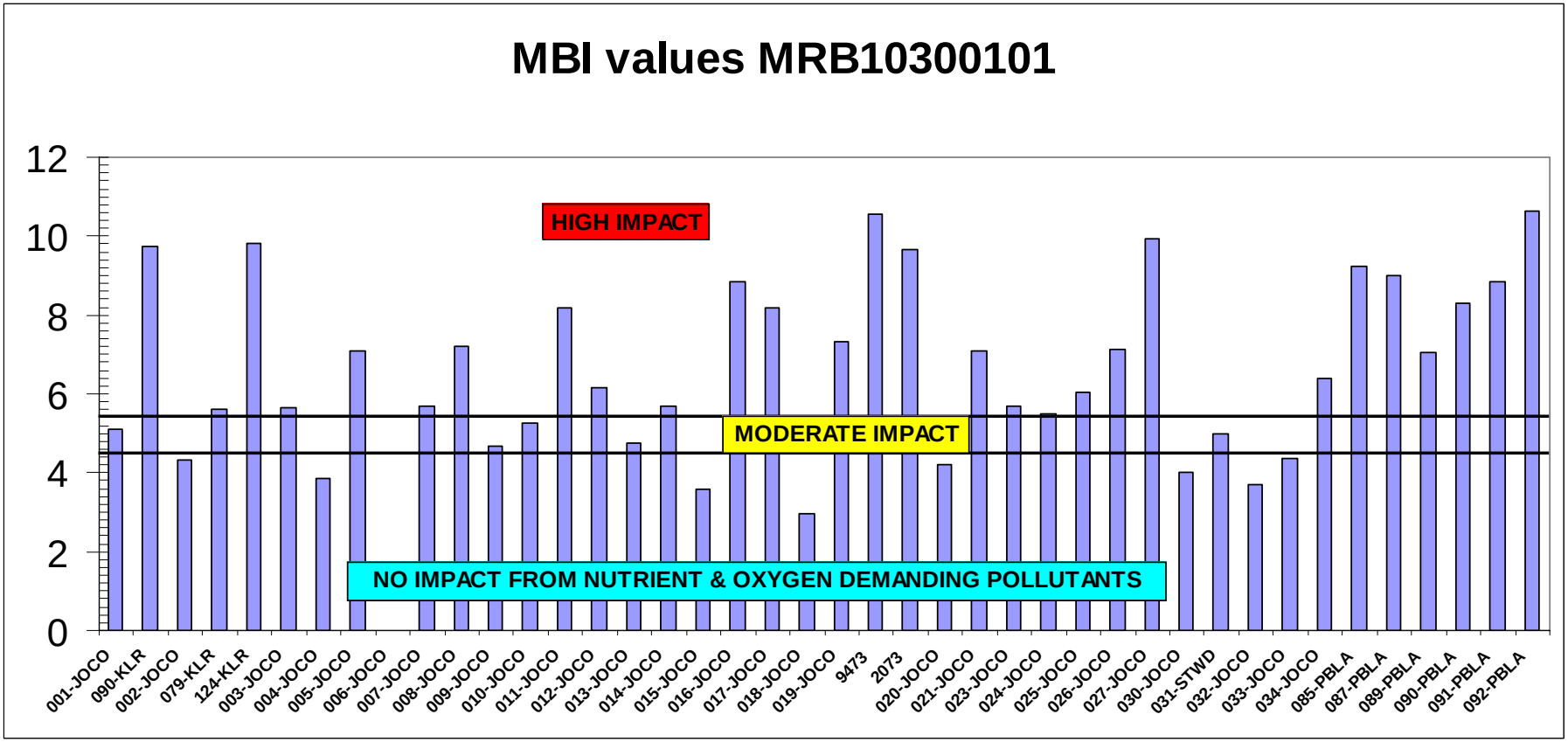


Figure 1. Graph of MBI values for HUC 10300101

Missouri River Basin
HUC 10300101

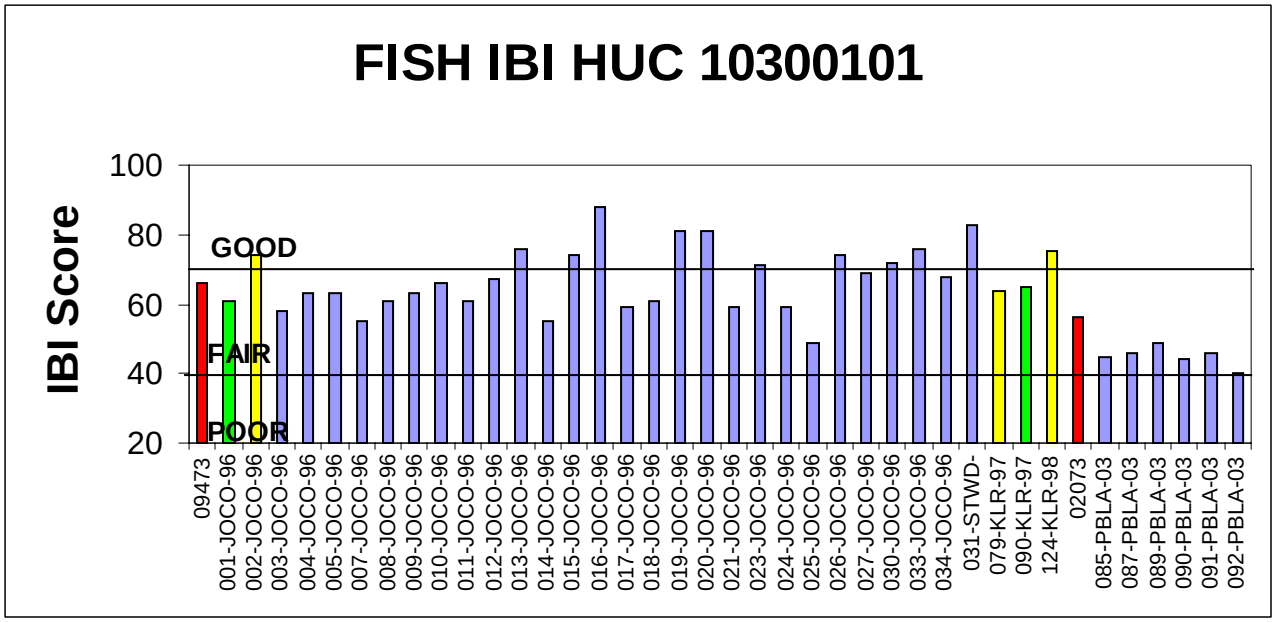
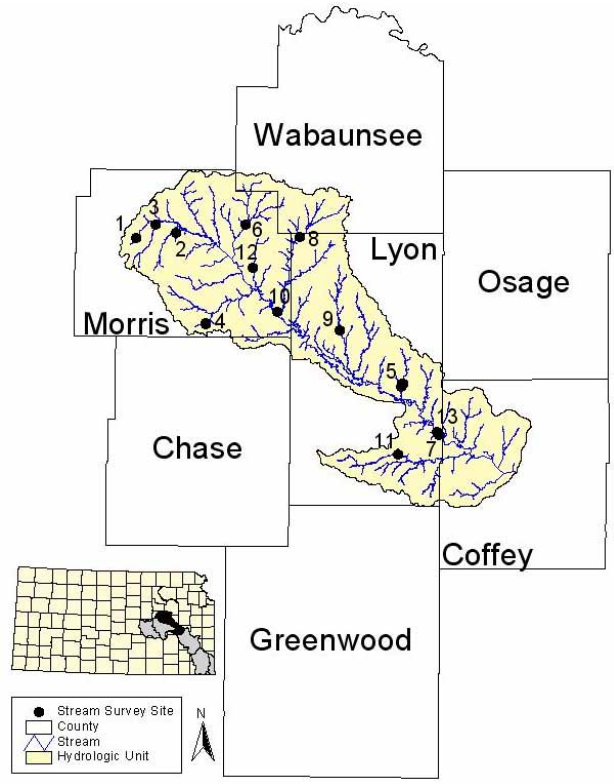


Figure 2. Graph of IBI values for HUC 10300101

Neosho River Basin
HUC 11070201

LOCATION



- This HUC consists of 13 sites (16 samples).
- Sites were surveyed between 1994-2003.

BIOLOGICAL HIGHLIGHTS

- 5 samples were not impacted by nutrient and oxygen demanding pollutants, 5 were moderately impacted, and 5 were highly impacted (see figure 1).
- The overall MBI value for this HUC was 4.82, indicating this area is moderately impacted by nutrient and oxygen demanding pollutants.
- 52 species of fish were surveyed (see fish species collected, page 2)
  - Threatened – Neosho madtom
  - SINC species – spotted sucker
- 27 species of freshwater mussels were surveyed (see mussel species collected, page 3)
  - Endangered – Neosho mucket
  - Threatened – Ouachita kidneyshell
  - SINC species – creeper, deertoe, fatmucket, fawnsfoot, spike, Wabash pigtoe, yellow sandshell

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Level	MR	95	3	*		2
2	Cat/Crooked	MR	95	4	*	1.78	10
3	WF Neosho	MR	95	8	*	4.33	15
4	East	MR	94	8	*	6.87	10
4			00	14	0.29	6.02	9
5	Badger	LY	95	10	*	5.87	24
5			96	9	*	5.24	24
5			97	10	*	5.07	21
6	Munkers	MR	96	14	0.007	3.95	26
7	Neosho	LY	96	21	0.661	4.77	30
8	Rock	LY	97	18	0.554	5.31	21
9	Allen	LY	97	20	0.569	5.6	20
10	Neosho	MR	95	7	*	8.04	13
11	Eagle	LY	97	13	0.825	4.28	17
12	Big John	MR	97	9	*	4.06	18
13	Neosho	LY	03	19	0.578	4.91	28

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in good health based on the information available at this time.

- Protection efforts should be utilized to maintain the Neosho madtom and spotted sucker populations as well as the various species of endangered, threatened, and SINC mussel species.
- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC.
- A water quality table is presented on page 3.

Stream Picture (see page 3)

Neosho River Basin
HUC 11070201

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	21	627	382.45	NA	0.165	7.82	NA	NA	NA	NA	NA
2	17	473	18.15	NA	9.98	8.47	NA	NA	NA	NA	NA
3	17	469	50	NA	7.43	8.12	NA	NA	NA	NA	NA
4	20	464	10	249	4.2	7.6	262	11	0.07	0.9	0.05
4	23	560	NA	290	4.6	7.55	NA	NA	NA	NA	NA
5	28	575	38.45	NA	10.22	7.96	NA	NA	NA	NA	NA
5	20	556	9	NA	7.615	8.12	NA	NA	NA	NA	NA
5	16	587	9	NA	8.5	8.62	NA	NA	NA	NA	NA
6	20	531.5	7	NA	8.35	7.93	NA	NA	NA	NA	NA
7	26	546.5	29	NA	7.9	8.37	NA	NA	NA	NA	NA
8	18	455	7	NA	8.095	8.03	NA	NA	NA	NA	NA
9	20	646	7.5	NA	7.3	8.27	NA	NA	NA	NA	NA
10	28	450	93	230	5.7	7.74	NA	NA	NA	NA	NA
11	24	424.5	15.5	NA	8.7	7.85	NA	NA	NA	NA	NA
12	22	468.5	2.5	NA	7.4	8.1	NA	NA	NA	NA	NA
13	26	781	28	380	4.2	8.4	221	16	0.05	3.7	0.38

TDS = total dissolved solids

Fish Species Collected

bigmouth buffalo
black buffalo
black bullhead
blackstripe topminnow
bluegill
bluegill X green sunfish hybrid
bluntface shiner
bluntnose minnow
brook silverside
bullhead minnow
cardinal shiner
central stoneroller
channel catfish
common carp
common shiner
creek chub
fathead minnow
flathead catfish
freshwater drum
ghost shiner
gizzard shad
golden redhorse
golden shiner
green sunfish
green sunfish X bluegill hybrid
largemouth bass
logperch
longear sunfish
longnose gar
mimic shiner
Neosho madtom
orangespotted sunfish
orangethroat darter
red shiner
redfin shiner
river carpsucker
rosyface shiner
sand shiner
shorthead redhorse
shortnose gar
slender madtom
slenderhead darter
smallmouth buffalo
southern redbelly dace
spotted bass
spotted sucker
stonecat
suckermouth minnow
warmouth
western mosquitofish
white bass
white crappie
wiper
yellow bullhead

Neosho River Basin
HUC 11070201

Mussel Species Collected

Asian clam	mapleleaf	pondhorn
bleufer	monkeyface	pondmussel
creeper	Neosho mucket	round pigtoe
deertoe	Ouachita kidneyshell	spike
fatmucket	paper pondshell	threehorn wartyback
fawnsfoot	pimpleback	threeridge
fragile papershell	pink papershell	Wabash pigtoe
giant floater	pistolgrip	white heelsplitter
lilliput	plain pocketbook	yellow sandshell

Image 1. Rock Creek, Lyon Co.

Neosho River Basin
HUC 11070201

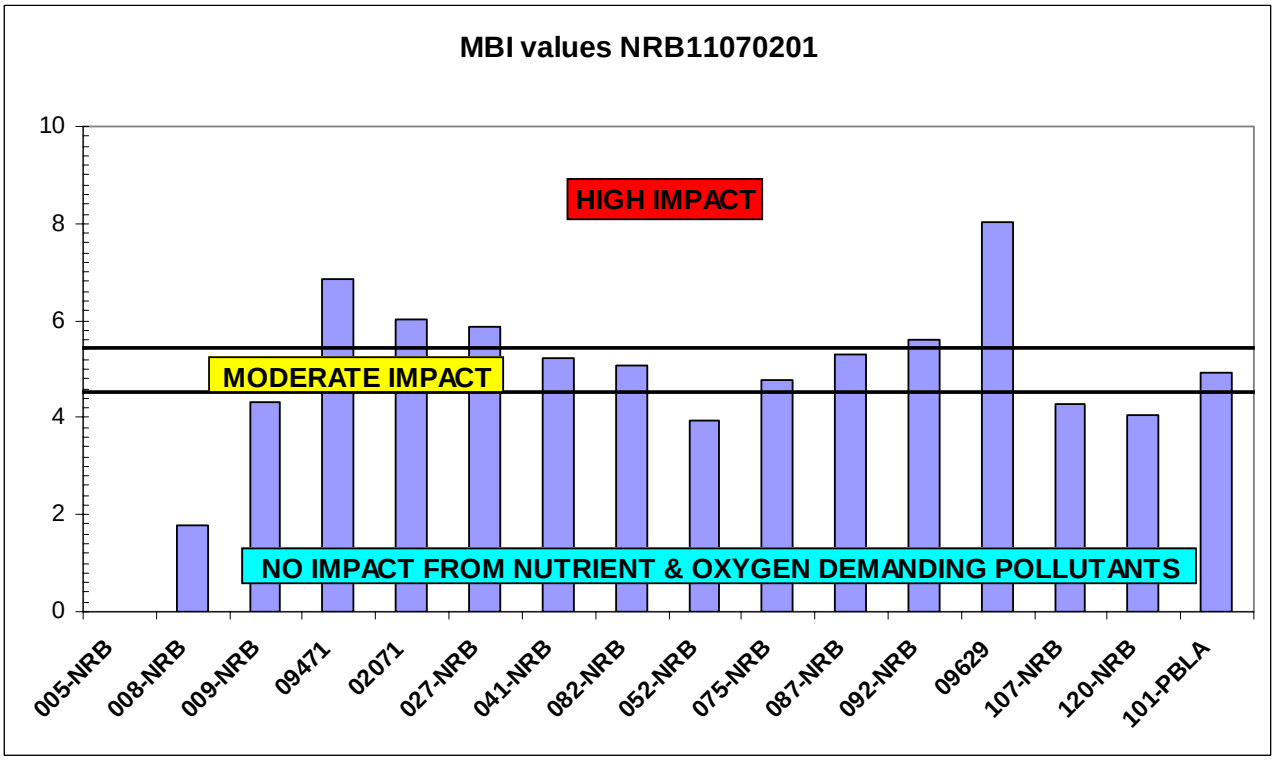


Figure 1. Graph of MBI values for HUC 11070201

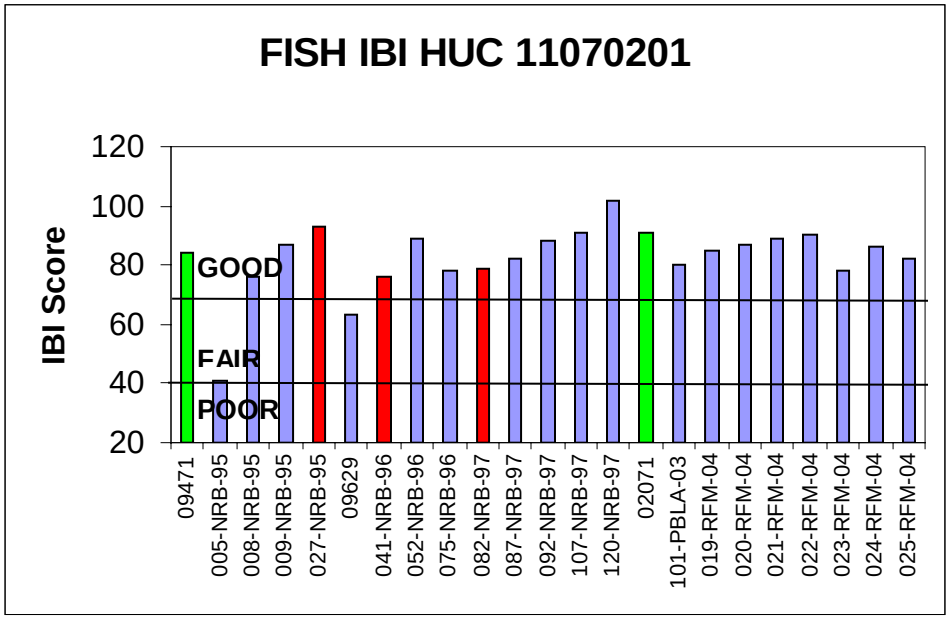
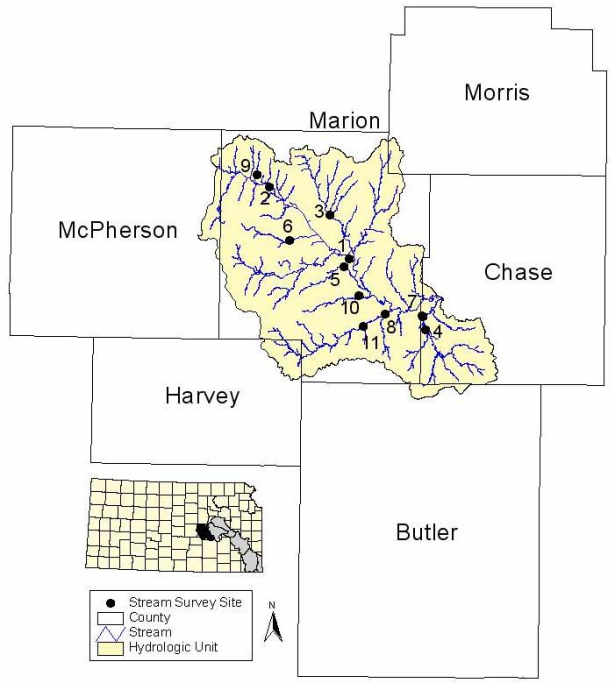


Figure 1. Graph of IBI values for HUC 11070201

Neosho River Basin

HUC 11070202

LOCATION



- This HUC consists of 11 sites (15 samples).
- Sites were surveyed between 1994-2001.

BIOLOGICAL HIGHLIGHTS

- 5 samples were not impacted by nutrient and oxygen demanding pollutants, 4 samples were moderately impacted, and 6 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 5.46 indicating it was moderately impacted by nutrient and oxygen demanding pollutants.
- Relatively good IBI scores throughout HUC.
- 48 species of fish were surveyed (see fish species collected, page 2)
  - SINC species – brindled madtom, spotted sucker
  - Threatened – Topeka shiner
- 23 species of freshwater mussels were surveyed (see mussel species collected, page 3)
  - SINC species – creeper, fawnsfoot, spike, Wabash pigtoe, yellow sandshell
  - Threatened – flutedshell

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Cottonwood	MN	94	5	*	6.17	24
1			00	19	0.244	4.59	18
2	NF Cottonwood	MN	96	15	0.363	5.89	16
3	Mud	MN	96	13	*	5.38	16
3			97	9	*	5	20
4	Cedar	CS	00	20	0.578	4.02	33
5	Spring Branch	MN	96	11	*	4.92	19
6	French	MN	96	6	*	5.76	16
7	Cedar	CS	97	23	0.598	3.89	32
7			01	23	0.598	5.99	22
8	Spring	MN	97	18	*	4.22	20
9	NF Cottonwood Trib	MN	95	8	*	9.75	8
9			01	14	0.011	10.07	6
10	Catlin	MN	97	15	0.715	3.91	24
11	Doyle	MN	97	18	0.41	4.31	26

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in good health based on the information available at this time.

- Protection efforts should be utilized to maintain the Topeka shiner, bindled madtom, and spotted sucker populations as well as the various species of endangered, threatened, and SINC mussel species listed.
- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC.
- A water quality table is presented on page 2.

Neosho River Basin
HUC 11070202

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	24	942	35	466	7	8.3	223	55	0.09	3	0.06
1	25	680	170	350	5.4	7.83	NA	NA	NA	NA	NA
2	26	835	16.5	NA	6.45	7.96	NA	NA	NA	NA	NA
3	23	1305	7.5	NA	5.8	7.94	NA	NA	NA	NA	NA
3	2	748	106.5	NA	NA	7.95	NA	NA	NA	NA	NA
4	22	200	390	95	7.6	NA	128	10	0.41	NA	0.13
5	23	1055	5.5	NA	5.15	7.89	NA	NA	NA	NA	NA
6	22	2800	14.5	NA	4.25	7.75	NA	NA	NA	NA	NA
7	18	289.5	79	NA	7.995	7.97	NA	NA	NA	NA	NA
7	20	1299	13	9.89	9.4	8.5	263	7	0.11	1.4	0.08
8	17	546	13	NA	8.055	7.78	NA	NA	NA	NA	NA
9	20	1742	26	9.89	8.1	8.3	406	31	0.55	4.3	0.28
9	19	990	26	500	3.5	7.96	NA	NA	NA	NA	NA
10	23	1070	10	NA	6.85	8.05	NA	NA	NA	NA	NA
11	23	1820	9.5	NA	8.5	8.2	NA	NA	NA	NA	NA

TDS = total dissolved solids

Fish Species Collected

bigmouth buffalo
black buffalo
black bullhead
blackstripe topminnow
bluegill
bluntface shiner
bluntnose minnow
brindled madtom
brook silverside
cardinal shiner
central stoneroller
channel catfish
channel darter
common carp
creek chub
fantail darter
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden redhorse
golden shiner
green sunfish
largemouth bass
logperch
longear sunfish
longnose gar
mimic shiner
orangespotted sunfish
orangethroat darter
red shiner
redfin shiner
river carpsucker
sand shiner
shorthead redhorse
slenderhead darter
slim minnow
smallmouth buffalo
spotted bass
spotted sucker
stonecat
suckermouth minnow
Topeka shiner
walleye
western mosquitofish
white bass
white crappie
yellow bullhead

Neosho River Basin
HUC 11070202

Mussel Species Collected

Asian clam	lilliput	pondmussel
bleufer	mapleleaf	spike
creeper	paper pondshell	threehorn wartyback
fawnsfoot	pimpleback	threeridge
fingernail clam	pink papershell	Wabash pigtoe
fluted shell	pistolgrip	white heelsplitter
fragile papershell	plain pocketbook	yellow sandshell
giant floater	pondhorn	

Neosho River Basin
HUC 11070202

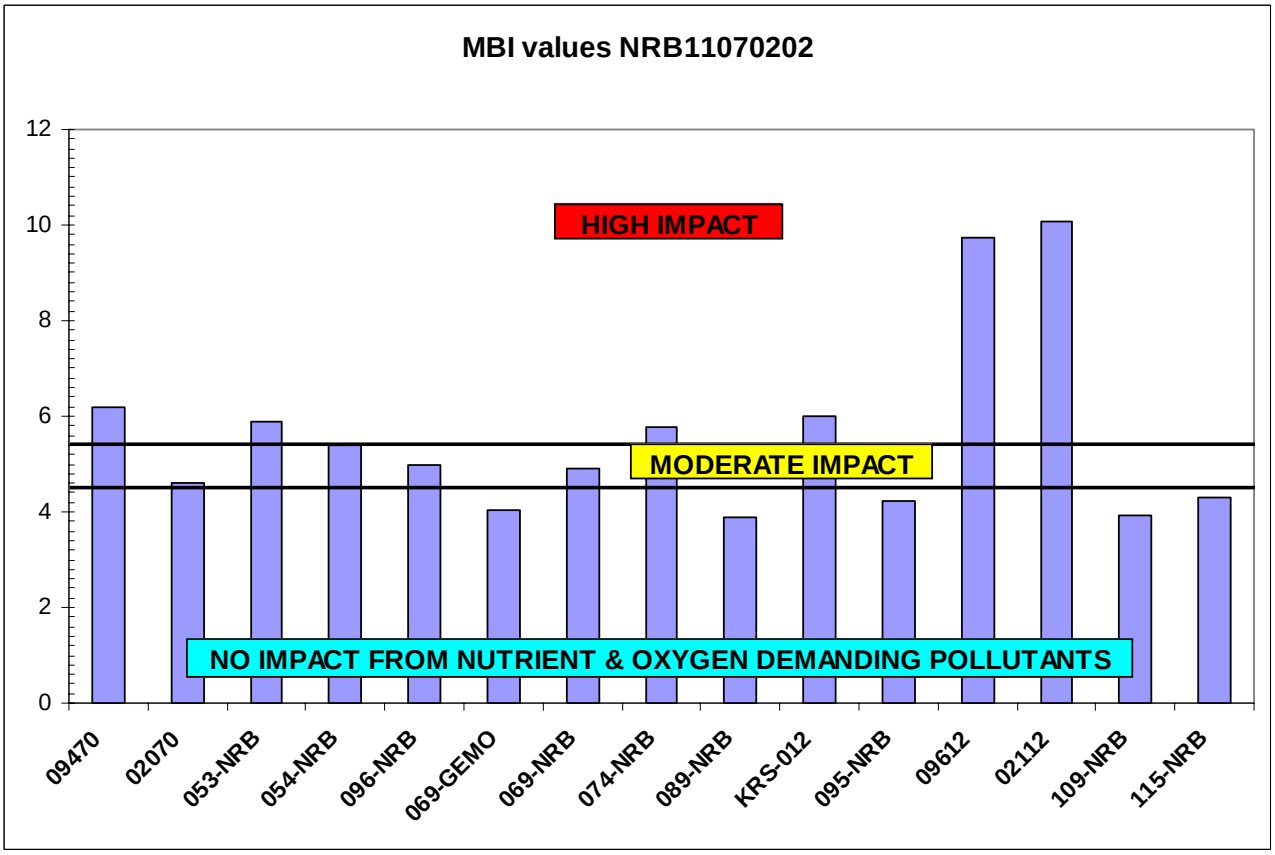


Figure 1. Graph of MBI values for HUC 11070202

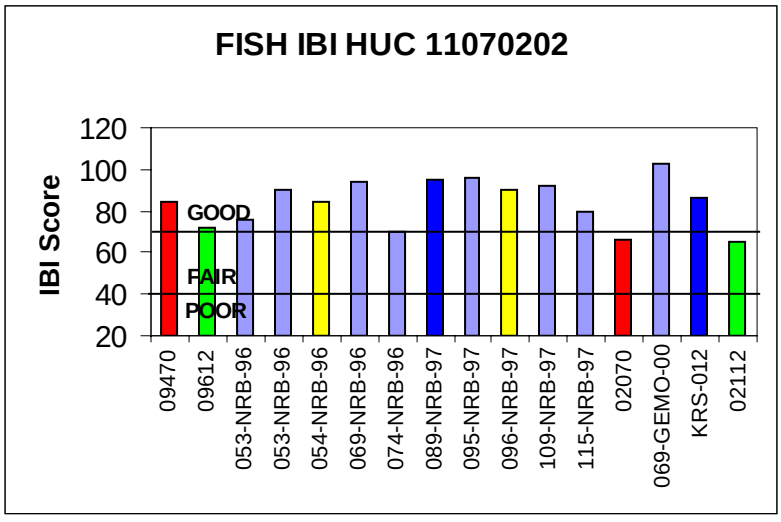
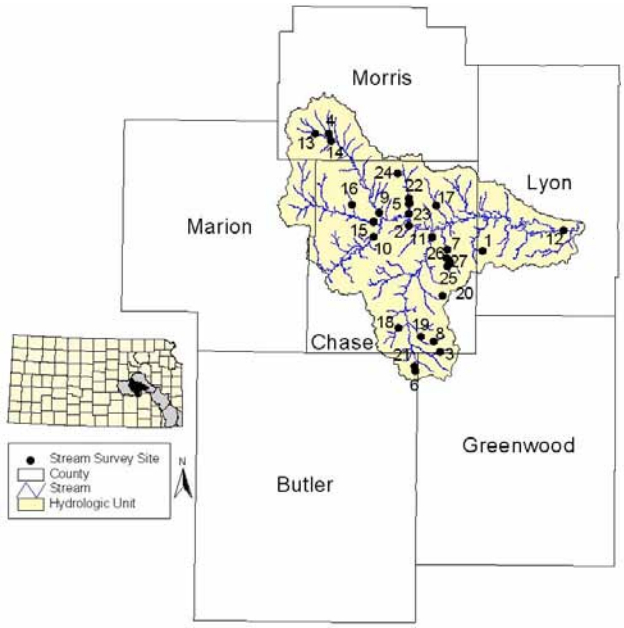


Figure 2. Graph of IBI values for HUC 11070202

Neosho River Basin

HUC 11070203



- This HUC consists of 27 sites (38 samples).
- Sites were surveyed between 1995-2003.

BIOLOGICAL HIGHLIGHTS

- 20 samples showed no impact from nutrient and oxygen demanding pollutants, 4 samples were moderately impacted, and 14 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 5.44, indicating this area is just on the low side of being highly impacted.
- Low number of introduced species.
- 53 species of fish were surveyed (see fish species collected, page 4).
    - Threatened species – Neosho madtom, Topeka shiner
- 26 species of freshwater mussels were surveyed (see mussel species collected, page 4)
    - SINC species – creeper, fawnsfoot, round pigtoe, spike, Wabash pigtoe, yellow sandshell
    - Threatened species – flutedshell, Ouachita kidneyshell
    - Endangered species – Neosho mucket

SUMMARY

This HUC could be considered in good health based on the information available at this time.

- Protection efforts should be utilized to maintain the Neosho madtom and Topeka shiner populations as well as the various species of endangered, threatened, and SINC mussel species.
- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC.
- A water quality table is presented on page 3.

Palmer creek, Tallgrass Prairie Preserve, Chase Co.

Neosho River Basin
HUC 11070203

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Jacob	LY	95	3	*	4.5	15
2	Spring	CS	95	5	*	1.58	10
3	Cannonball	CS	95	7	*	3.88	7
4	Three Mile	MR	95	8	*	3.88	19
5	Fox	CS	95	12	*	2.92	23
5			02	18	0.642	5.25	24
6	Thurman	BU	95	12	*	3	15
7	Bloody	CS	95	11	*	8.12	27
7			96	9	*	5.52	22
7			97	13	*	3.79	23
8	Little Cedar	CS	95	13	*	5.42	15
9	Diamond	CS	95	8	*	4.01	27
10	Cottonwood	CS	95	7	*	4.09	24
10			96	18	0.755	4.4	19
10			97	15	0.558	3.3	32
11	SF Cottonwood	CS	95	13	*	3.74	24
11			96	23	0.79	4.55	36
11			97	15	0.355	3.68	35
12	Cottonwood	LY	95	7	*	3.63	17
13	Camp	MR	96	15	0.06	5.97	21
14	Six Mile	MR	96	27	0.588	4.98	23
14			97	21	0.592	3.94	29
15	Middle	CS	96	17	0.644	4.18	24
15			97	15	*	3.61	26
16	Collett	CS	96	20	0.608	4.62	16
16			97	15	0.724	4.13	16
17	Peyton	CS	97	16	0.474	5.79	18
18	Mercer	CS	97	12	*	5.64	18
19	Little Cedar	CS	97	18	*	4.58	20
20	EB Sharpes	CS	95	9	*	8.99	3
20			01	11	0.014	10.6	2
21	SF Cottonwood	BU	00	19	*	7.55	15
22	Fox	CS	02	21	0.626	6.25	20
23	Fox	CS	02	18	*	7.14	298
24	Palmer	CS	02	13	*	6.82	8
25	Little Bloody	CS	03	17	0.314	7.75	14
26	Little Bloody	CS	03	17	0.419	5.01	20
27	Bloody	CS	03	17	0.339	7.31	16

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

Neosho River Basin
HUC 11070203

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	17	522	20	NA	9.355	8.27	NA	NA	NA	NA	NA
2	15	461	9.335	NA	9.015	8.39	NA	NA	NA	NA	NA
3	17	348.5	2.5	NA	7.895	8.1	NA	NA	NA	NA	NA
4	19	234.5	141.15	NA	7.11	7.65	NA	NA	NA	NA	NA
5	20	464	9.05	NA	7.115	7.99	NA	NA	NA	NA	NA
5	24	462	10	224	4.5	8.8	200	6.2	0.05	0.4	0.33
6	20	428	4.65	NA	5.255	7.61	NA	NA	NA	NA	NA
7	23	707	5	NA	5.955	7.49	NA	NA	NA	NA	NA
7	19	1230	3.5	NA	5.75	7.69	NA	NA	NA	NA	NA
7	25	508	5	NA	9.78	8	NA	NA	NA	NA	NA
8	20	494.5	5.85	NA	5.445	7.44	NA	NA	NA	NA	NA
9	24	574	36	NA	7	8.37	NA	NA	NA	NA	NA
10	25	652	203.5	NA	5.695	7.8	NA	NA	NA	NA	NA
10	29	980	30.5	NA	5.95	8.14	NA	NA	NA	NA	NA
10	26	787	37	NA	6.25	8.3	NA	NA	NA	NA	NA
11	25	492	53.1	NA	6.67	8.02	NA	NA	NA	NA	NA
11	24	419.5	14.5	NA	5.7	8.06	NA	NA	NA	NA	NA
11	26	463	8	NA	6.45	8.23	NA	NA	NA	NA	NA
12	26	770	NA	NA	6.165	7.98	NA	NA	NA	NA	NA
13	18	701	23.5	NA	7.9	8.16	NA	NA	NA	NA	NA
14	25	658	NA	NA	6.4	8.2	NA	NA	NA	NA	NA
14	25	639.5	6.5	NA	5.45	8.35	NA	NA	NA	NA	NA
15	21	526	13	NA	6.4	8.13	NA	NA	NA	NA	NA
15	24	424.5	23	NA	10.8	8.2	NA	NA	NA	NA	NA
16	21	535.5	1.5	NA	5.9	7.81	NA	NA	NA	NA	NA
16	19	543	2	NA	7.05	8.03	NA	NA	NA	NA	NA
17	18	428.5	8	NA	8.45	8.44	NA	NA	NA	NA	NA
18	19	199	50.5	NA	8.15	7.93	NA	NA	NA	NA	NA
19	20	236	25	NA	7.885	7.87	NA	NA	NA	NA	NA
20	15	2070	25	11.26	11.7	8.3	243	7.4	0.07	1.8	0.13
20	16	580	3	290	3.2	7.35	NA	NA	NA	NA	NA
21	25	510	0	247	8.4	8	250	24	0.03	1	0.03
22	24	443	18	214	5.6	8.7	209	9.2	0.27	0.3	0.08
23	26	503	19	243	5.3	8.4	247	6	0.02	0	0.16
24	22	574	0	279	4.5	8.5	311	6.2	0.01	0.5	0.38
25	22	509	55	246	6.8	8.1	228	3	0.05	0.8	0.01
26	22	517	44	250	6.6	8.1	207	4	0.05	0.4	0.01
27	25	473	61	229	4.6	8.1	196	8	0.15	1.4	0.02

TDS = total dissolved solids

Neosho River Basin
HUC 11070203

Fish Species Collected

black buffalo
black bullhead
black crappie
blackstripe topminnow
bluegill
bluegill X green sunfish hybrid
bluntface shiner
bluntnose minnow
brook silverside
bullhead minnow
cardinal shiner
central stoneroller
channel catfish
channel darter
common carp
creek chub
fantail darter
fathead minnow
flathead catfish
freckled madtom
freshwater drum
ghost shiner
gizzard shad
golden redhorse
golden shiner
green sunfish
largemouth bass
logperch
longear sunfish
longnose gar
mimic shiner
Neosho madtom
orangespotted sunfish
orangethroat darter
red shiner
redfin shiner
river carpsucker
rosyface shiner
sand shiner
shorthead redhorse
shortnose gar
slenderhead darter
slenderhead darter X logperch
slim minnow
smallmouth buffalo
spotted bass
spotted gar
spotted sucker
stonecat
suckermouth minnow
Topeka shiner
western mosquitofish
white bass
white crappie
yellow bullhead

Mussel Species Collected

black sandshell
bleufer
creeper
fawnsfoot
fingernail clam
fluted shell
fragile papershell
giant floater
lilliput
mapleleaf
monkeyface
Neosho mucket
Ouachita kidneyshell
pimpleback
pink papershell
pistolgrip
plain pocketbook
pondhorn
pondmussel
round pigtoe
spike
threeridge
Wabash pigtoe
wartyback
white heelsplitter
yellow sandshell

Neosho River Basin
HUC 11070203

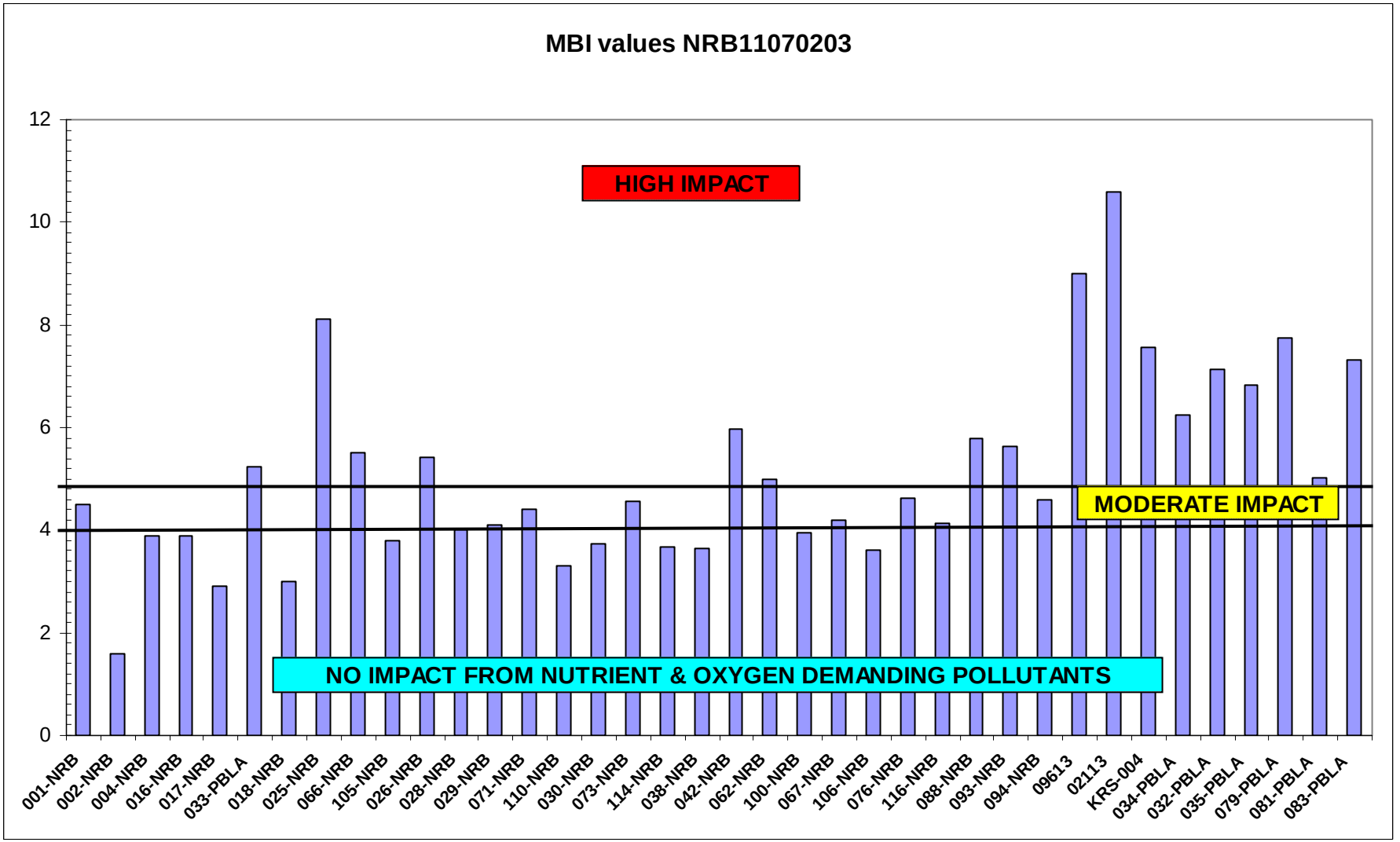
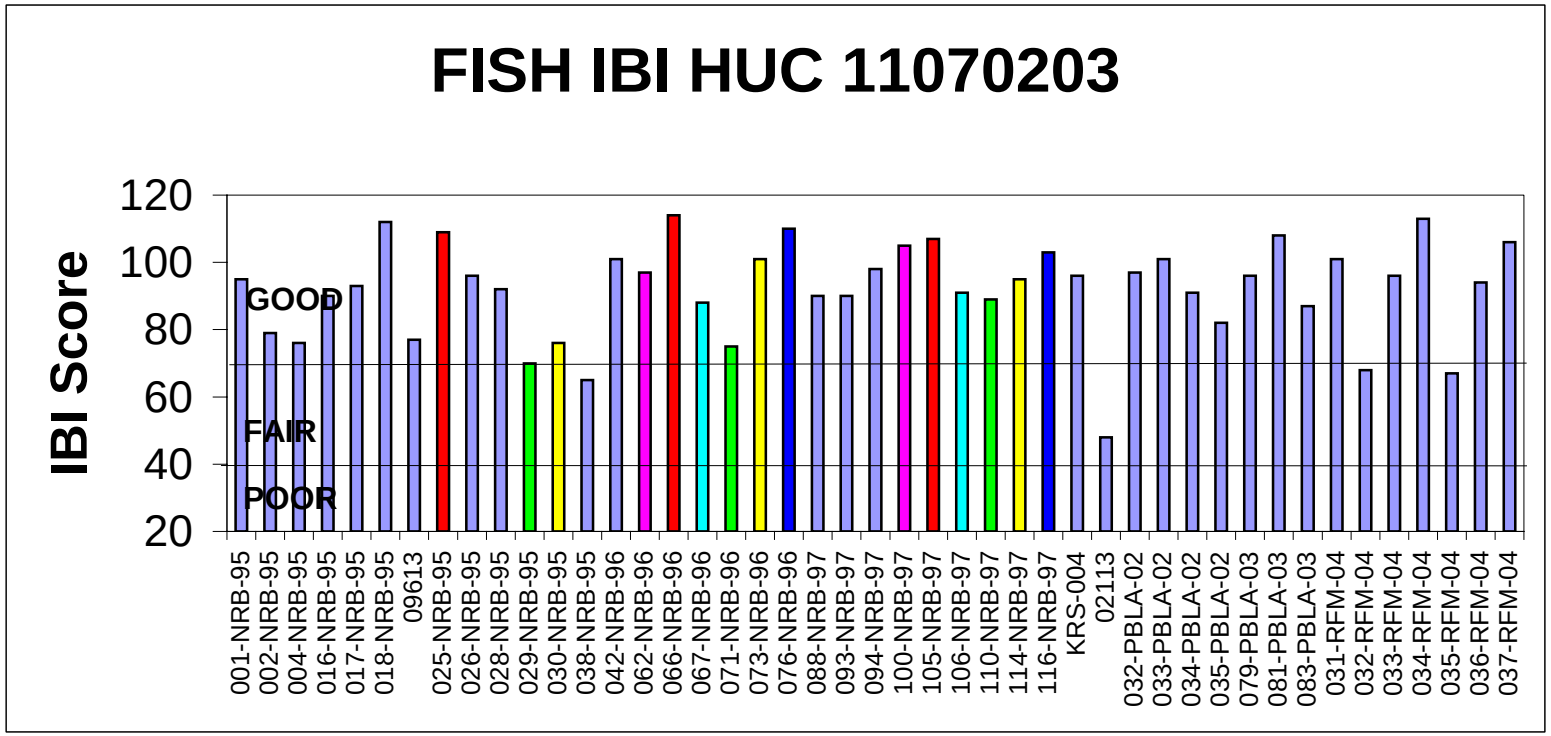


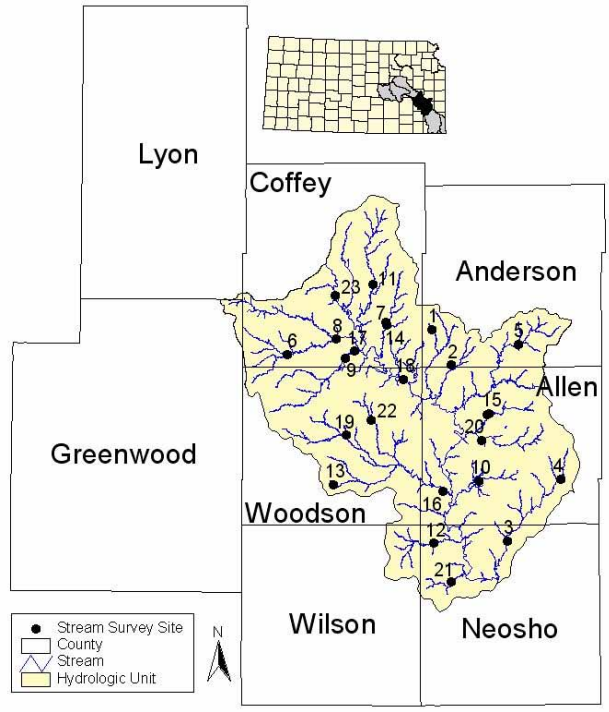
Figure 1. Graph of MBI values for HUC 11070203

Neosho River Basin
HUC 11070203



Neosho River Basin
HUC 11070204

LOCATION



- This HUC consists of 23 sites (30 samples).
- Sites were surveyed between 1994-2000.

BIOLOGICAL HIGHLIGHTS

- 12 samples were not impacted by nutrient and oxygen demanding pollutants, 9 samples were moderately impacted, and 8 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC is 5.1, indicating that this area has been moderately impacted by nutrient and oxygen demanding pollutants.
- 51 species of fish were surveyed (see fish species collected, page 4)
    - Threatened – Neosho madtom
    - SINC – spotted sucker
- 32 species of freshwater mussels were surveyed (see mussel species collected, page 4)
    - Threatened – butterfly, flutedshell, Ouachita kidneyshell
    - Endangered – Neosho mucket, rabbitsfoot
    - SINC – creeper, fatmucket, fawnsfoot, round pigtoe, spike, Wabash pigtoe, wartyback, washboard, yellow sandshell

SUMMARY

This HUC could be considered in good health based on the information available at this time.

- Protection efforts should be utilized to maintain the Neosho madtom and spotted sucker populations as well as the various species of endangered, threatened, and SINC mussel species.
- A water quality table is presented on page 3.

SUB-WATERSHED REPORT

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Little Indian	AN	95	11	*	4.21	14
2	Martin Trib	An	95	3	*	4.5	7
3	Big	NO	95	7	*	4.38	
4	Big	AL	95	6	*	4.4	21
5	Deer	AN	95	9	*	2.89	19
5			96	23	0.414	5.65	17
5			97	15	*	4.92	19
6	S Big	CF	94	14	*	5.58	23
6			00	15	0.115	4.96	18
7	Crooked	CF	94	1	*	0	14
7			00	9	0	8.34	14
8	S Big	CF	95	7	*	5.07	29
9	Turkey	CF	95	5	*	4.25	24
10	Coal	AL	95	10	0.061	4.47	23
11	Long	CF	96	7	*	7.78	10
11			97	16	*	3.77	15
12	Village	NO	96	16	*	6.08	18
13	S Owl	WO	96	16	*	6.1	25
14	Crooked	CF	96	9	*	5.15	24
15	Rock	AL	96	20	0.359	4.8	24
15			97	14	*	3.97	25
16	Owl	AL	96	11	*	4.79	17
16			97	9	*	4.87	24
17	Turkey	CF	96	16	0.723	5.47	25
18	Neosho	WO	96	19	0.755	4.41	22
19	Owl	WO	97	10	*	6.08	17
20	Elm	AL	97	9	0.352	3.4	21
21	Turkey	NO	97	11	*	3.75	27
22	Cherry	WO	97	9	*	4.53	15
23	Neosho	CF	97	10	*	3.48	27

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

Neosho River Basin
HUC 11070204

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	20	171	83.5	NA	5.5	7.77	NA	NA	NA	NA	NA
2	23	195.5	24.15	NA	6.505	7.61	NA	NA	NA	NA	NA
3	27	290.5	NA	NA	5.24	7.55	NA	NA	NA	NA	NA
4	22	346.5	17.2	NA	6.575	7.99	NA	NA	NA	NA	NA
5	22	393	26.3	NA	6.945	7.86	NA	NA	NA	NA	NA
5	24	272	33	NA	4.5	7.7	NA	NA	NA	NA	NA
5	24	418.5	22	NA	NA	7.9	NA	NA	NA	NA	NA
6	25	1388	26	684	6.5	7.8	100	73	0.19	0	0.03
6	25	580	33	300	4.2	7.9	NA	NA	NA	NA	NA
7	24	293	51	142.5	6.8	8	166	4	0.55	0	0.04
7	23	240	47	130	8.2	6.9	NA	NA	NA	NA	NA
8	25	332.5	NA	NA	4.29	7.54	NA	NA	NA	NA	NA
9	23	258	998.5	NA	4.995	7.33	NA	NA	NA	NA	NA
10	24	321.5	116	NA	5.395	7.54	NA	NA	NA	NA	NA
11	20	371	10	NA	3.1	7.6	NA	NA	NA	NA	NA
11	17	342	29.5	NA	7.55	7.5	NA	NA	NA	NA	NA
12	19	309	59.5	NA	5.55	7.49	NA	NA	NA	NA	NA
13	24	275	23.5	NA	5.65	8.41	NA	NA	NA	NA	NA
14	24	248	41	NA	3.7	7.59	NA	NA	NA	NA	NA
15	26	348.5	NA	NA	3.13	7.54	NA	NA	NA	NA	NA
15	24	186	79.5	NA	4.395	7.7	NA	NA	NA	NA	NA
16	27	297	NA	NA	5.45	7.72	NA	NA	NA	NA	NA
16	24	262.5	30.5	NA	8.225	7.6	NA	NA	NA	NA	NA
17	25	297	21	NA	5.65	7.94	NA	NA	NA	NA	NA
18	28	435.5	15.5	NA	7.7	8.46	NA	NA	NA	NA	NA
19	18	224.5	134.5	NA	7.67	7.52	NA	NA	NA	NA	NA
20	17	417.5	10	NA	7.86	7.91	NA	NA	NA	NA	NA
21	24	216	55	NA	7.94	7.67	NA	NA	NA	NA	NA
22	25	359.5	32	NA	4.9	7.35	NA	NA	NA	NA	NA
23	25	419.5	14.5	NA	7.45	8.25	NA	NA	NA	NA	NA

TDS = total dissolved solids

Neosho River Basin
HUC 11070204

Fish Species Collected

bigmouth buffalo
black buffalo
black bullhead
black crappie
blackstripe topminnow
bluegill
bluegill X green sunfish hybrid
bluegill X longear sunfish
bluegill X orangespotted sunfish
bluegill X warmouth
bluntnose darter
bluntnose minnow
brook silverside
bullhead minnow
central stoneroller
channel catfish
common carp
fantail darter
fathead minnow
flathead catfish
freckled madtom
freshwater drum
ghost shiner
gizzard shad
golden redhorse
golden shiner
green sunfish
Johnny darter
largemouth bass
logperch
longear sunfish
longnose gar
mimic shiner
Neosho madtom
orangespotted sunfish
orangethroat darter
red shiner
redfin darter
redfin shiner
river carpsucker
rosyface shiner
shortnose gar
slenderhead darter
slim minnow
smallmouth buffalo
spotted bass
spotted sucker
stonecat
suckermouth minnow
walleye
warmouth
western mosquitofish
white bass
white crappie
yellow bullhead

Mussel Species Collected

Asian clam
black sandshell
bleufer
butterfly
creeper
fatmucket
fawnsfoot
fingernail clam
fluted shell
fragile papershell
giant floater
lilliput
mapleleaf
monkeyface
Neosho mucket
Ouachita kidneyshell
pimpleback
pink papershell
pistolgrip
plain pocketbook
pondhorn
pondmussel
rabbitsfoot
round pigtoe
spike
threehorn wartyback
threeridge
Wabash pigtoe
wartyback
washboard
white heelsplitter
yellow sandshell

Neosho River Basin
HUC 11070204

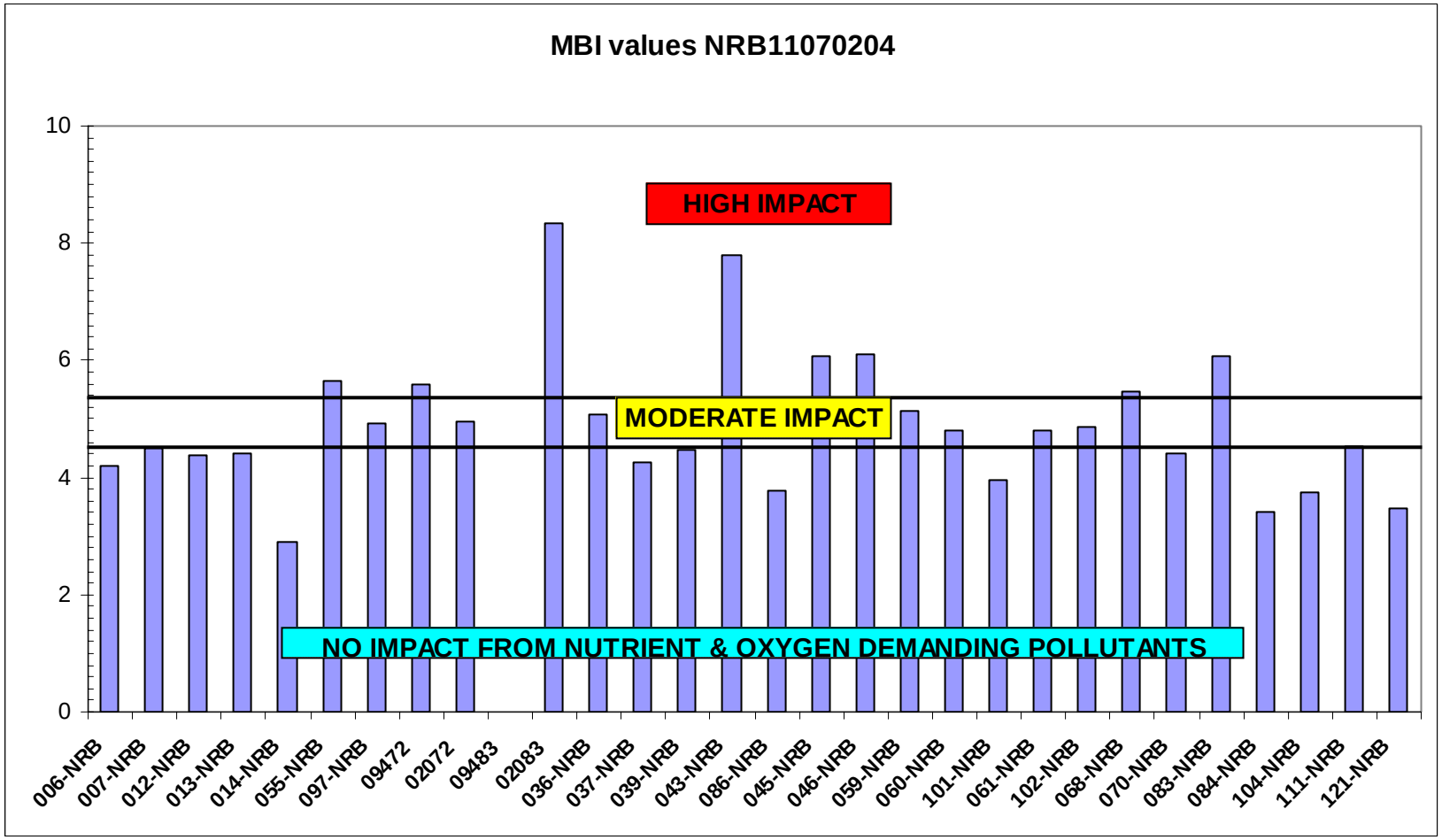


Figure 1. Graph of MBI values for HUC 11070204

Neosho River Basin
HUC 11070204

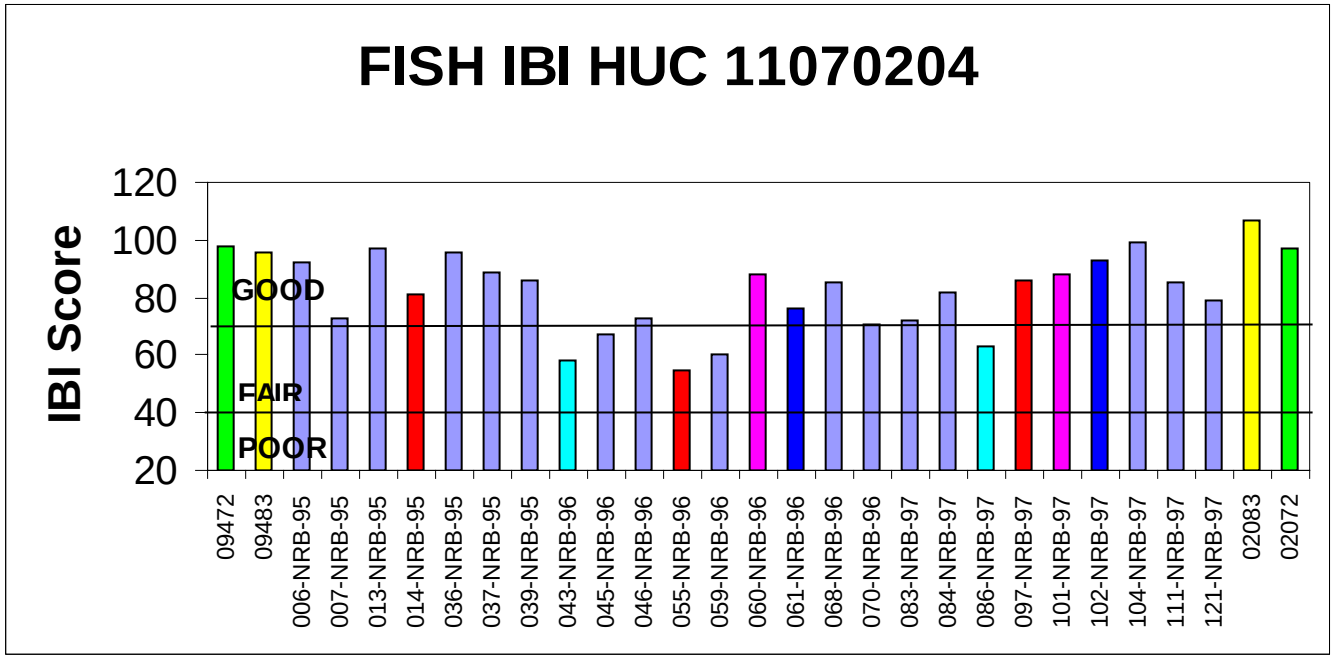
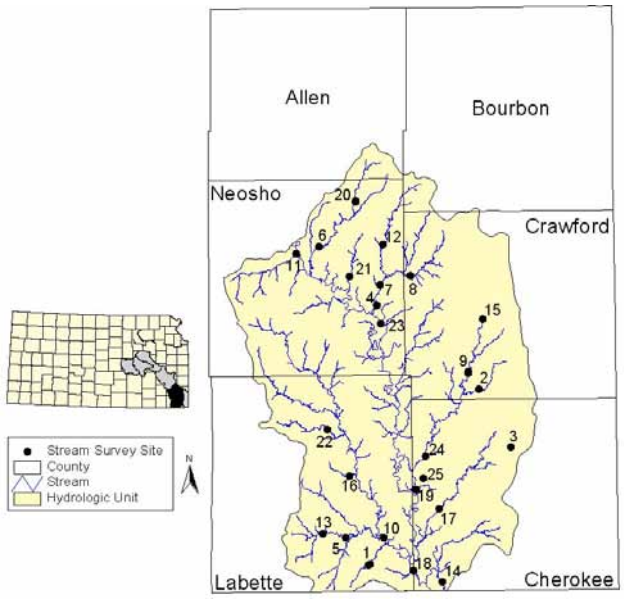


Figure 2. Graph of IBI values for HUC 11070204

Neosho River Basin

HUC 11070205



- This HUC consists of 25 sites (36 samples).
- Sites were surveyed between 1995-2002.

BIOLOGICAL HIGHLIGHTS

- 12 samples were not impacted by nutrient and oxygen demanding pollutants, 12 were moderately impacted, and 12 were highly impacted (see figure 1).
- The overall MBI value for this HUC was 5.51, indicating it is on the low side of being highly impacted.
- 62 species of fish were surveyed (see fish species collected, page 4).
    - Threatened – Neosho madtom
    - SINC – blue sucker, bluntnose darter, gravel chub, river darter, slough darter, spotted sucker, stippled darter
    - New state collection of an inland silverside
- 25 species of freshwater mussels were surveyed (see mussel species collected, page 4).
    - Threatened – butterfly
    - Endangered – Neosho mucket, rabbitsfoot
    - SINC – fatmucket, round pigtoe, spike, Wabash pigtoe, yellow sandshell

SUMMARY

This HUC could be considered in good health based on the information available at this time.

- Protection efforts should be utilized to maintain the Neosho madtom population and SINC species of fish, as well as the various species of endangered, threatened, and SINC mussel species.
- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC.
- A water quality table is presented on page 3.

Neosho River Basin
HUC 11070205

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Turkey	LB	95	8	*	4.57	19
1			96	12	*	5.51	22
1			97	9	*	9.59	22
2	Limestone	CR	95	8	*	4.03	21
2			96	14	*	5.45	23
2			97	12	*	4.01	26
3	Little Cherry	CK	95	11	*	4.5	10
4	Downey	NO	95	9	*	5.63	25
4			96	4	*	5.09	12
4			97	4	*	3.5	21
5	Hackberry	LB	95	9	*	4.47	22
6	Canville	NO	95	9	0.408	3.54	16
7	Flat Rock	NO	95	8	*	7.88	23
8	Walnut	CR	95	7	*	4.33	24
9	Lightning	CR	95	6	*	6.75	19
9			96	15	0.675	5.04	26
9			97	10	0.203	4.33	29
10	Labette	LB	95	7	*	4.5	29
11	Elk	NO	95	6	*	3.9	20
12	Flat Rock	NO	96	14	*	6.09	16
12			97	12	0.298	6.62	22
13	Hackberry	LB	96	16	*	5.05	21
14	Fly	CK	96	9	*	7.32	16
15	Lightning	CR	96	16	0.355	5.26	25
16	Spring	LB	96	12	*	7.31	23
16			97	10	*	4.42	26
17	Cherry	CK	96	18	0.379	5.28	22
18	Neosho	LB	96	15	0.745	4.28	32
19	Wolf	CK	97	14	*	4.82	29
20	Canville	NO	95	11	0.458	6.63	20
20			01	21	0.049	7.76	18
21	Four Mile	NO	97	9	*	4	23
22	Bachelor	LB	97	15	*	4.87	27
23	Neosho	NO	97	9	*	3.8	26
24	Lightning	CK	02	23	0.235	6.69	27
25	Deer	CK	02	8	*	5.01	11

Neosho River Basin
HUC 11070205

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	19	403.5	10.17	NA	7.32	8.24	NA	NA	NA	NA	NA
1	21	375	12.5	NA	5.85	8.06	NA	NA	NA	NA	NA
1	20	433.5	8	NA	6.65	7.74	NA	NA	NA	NA	NA
2	23	925	29.15	NA	5.725	7.59	NA	NA	NA	NA	NA
2	21	303.5	80.5	NA	5.55	7.58	NA	NA	NA	NA	NA
2	27	744.5	14.5	NA	4.6	7.67	NA	NA	NA	NA	NA
3	21	836	1.3	NA	5.81	6.13	NA	NA	NA	NA	NA
4	23	312	35	NA	1.84	7.26	NA	NA	NA	NA	NA
4	23	800	76	NA	4.7	7.35	NA	NA	NA	NA	NA
4	25	213.5	26	NA	7.53	7.46	NA	NA	NA	NA	NA
5	27	339	13.8	NA	6.06	7.46	NA	NA	NA	NA	NA
6	23	422	34.5	NA	2.735	7.51	NA	NA	NA	NA	NA
7	26	269	113.3	NA	2.36	7.29	NA	NA	NA	NA	NA
8	21	149	999	NA	5.07	6.98	NA	NA	NA	NA	NA
9	25	192	594	NA	3.91	7.28	NA	NA	NA	NA	NA
9	23	307	12.5	NA	4.55	7.52	NA	NA	NA	NA	NA
9	25	348	12.5	NA	5.35	7.48	NA	NA	NA	NA	NA
10	26	174.5	502	NA	5.12	7.39	NA	NA	NA	NA	NA
11	24	383	NA	NA	5.53	7.46	NA	NA	NA	NA	NA
12	20	396.5	2.5	NA	5.05	7.93	NA	NA	NA	NA	NA
12	18	418	7	NA	5.99	7.96	NA	NA	NA	NA	NA
13	21	235.5	32.5	NA	5.7	7.39	NA	NA	NA	NA	NA
14	23	221	46.5	NA	4.65	7.35	NA	NA	NA	NA	NA
15	18	355.5	10	NA	6.6	7.81	NA	NA	NA	NA	NA
16	24	326.5	12.5	NA	3.4	7.5	NA	NA	NA	NA	NA
16	21	313	45.5	NA	6.98	7.57	NA	NA	NA	NA	NA
17	24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
18	26	305	14.5	NA	6.55	7.86	NA	NA	NA	NA	NA
19	20	547	2	NA	4.555	7.28	NA	NA	NA	NA	NA
20	27	290	21	150	3.5	7.63	NA	NA	NA	NA	NA
20	26	NA	31	NA	6.5	8.5	135	10	0.03	2.4	0.04
21	26	535.5	2.5	NA	5.2	7.7	NA	NA	NA	NA	NA
22	22	211.5	12	NA	5	7.67	NA	NA	NA	NA	NA
23	25	433	31.5	NA	7.85	8.37	NA	NA	NA	NA	NA
24	25	401	28	192.6	7.3	8.9	118	8.1	0.02	0.4	0.37
25	26	2200	16	1108	2.6	8.5	160	2.1	0.06	0.3	0.5

TDS = total dissolved solids

Neosho River Basin
HUC 11070205

Fish Species Collected

bigmouth buffalo
black buffalo
black bullhead
black crappie
blackstripe topminnow
blue sucker
bluegill
bluegill X green sunfish hybrid
bluegill X longear sunfish
bluegill X warmouth
bluntface shiner
bluntnose darter
bluntnose minnow
brook silverside
bullhead minnow
central stoneroller
channel catfish
channel darter
common carp
creek chub
emerald shiner
fantail darter
fathead minnow
flathead catfish
freckled madtom
freshwater drum
ghost shiner
gizzard shad
golden redhorse
golden shiner
grass carp
gravel chub
green sunfish
inland silverside
largemouth bass
logperch
longear sunfish
longnose gar
mimic shiner
Neosho madtom
orangespotted sunfish
orangethroat darter
red shiner
redear sunfish
redfin darter
redfin shiner
river carpsucker
river darter
shorthead redhorse
slenderhead darter
slenderhead darter X logperch
slim minnow
slough darter
smallmouth buffalo
spotted bass
spotted gar
spotted sucker
stippled darter
stonecat
suckermouth minnow
warmouth
western mosquitofish
white bass
white crappie
white sucker
yellow bullhead

Mussel Species Collected

Asian clam
bleufer
butterfly
fatmucket
fragile papershell
giant floater
lilliput
mapleleaf
monkeyface
Neosho mucket
paper pondshell
pimpleback
pink papershell
pistolgrip
plain pocketbook
pondhorn
pondmussel
rabbitsfoot
round pigtoe
spike
threehorn wartyback
threeridge
Wabash pigtoe
white heelsplitter
yellow sandshell

Neosho River Basin
HUC 11070205

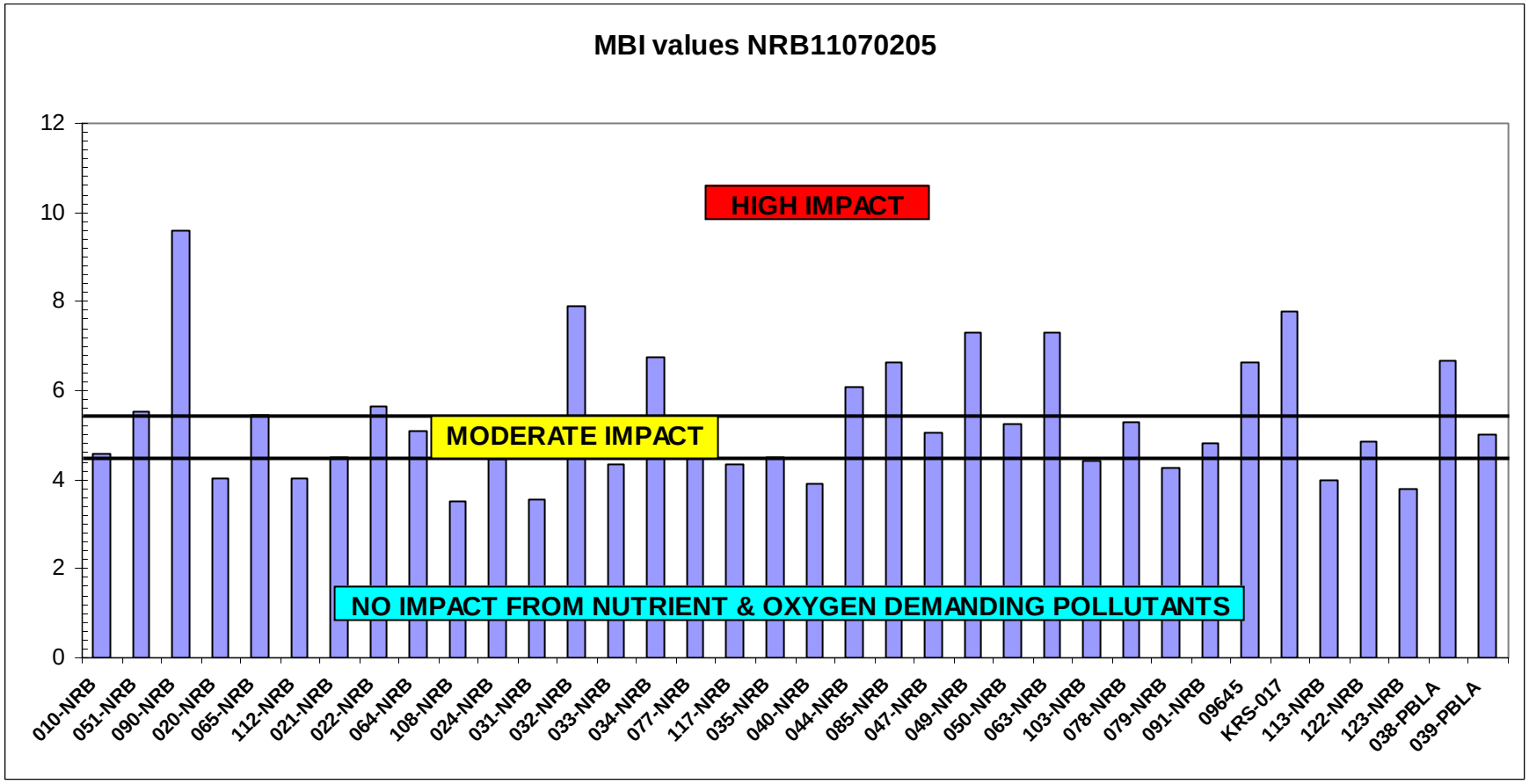


Figure 1. Graph of MBI values for HUC 11070205

Neosho River Basin
HUC 11070205

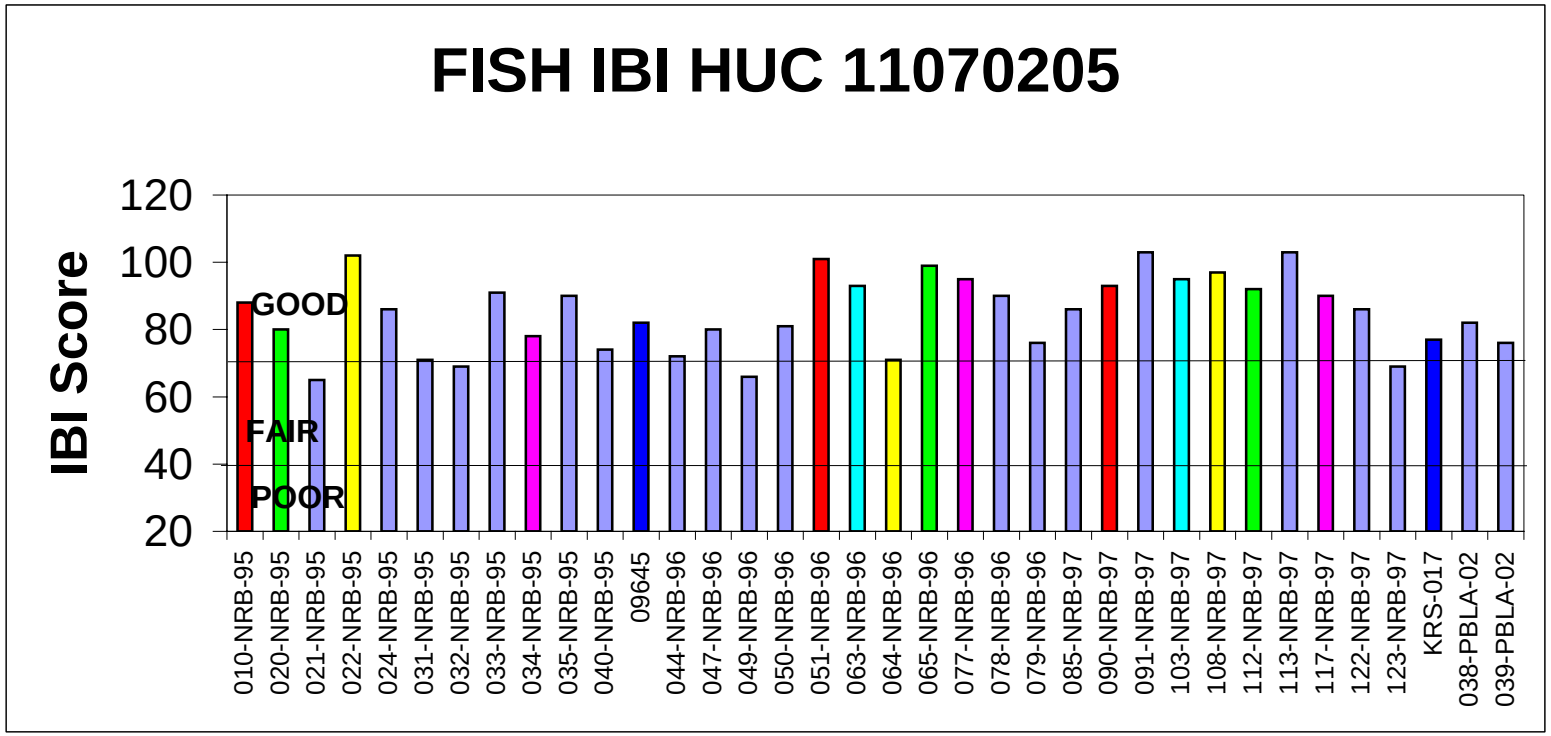
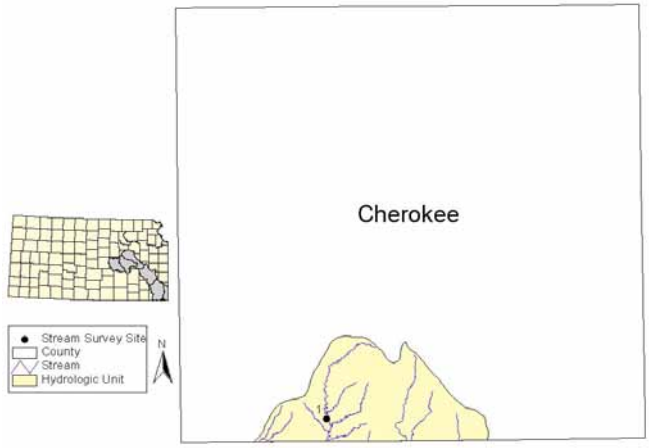


Figure 2. Graph of IBI values for HUC 11070205

Neosho River Basin
HUC 11070206

LOCATION



- This HUC consists of 1 site (1 sample).
- Site was surveyed in 1995.

BIOLOGICAL HIGHLIGHTS

- The one sample in this HUC showed no impact from nutrient and oxygen demanding pollutants. The MBI score was 3.94 (see figure 1).
- 20 species of fish were surveyed (see fish species collected, page 2)
    - SINC – slough darter, spotted sucker
- No mussels have been surveyed in this HUC

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Four Mile	CK	95	9	*	3.94	20

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- Based on the information from one sample, this area would be considered in good health.
- Further surveys should be performed as the opportunity arises to gain further understanding of the fish and aquatic invertebrates of this HUC.
    - Assess populations of SINC fish species
    - Survey for mussel species
- A water quality table is presented on page 2.

Neosho River Basin
HUC 11070206

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	21	170.5	13.5	NA	3.505	6.84	NA	NA	NA	NA	NA

TDS = total dissolved solids

Fish Species Collected

black bullhead
blackstripe topminnow
bluegill
bluegill X green sunfish hybrid
bluntnose darter
bluntnose minnow
brook silverside
channel catfish
golden shiner
green sunfish
largemouth bass
orangethroat darter
red shiner
redfin shiner
river carpsucker
slough darter
spotted sucker
warmouth
western mosquitofish
white crappie
yellow bullhead

Mussel Species Collected

No mussels were collected in this HUC

Neosho River Basin
HUC 11070206

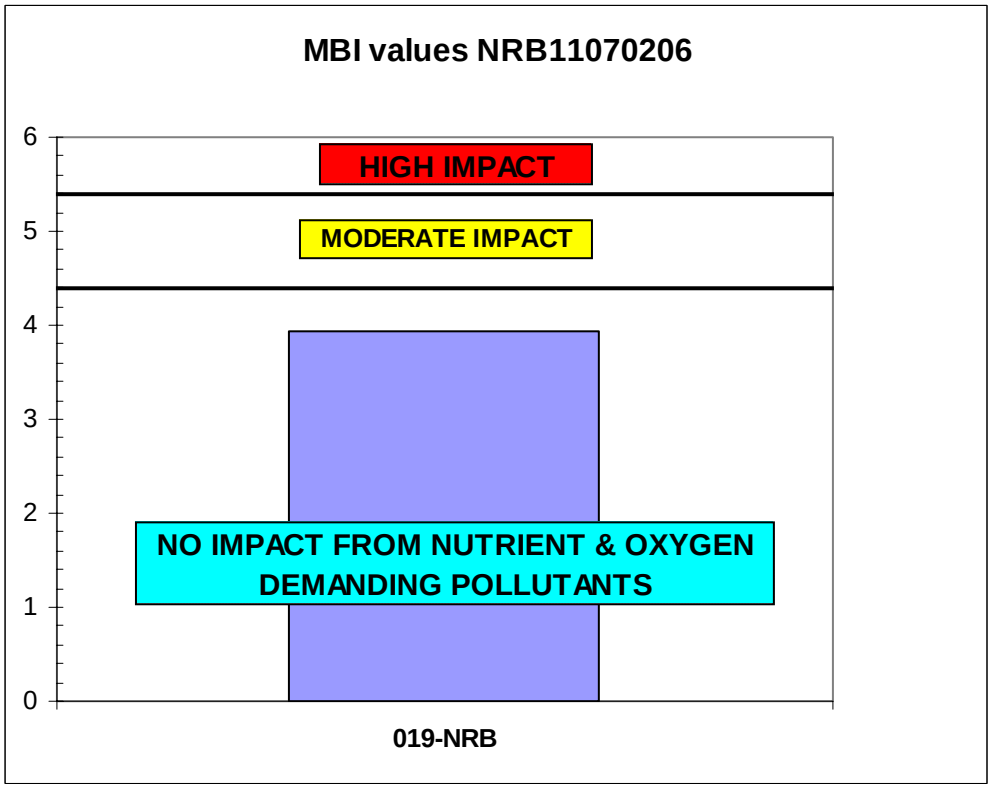


Figure 1. Graph of MBI value for HUC 11070206

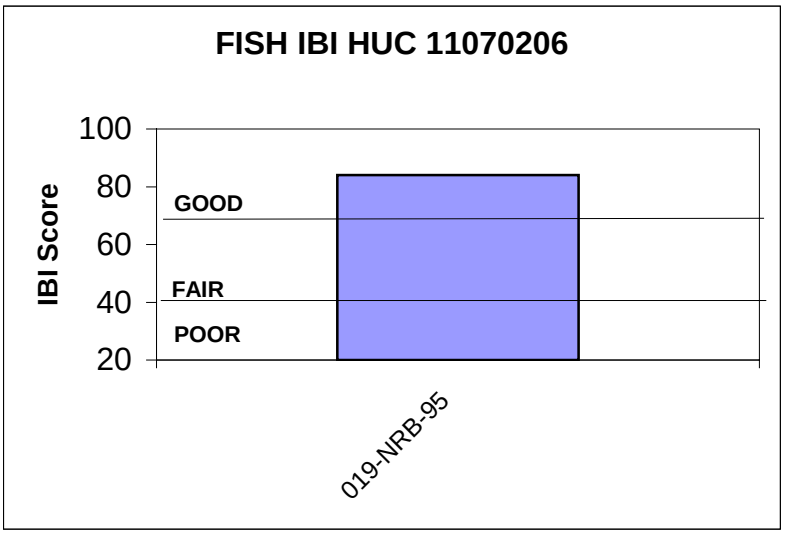
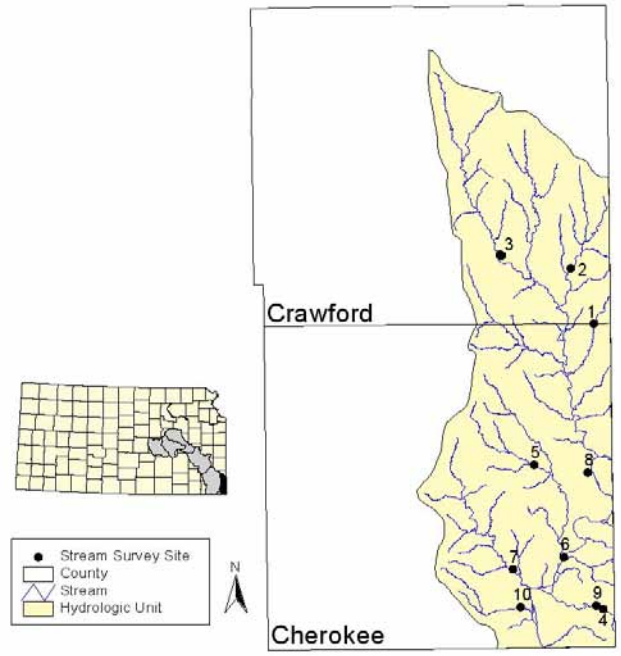


Figure 2. Graph of IBI values for HUC 11070206

Neosho River Basin

HUC 11070207

LOCATION



- This HUC consists of 10 sites (17 samples).
- Sites were surveyed between 1995-2002.

BIOLOGICAL HIGHLIGHTS

- 6 samples were not impacted by nutrient and oxygen demanding pollutants, 3 were moderately impacted, and 8 were highly impacted (see figure 1).
- The overall MBI value for this HUC is 5.33, indicating the area is moderately impacted by nutrient and oxygen demanding pollutants.
- 63 species of fish were surveyed (see fish species collected, page 2 & 3).
    - Threatened – redspot chub
    - SINC – banded darter, banded sculpin, bluntnose darter, gravel chub, greenside darter, northern hogsucker, Ozark minnow, river redhorse, slough darter, speckled darter, spotfin shiner, spotted sucker, stippled darter
- 24 species of mussel were surveyed (see mussel species collected, page 3)
    - Endangered – ellipse, Neosho mucket, rabbitsfoot, western fanshell
    - Threatened – flutedshell, Ouachita kidneyshell
    - SINC – creeper, round pigtoe, spike, Wabash pigtoe, yellow sandshell

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Taylor Branch	Ck	95	5	*	6.88	15
2	Little/E Cow	CR	95	8	*	4.5	13
3	Cow	CR	95	9	*	4.5	19
3			96	14	0.195	5.65	24
3			97	12	*	4.56	26
3			02	23		5.96	20
4	Shoal	CK	95	7	*	3.42	23
4			96	19	*	5.76	30
4			97	15	*	4.07	33
5	Shawnee	CK	96	15	*	5.95	15
6	Short	CK	96	9	*	6.11	7
7	Brush	CK	96	21	0.478	5.64	24
8	Spring	CK	96	17	0.443	4.57	31
8			97	17	0.407	3.7	39
9	Shoal	CK	95	17	0.61	4.33	25
9			00	21	0.571	5.91	27
10	Willow	CK	97	9	*	4.94	20

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

This HUC could be considered in good health based on the information available at this time.

- Efforts should be utilized to maintain the redspot chub population and SINC species of fish, as well as the various species of endangered, threatened, and SINC mussel species.
- Additional surveys should be performed as the opportunities arise to continue assessment of this HUC.
- A water quality table is presented on page 2.

Stream photo (see page 3)

Neosho River Basin
HUC 11070207

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	19	174	228	NA	7.52	7.61	NA	NA	NA	NA	NA
2	22	1060	16	NA	6.61	7.58	NA	NA	NA	NA	NA
3	24	1165	38	NA	5.09	7.4	NA	NA	NA	NA	NA
3	26	978	20	479	3.4	8.4	249	6.9	0.01	0.1	0.24
3	25	357	36.5	NA	3.7	7.48	NA	NA	NA	NA	NA
3	25	534	50.5	NA	NA	7.53	NA	NA	NA	NA	NA
4	24	289.5	16.2	NA	7.99	7.97	NA	NA	NA	NA	NA
4	26	343	2.5	NA	6.7	7.98	NA	NA	NA	NA	NA
4	25	351.5	4.5	NA	6.1	7.78	NA	NA	NA	NA	NA
5	18	205.5	18	NA	5.2	7.35	NA	NA	NA	NA	NA
6	26	501	0.5	NA	9.7	7.49	NA	NA	NA	NA	NA
7	25	450.5	8.5	NA	3.65	7.72	NA	NA	NA	NA	NA
8	27	373	3	NA	5.65	7.78	NA	NA	NA	NA	NA
8	25	421.5	6	NA	6.75	8.2	NA	NA	NA	NA	NA
9	25	360	4	190	4.6	7.28	NA	NA	NA	NA	NA
9	22	309	8	159	6.4	8.3	162	15	0.05	2.8	0.15
10	25	341.5	5.5	NA	NA	7.49	NA	NA	NA	NA	NA

TDS = total dissolved solids

Fish Species Collected

banded darter
banded sculpin
bigeye shiner
black buffalo
black bullhead
black crappie
blackstripe topminnow
bluegill
bluegill X green sunfish hybrid
bluegill X longear sunfish
bluegill X orangespotted sunfish
bluntface shiner
bluntnose darter
bluntnose minnow
brook silverside
fantail darter
flathead catfish
gizzard shad
golden redhorse
golden shiner
gravel chub
green sunfish
greenside darter
Johnny darter
largemouth bass
logperch
longear sunfish
longnose gar
northern hogsucker
orangespotted sunfish
orangethroat darter
river redhorse
rock bass
rosyface shiner
shorthead redhorse
slender madtom
slenderhead darter
slim minnow
slough darter
smallmouth bass
smallmouth buffalo
speckled darter
spotfin shiner
spotted bass
spotted sucker
stippled darter
stonecat

Neosho River Basin
HUC 11070207

Fish Species Collected

bullhead minnow
cardinal shiner
central stoneroller
channel catfish
channel darter
common carp
creek chub
Ozark minnow
red shiner
redear sunfish
redfin darter
redfin shiner
redspot chub
suckermouth minnow
warmouth
western mosquitofish
white crappie
white sucker
yellow bullhead

Mussel Species Collected

Asian clam
creeper
ellipse
fluted shell
fragile papershell
giant floater
mapleleaf
Neosho mucket
Ouachita kidneyshell
paper pondshell
pimpleback
pink papershell
pistolgrip
plain pocketbook
pondhorn
pondmussel
rabbitsfoot
round pigtoe
spike
threeridge
Wabash pigtoe
western fanshell
white heelsplitter
yellow sandshell

Image 1. Spring River, Cherokee Co.

Neosho River Basin
HUC 11070207

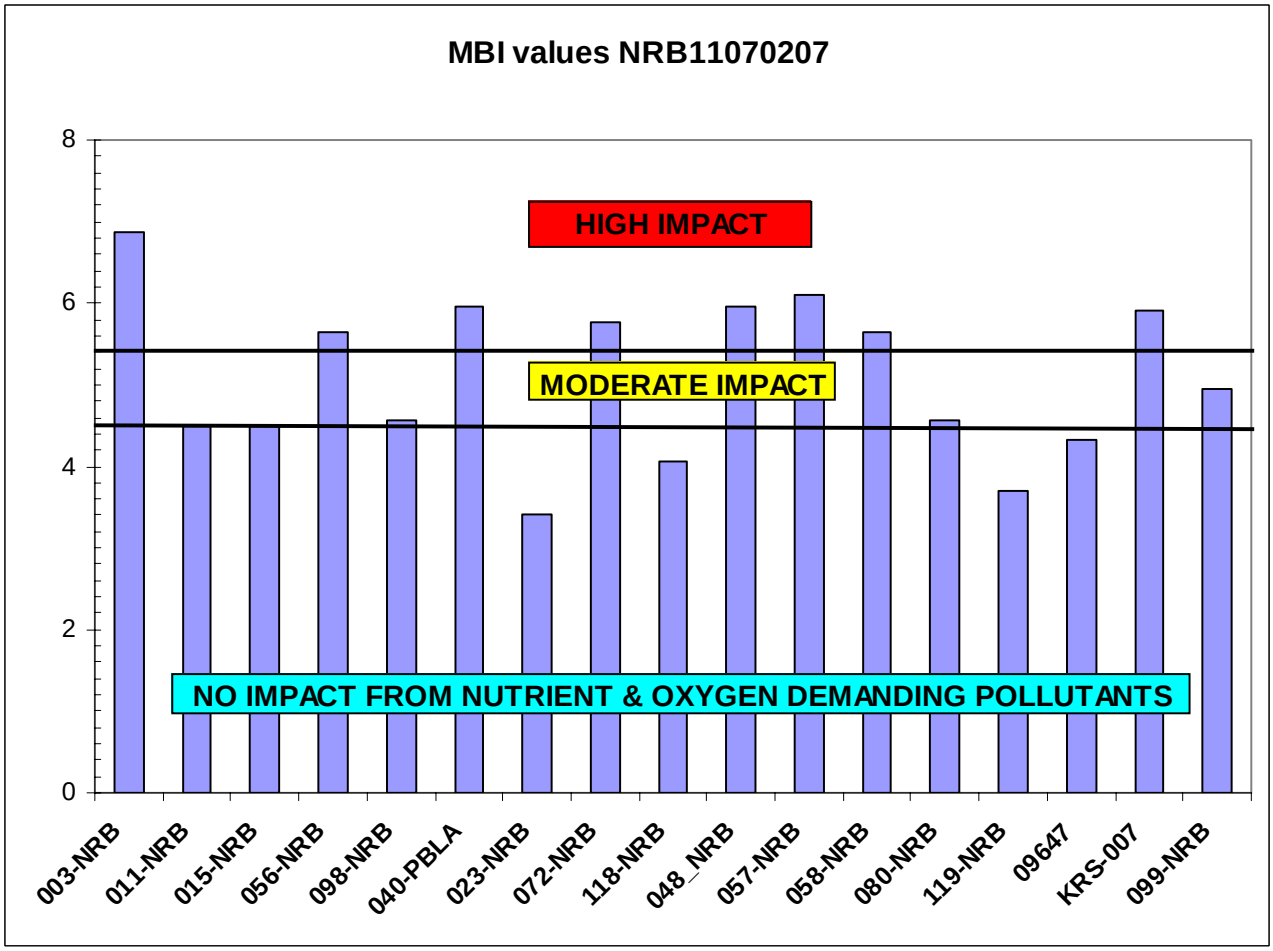


Figure 1. Graph of MBI values for HUC 11070207

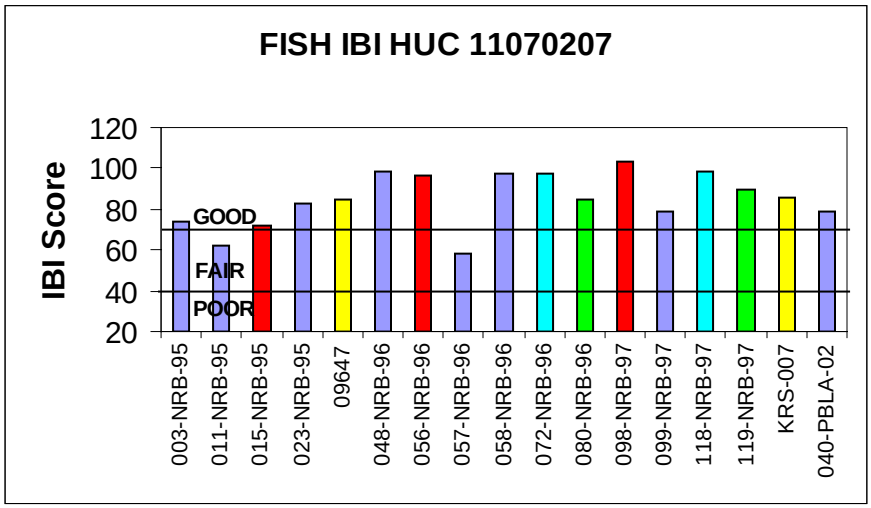
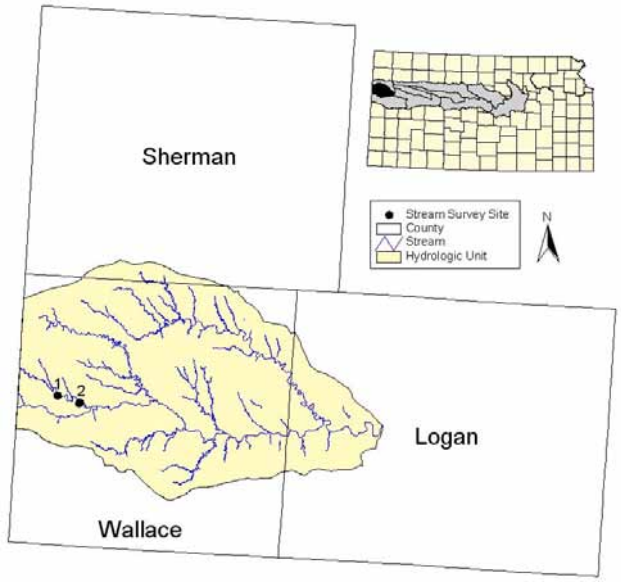


Figure 2. Graph of IBI values for HUC 11070207

Smoky Hill-Saline River Basin
HUC 10260001

LOCATION



- This HUC consists of 2 sites (5 samples).
- Sites were surveyed between 1994-2000.

BIOLOGICAL HIGHLIGHTS

- All 5 samples within this HUC were highly impacted by nutrient and oxygen demanding pollutants (see figure 1). The overall MBI value for this area was 6.01.
- 12 species of fish were surveyed (see fish species collected, page 2)
  - Threatened – Topeka shiner
  - Low proportion of carnivore species present, although creek chub and largemouth bass have been documented in Willow creek.
- 2 species of freshwater mussels were surveyed (see mussel species collected, page 2).

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Willow	WA	96	11	*	6.5	8
2	Willow	WA	94	5	*	7.1	9
2			95	6	0.3	5.4	10
2			95	13	*	5.89	9
2			00	8	*	6.6	11

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered in fair to good health based on the information available at this time.
- Protection efforts should be utilized to maintain and restore the Topeka shiner population.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- Reduce largemouth bass numbers in isolated pools.
- A water quality table is presented on the next page.

Smoky Hill-Saline River Basin
HUC 10260001

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	14	386	4	184	5.6	7.68	173	3.4	0.04	1.3	0.11
2	19	865	20	480	3.3	8.2	250	22	0.03	2	0.02
2	22	1120	10	570	2.3	7.52	NA	NA	NA	NA	NA
2	16	740	11	380	3.3	7.44	NA	NA	NA	NA	NA
2	21	840	17	430	3.2	7.44	NA	NA	NA	NA	NA

TDS = total dissolved solids

Fish Species Collected

black bullhead
bluntnose minnow
central stoneroller
common shiner
creek chub
fathead minnow
green sunfish
orangespotted sunfish
orangethroat darter
plains killifish
red shiner
Topeka shiner

Mussel Species Collected

fingernail clam
pondhorn

Smoky Hill-Saline River Basin
HUC 10260001

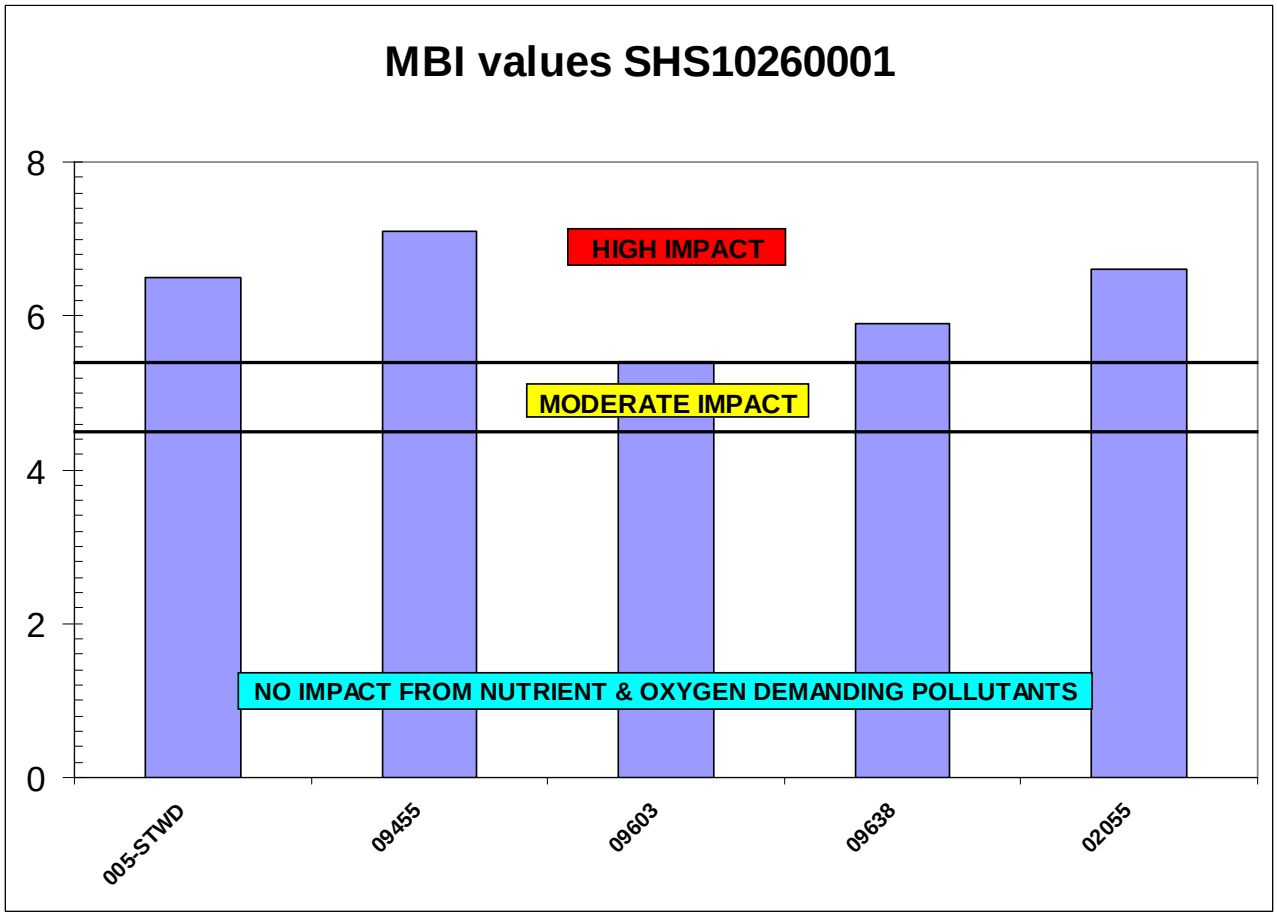


Figure 1. Graph of MBI values for HUC 10260001

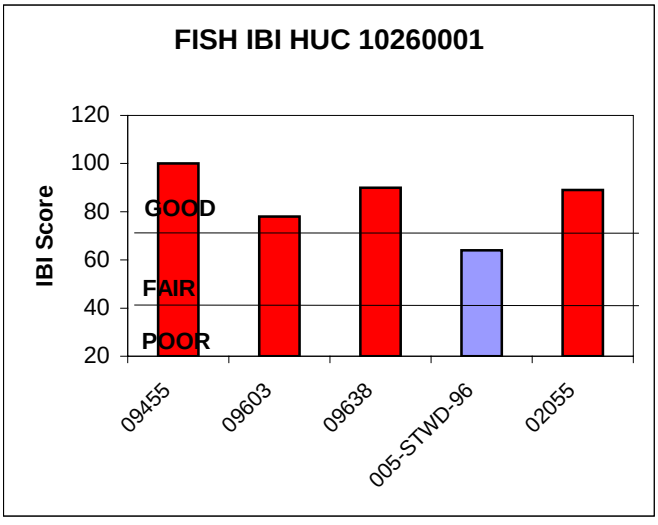
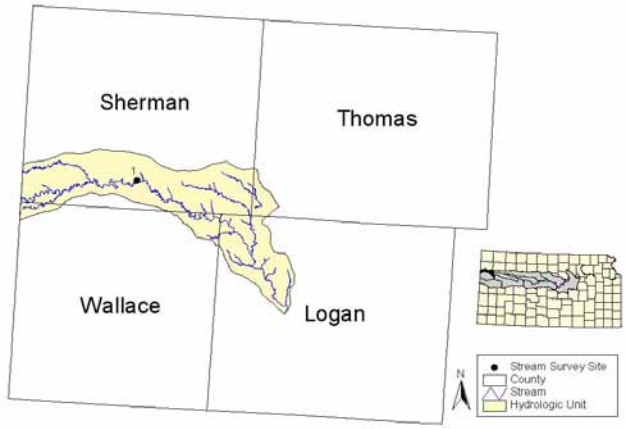


Figure 1. Graph of IBI values for HUC 10260001

Smoky Hill-Saline River Basin
HUC 10260002

LOCATION



- This HUC consists of 1 site (1 sample).
- Site was surveyed in 1996.

BIOLOGICAL HIGHLIGHTS

- 1 sample from this area showed high impact from nutrient and oxygen demanding pollutants (see figure 1). The MBI value for this HUC is 5.52.
- 6 species of fish were surveyed in this HUC (see fish species collected, page 2).
    - SINC – brassy minnow
    - High proportion of tolerant and introduced species in this survey.
- 8 sepcies of freshwater mussels were surveyed (see mussel species collected, page 2).
    - SINC – yellow sandshell

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	NF Smoky Hill	SH	96	6	*	5.52	6

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in poor condition based on the information available at this time.
- Efforts should be utilized to protect the brassy minnow and yellow sandshell populations.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- Additional surveys needed to support listed mussel community.
- A water quality table is presented on page 2.

Smoky Hill-Saline River Basin
HUC 10260002

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	16	885	12	446	1.7	7.6	367	5.9	0.01	0.3	0.49

TDS = total dissolved solids

Fish Species Collected

bluegill
brassy minnow
common carp
fathead minnow
green sunfish
orangespotted sunfish

Mussel Species Collected

Asian clam	pondmussel
giant floater	threeridge
mapleleaf	white heelsplitter
pimpleback	yellow sandshell

Smoky Hill-Saline River Basin

HUC 10260002

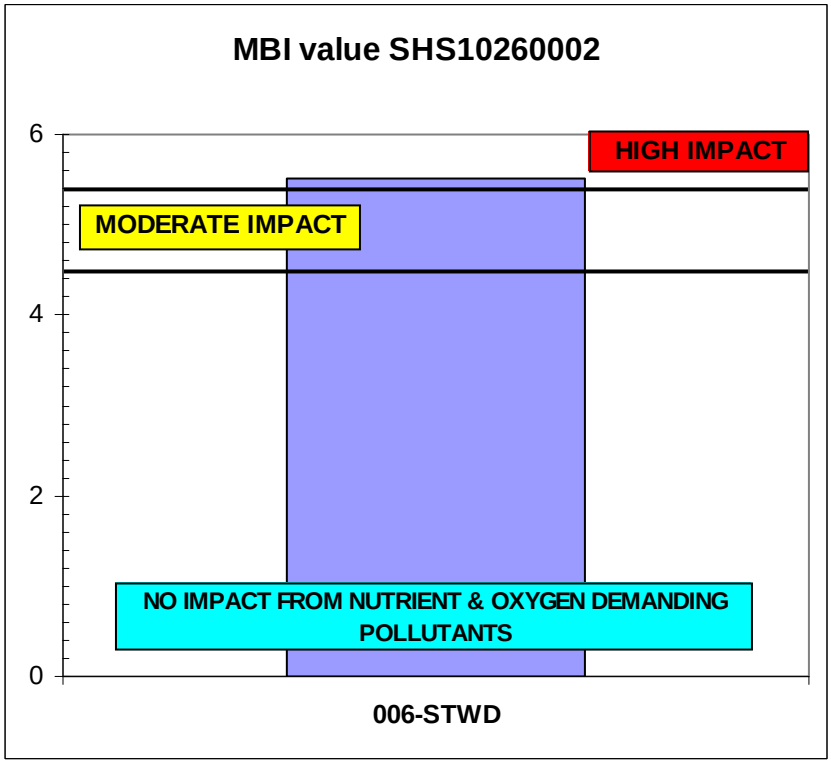


Figure 1. Graph of MBI values for HUC 10260002

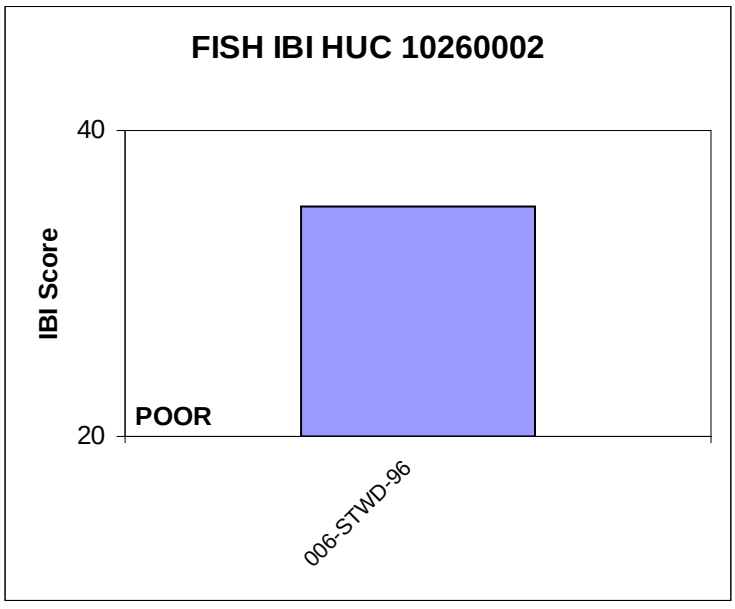
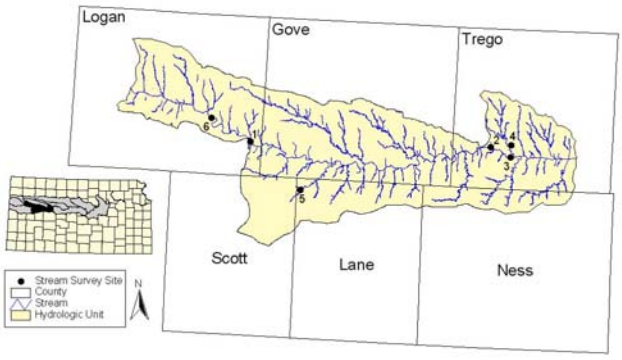


Figure 2. Graph of IBI value for HUC 10260002

Smoky Hill-Saline River Basin
HUC 10260003

LOCATION



- This HUC consists of 6 sites (7 samples).
- Sites were surveyed between 1994-2001.

BIOLOGICAL HIGHLIGHTS

- 1 sample showed no impact from nutrient and oxygen demanding pollutants, 6 samples showed high impact (see figure 1).
- The overall MBI value for this HUC was 7.27, indicating that it has been highly impacted by nutrient and oxygen demanding pollutants.
- 20 species of fish were surveyed (see fish species collected, page 2)
    - SINC – brassy minnow and plains minnow
- 2 species of freshwater mussels were surveyed (see mussel species collected, page 2)

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Smoky Hill	LG	99	10	*	7.5	10
2	Smoky Hill	TR	99	7	*	4.29	14
3	Smoky Hill	TR	94	3	*	8.62	15
4	Smoky Hill	TR	00	16	0.279	7.72	9
5	W Salt	LE	95	12	*	6.64	5
5			01	16	0.196	6.31	8
6	Smoky Hill	LG	00	10	*	8.04	13

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair to good condition based on the information available at this time.
- Efforts should be utilized to protect the brassy minnow population.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on the next page.

Smoky Hill-Saline River Basin
HUC 10260003

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	17	744	188	359	4	8.4	179	27	0.21	17.2	0.01
2	14	1354	359	662	6.7	5.4	351	24	0.55	33.3	0.52
3	18	987	10	559	6.2	8	209	48	0.17	0.6	0.05
3	19	1540	99	780	9	6.94	NA	NA	NA	NA	NA
4	14	700	44	360	3.6	7.62	NA	NA	NA	NA	NA
4	22	NA	36	NA	3.3	8.4	254	36	0.15	4.2	0.13
5	23	2310	27	1206	7	8.2	270	112	0.04	1	0.02

TDS = total dissolved solids

Fish Species Collected

black bullhead
bluegill
brassy minnow
central stoneroller
channel catfish
common carp
creek chub
fathead minnow
green sunfish
largemouth bass
orangespotted sunfish
orangethroat darter
plains killifish
plains minnow
red shiner
river carpsucker
sand shiner
suckermouth minnow
western mosquitofish
yellow bullhead

Mussel Species Collected

fingernail clam
giant floater

Smoky Hill-Saline River Basin
HUC 10260003

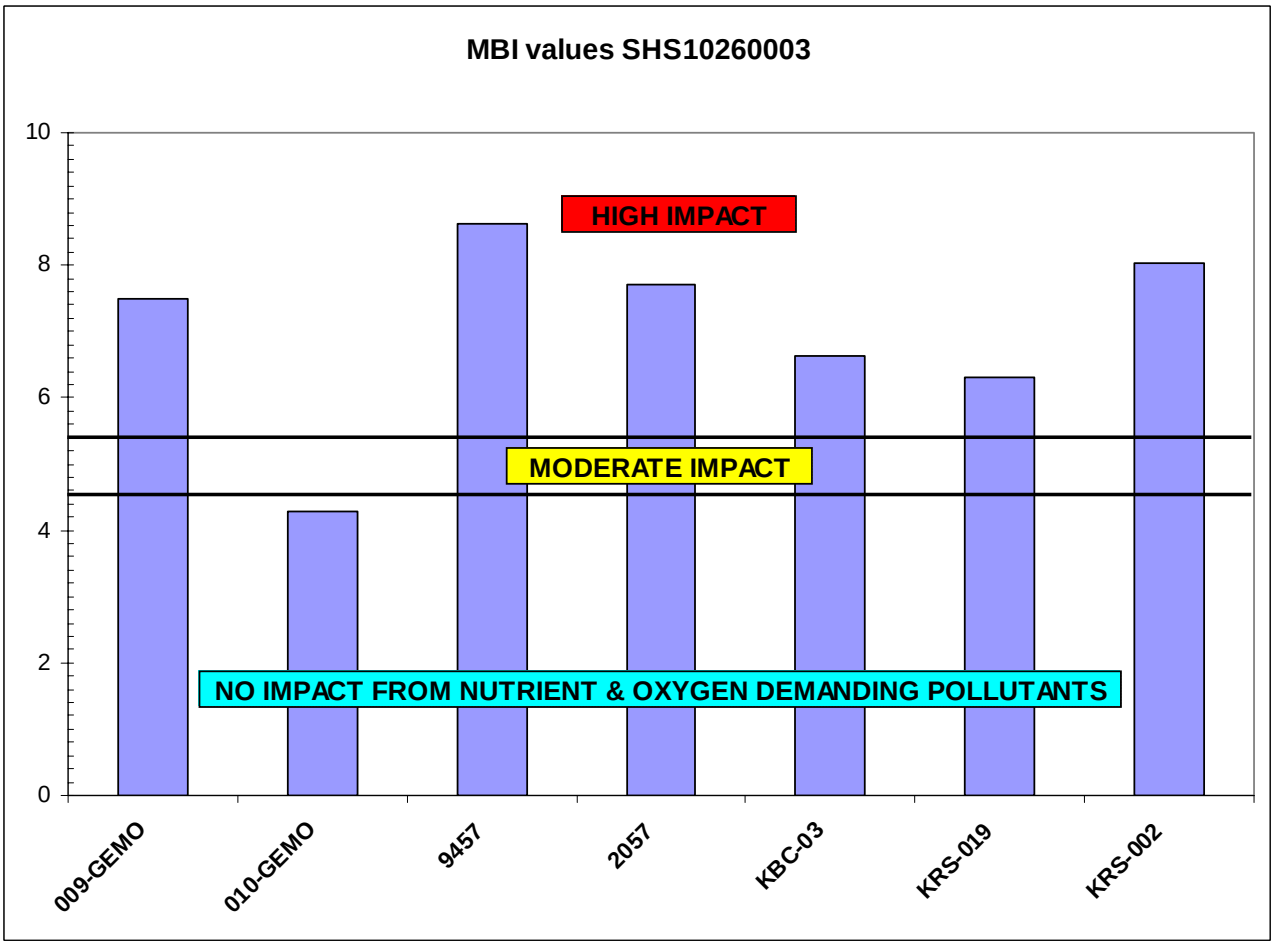


Figure 1. Graph of MBI values for HUC 10260003

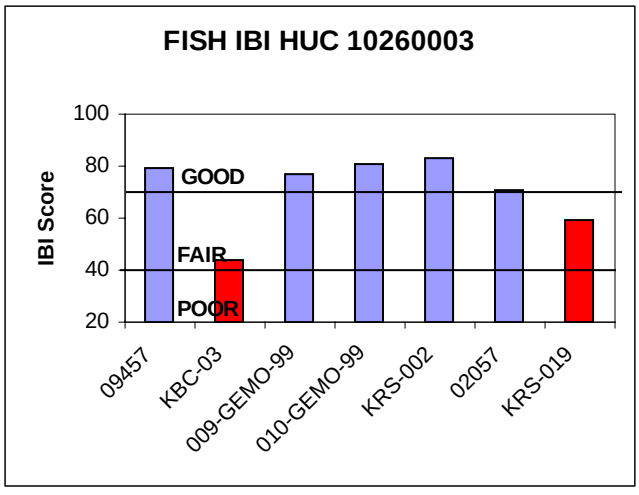
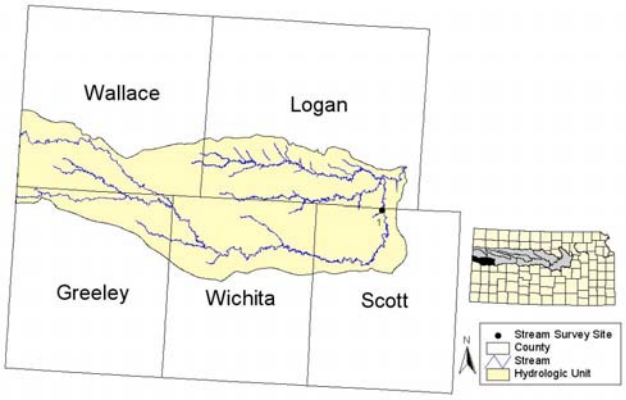


Figure 2. Graph of IBI values for HUC 10260003

Smoky Hill-Saline River Basin
HUC 10260004

LOCATION



- This HUC consists of 1 site (1 sample).
- Site was surveyed in 1997.

BIOLOGICAL HIGHLIGHTS

- The single sample from this HUC had an MBI value of 6.63, indicating that the area has been highly impacted by nutrient and oxygen demanding pollutants (see figure 1).
- 12 species of fish were surveyed (see fish species collected, page 2)
- 1 species of freshwater mussel was surveyed
    - SINC – cylindrical papershell

Image 1. Ladder Creek, Scott Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Ladder	SC	97	11	0.139	6.63	12

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in good condition based on the information available at this time.
- Efforts should be utilized to protect the cylindrical papershell population.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on the next page.

Smoky Hill-Saline River Basin
HUC 10260004

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	17	626	74	300	4.9	7	230	15	0.11	3.3	0.27

TDS = total dissolved solids

Fish Species Collected

black bullhead
bluegill
common carp
fathead minnow
golden shiner
green sunfish
largemouth bass
orangespotted sunfish
plains killifish
red shiner
sand shiner
white crappie

Mussel Species Collected

cylindrical papershell

Smoky Hill-Saline River Basin
HUC 10260004

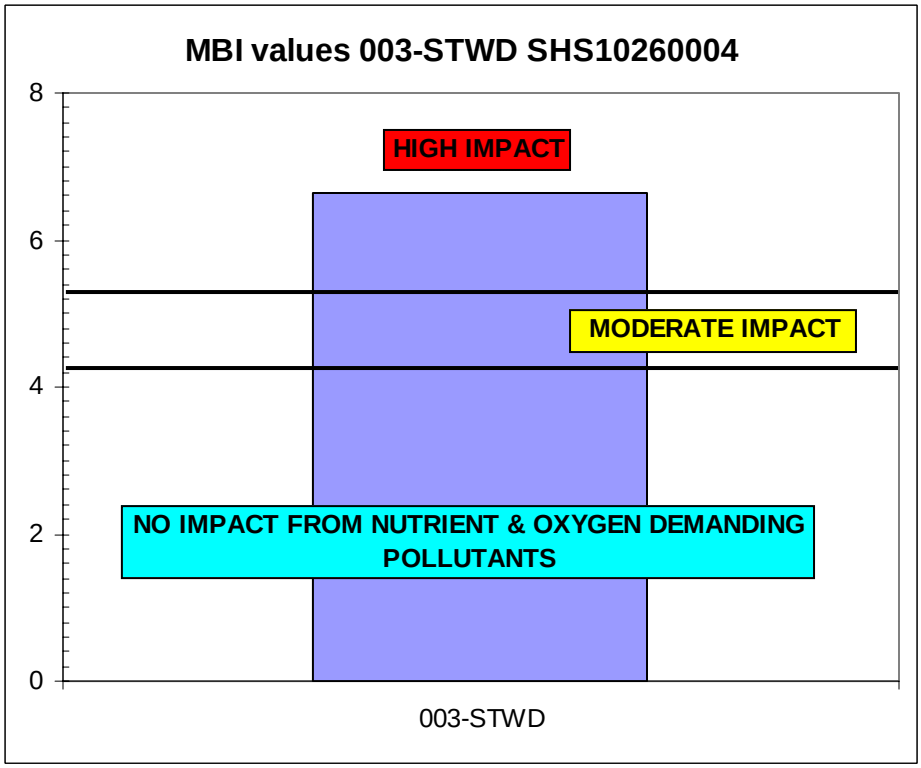


Figure 1. Graph of MBI values for HUC 10260004

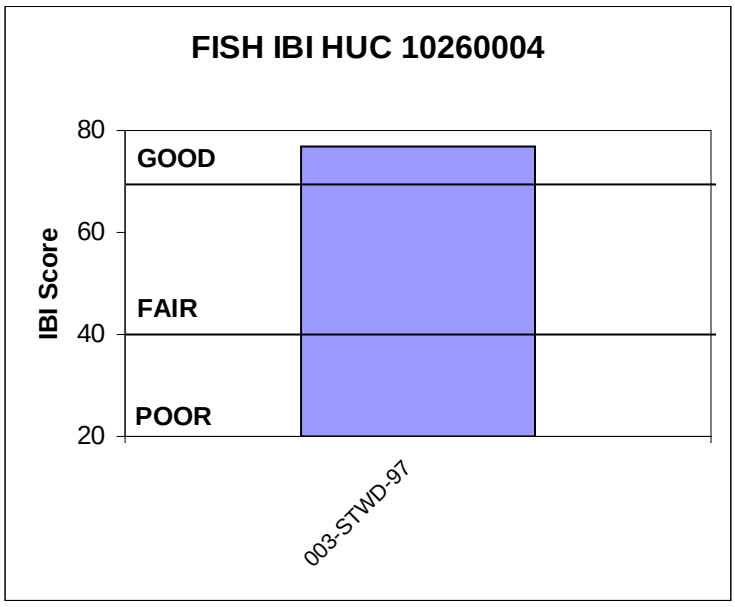
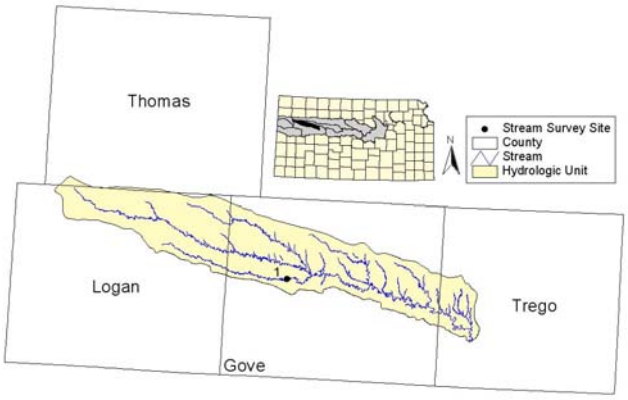


Figure 2. Graph of IBI values for HUC 10260004

Smoky Hill-Saline River Basin
HUC 10260005

LOCATION



- This HUC consists of 1 site (2 samples).
- Site was surveyed in 1994 and 2000.

BIOLOGICAL HIGHLIGHTS

- 2 samples showed high impact from nutrient and oxygen demanding pollutants. The overall MBI value is 8.02 (see figure 1).
- 6 species of fish were surveyed (see fish species collected, page 2)
- very high proportion of tolerant species.
- 2 species of freshwater mussels were surveyed

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	SB Hackberry	GO	94	4	*	7.44	6
1			00	12	0.486	8.05	6

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2.

Smoky Hill-Saline River Basin
HUC 10260005

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	22	1064	38	540	5.9	7.45	NA	NA	NA	NA	NA
1	16	676	93	399	7.2	7.9	270	76.6	0.1	3.1	0.18

TDS = total dissolved solids

Fish Species Collected

black bullhead
common carp
fathead minnow
green sunfish
orangespotted sunfish
red shiner

Mussel Species Collected

fingernail clam
pondhorn

Smoky Hill-Saline River Basin
HUC 10260005

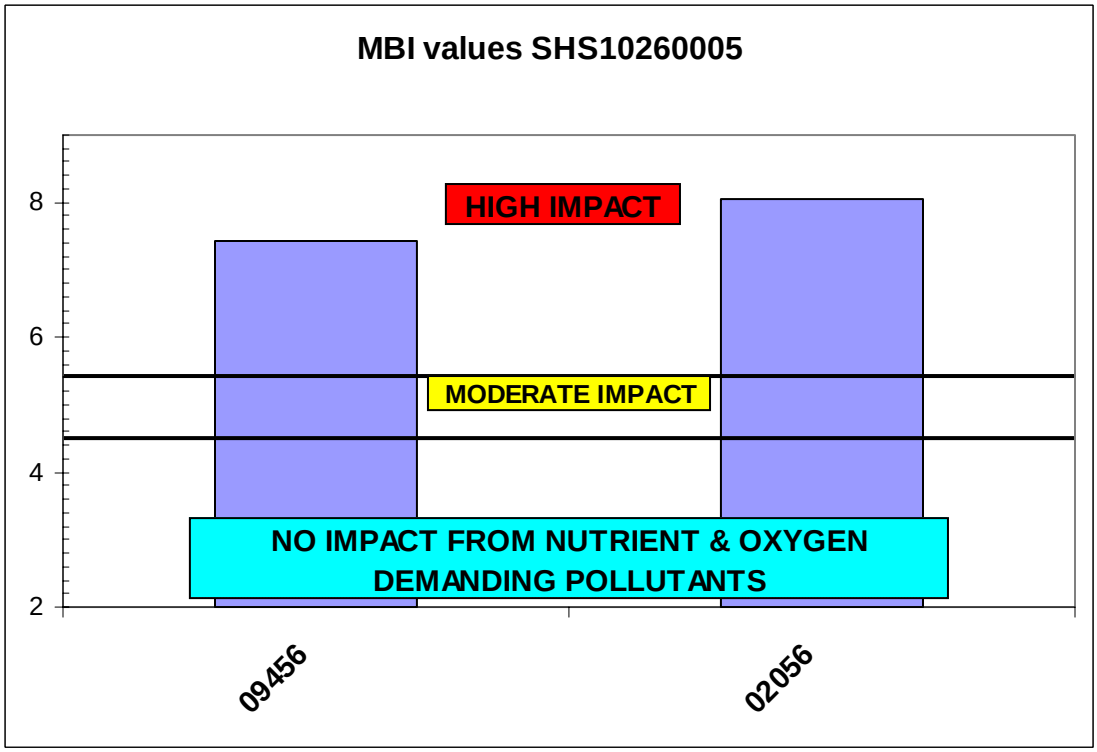


Figure 1. Graph of MBI values for HUC 10260005

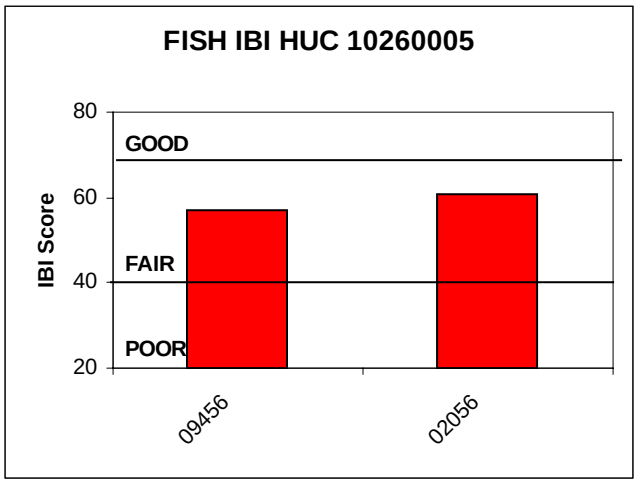
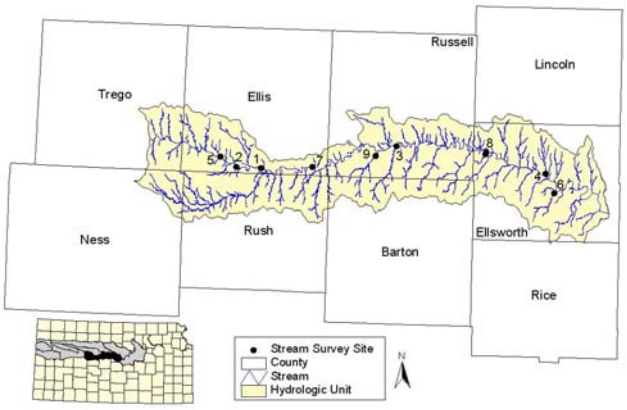


Figure 2. Graph of IBI values for HUC 10260005

Smoky Hill-Saline River Basin
HUC 10260006

LOCATION



- This HUC consists of 9 sites (10 samples).
- Sites were surveyed between 1995-2001.

BIOLOGICAL HIGHLIGHTS

- 1 sample showed no impact from nutrient and oxygen demanding pollutants, 2 were moderately impacted, and 7 were highly impacted (see figure 1)
- The overall MBI value for this HUC was 5.91 indicating high impact from nutrient and oxygen demanding pollutants.
- 26 species of fish were surveyed (see fish species collected, page 2).
- 11 species of freshwater mussels were surveyed (see mussel species collected, page 2)
    - SINC – creeper, cylindrical papershell

Image 1. Smoky Hill River, Ellis Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Smoky Hill	EL	99	14	0.796	4.35	18
2	Smoky Hill	EL	99	14	*	5.74	14
3	Smoky Hill	RS	99	10	*	6.93	13
4	Smoky Hill	EW	99	9	*	8.31	14
5	Smoky Hill	EL	97	10	*	4.82	16
6	Smoky Hill	EW	96	12	*	7.54	13
7	Smoky Hill	EL	96	12	*	5.29	17
8	Spring	EW	95	10	*	5.49	10
8			01	9	*	7.69	9
9	Landon	RS	01	24	0.389	6.01	13

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair to good condition based on the information available at this time.
- Efforts should be made to maintain the SINC species of mussels present in this area.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2.

Smoky Hill-Saline River Basin
HUC 10260006

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	21	1459	28	705	5.6	3	125	70	0.01	0.6	0.82
2	20	1398	89	689	4.8	3.2	167	96	0.05	1.1	0.06
3	20	1763	74	861	7.6	2	NA	312	0.08	4.1	0.21
4	22	1806	34	890	6.8	3.1	175	238	0.03	1.5	0.16
5	24	1415	24	689	6.6	7.72	262	55	0	0.6	0.03
6	26	783	336	376	6.5	8.12	129	18	0.22	29.7	0.31
7	22	1405	57	686	10.1	8.03	204	16.1	0.05	4	0.1
8	13	1040	12	530	5.4	7.11	NA	NA	NA	NA	NA
8	23	NA	6	NA	5.1	8.5	329	245	0.05	3.5	0.05
9	24	NA	7	NA	10.7	8.5	130	380	2.1	4.9	0.04

TDS = total dissolved solids

Fish Species Collected

bigmouth buffalo
black bullhead
black crappie
bluegill
bluntnose minnow
bullhead minnow
central stoneroller
channel catfish
common carp
creek chub
fathead minnow
flathead catfish
freshwater drum
gizzard shad
green sunfish
largemouth bass
orangespotted sunfish
orangethroat darter
red shiner
river carpsucker
sand shiner
suckermouth minnow
white bass
white crappie
white sucker
yellow bullhead

Mussel Species Collected

creeper
cylindrical papershell
fingernail clam
fragile papershell
giant floater
mapleleaf
paper pondshell
pimpleback
pink papershell
pondhorn
pondmussel

Smoky Hill-Saline River Basin
HUC 10260006

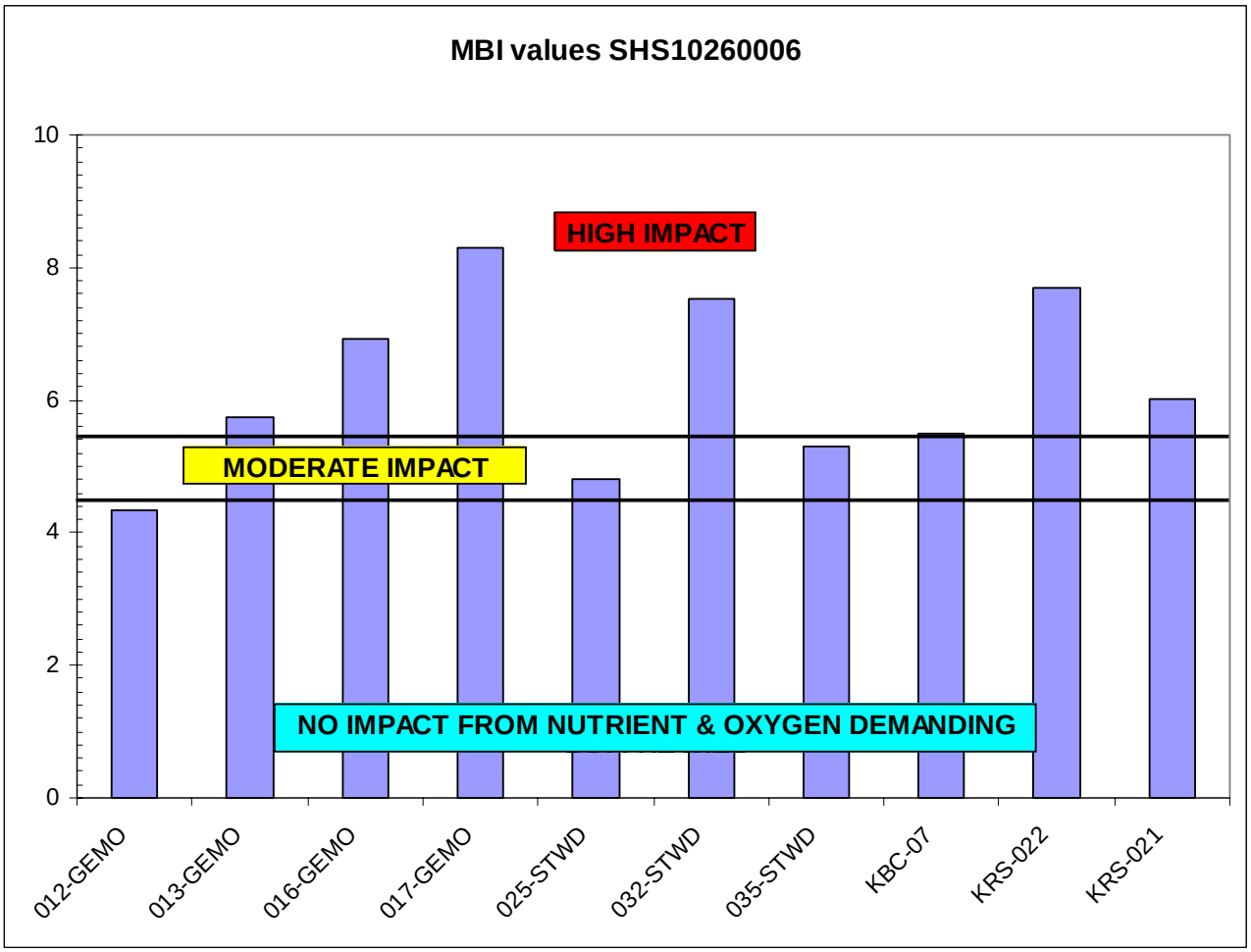


Figure 1. Graph of MBI values for HUC 10260006

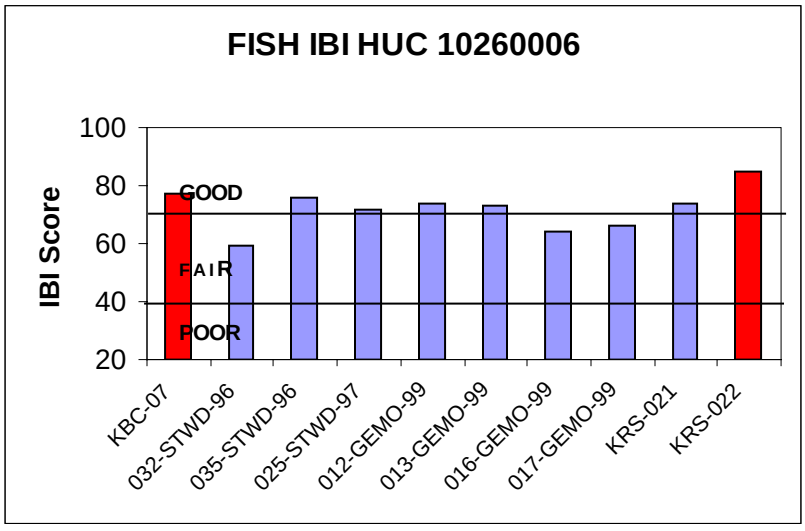
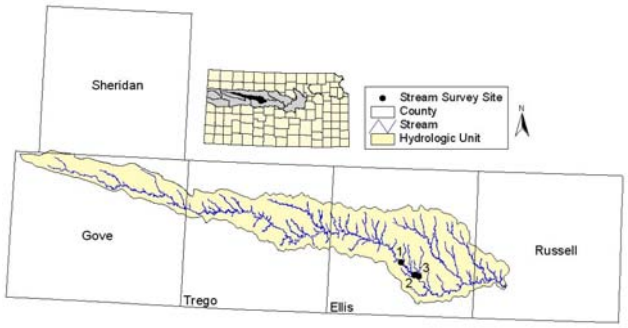


Figure 2. Graph of IBI values for HUC 10260006

Smoky Hill-Saline River Basin
HUC 10260007

LOCATION



- This HUC consists of 3 sites (4 samples).
- Sites were surveyed between 1994-2000.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Big creek	EL	99	7	*	7.44	6
2	Big creek	EL	94	4	*	7.14	11
2			00	11	*	5.6	9
3	Big creek	EL	99	8	*	7.39	10

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

BIOLOGICAL HIGHLIGHTS

- All 4 samples surveyed within this HUC have been highly impacted by nutrient and oxygen demanding pollutants (see figure 1). The overall MBI value is 6.47.
- 14 species of fish were surveyed within this area (see fish species collected, page 2).
- 2 species of freshwater mussels were surveyed (see mussel species collected, page 2)

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2.

Smoky Hill-Saline River Basin
HUC 10260007

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	23	762	105	364	4.5	2.6	159	66	0.22	5.5	0.72
2	19	1059	78	595	7.8	8	228	176	0.15	4	0.51
2	24	1190	97	600	4.8	7.86	NA	NA	NA	NA	NA
3	23	1202	124	585	4.7	1.7	243	128	0.18	7.3	1.76

TDS = total dissolved solids

Fish Species Collected

black bullhead
bluegill
channel catfish
common carp
fathead minnow
flathead catfish
green sunfish
largemouth bass
orangespotted sunfish
red shiner
sand shiner
suckermouth minnow
white bass
white crappie

Mussel Species Collected

fingernail clam
giant floater

Smoky Hill-Saline River Basin
HUC 10260007

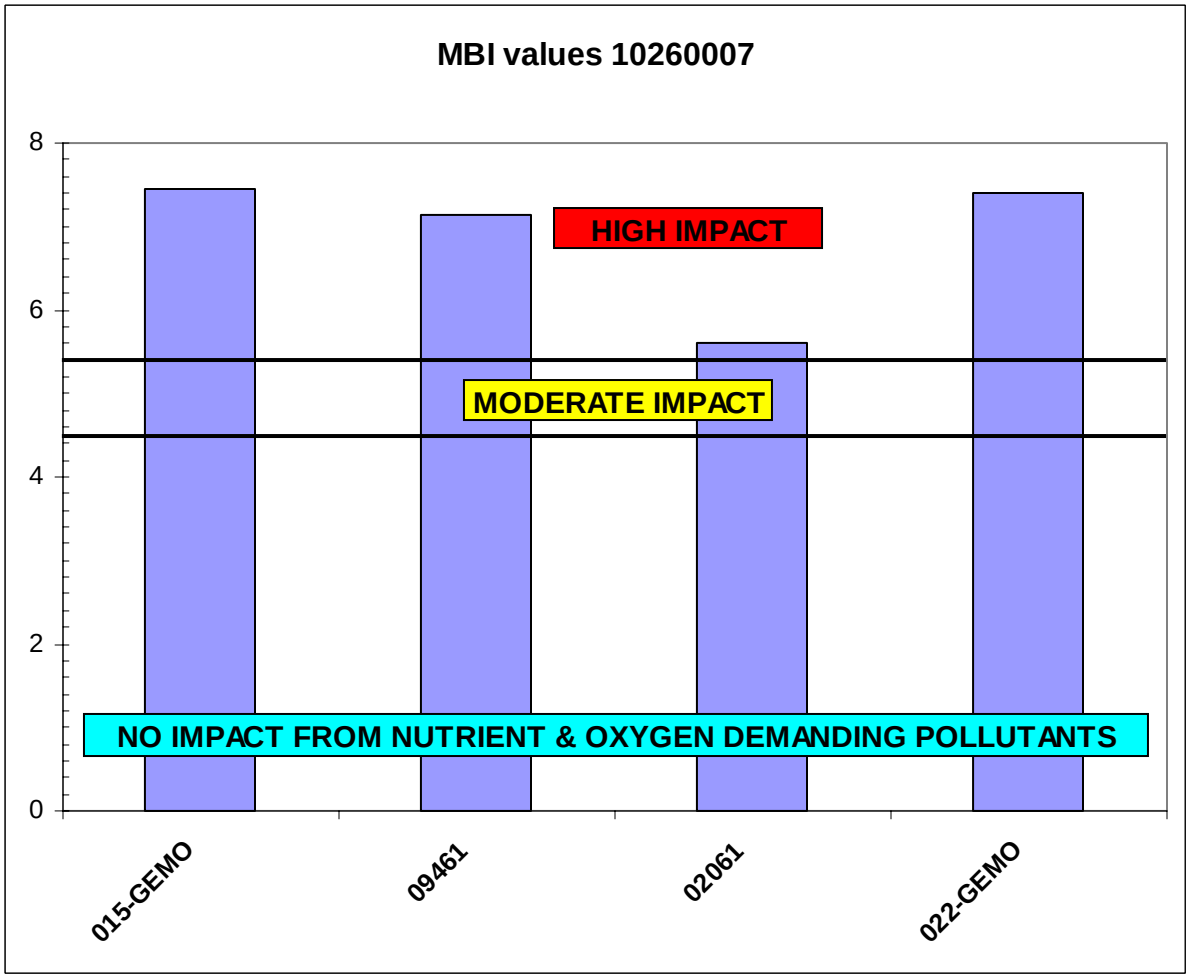


Figure 1. Graph of MBI values for HUC 10260007

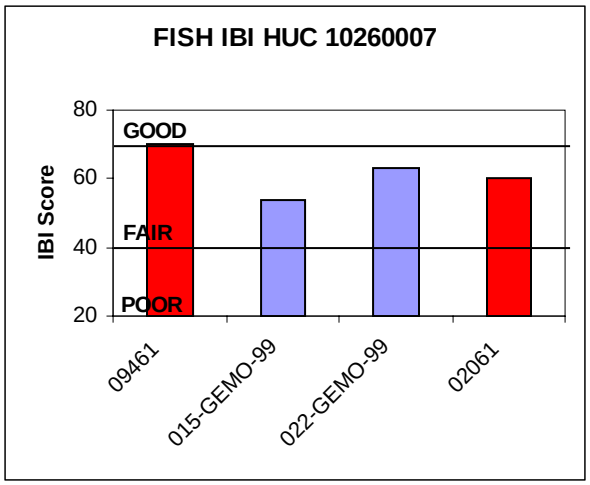
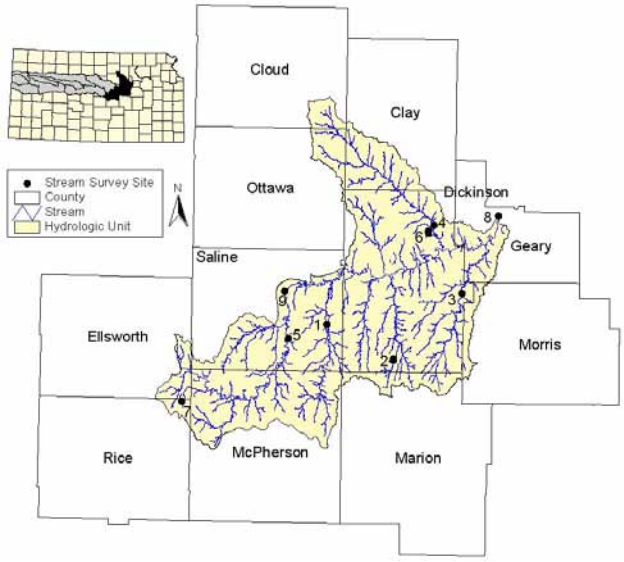


Figure 2. Graph of IBI values for HUC 10260007

Smoky Hill-Saline River Basin
HUC 10260008

LOCATION



- This HUC consists of 9 sites (16 samples).
- Sites were surveyed between 1994-2003.

BIOLOGICAL HIGHLIGHTS

- 2 samples were not impacted by nutrient and oxygen demanding pollutants, 1 sample was moderately impacted, and 12 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 6.25, indicating the area has been highly impacted by nutrient and oxygen demanding pollutants.
- 37 species of fish were surveyed (see fish species collected, page 2)
    - SINC – blue sucker
- 16 species of freshwater mussels were surveyed (see mussel species collected, page 3)
    - SINC – creeper, fatmucket, Wabash pigtoe, yellow sandshell

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Gypsum	SA	94	5	*	8.5	14
1			00	19	0.117	5.93	13
2	W Turkey	DK	94	3	0.291	9.01	8
2			95	6	*	8.92	6
2			95	8	*	6.03	7
2			00	8	0.098	9.1	7
3	Lyon	DK	96	13	0.445	5.57	22
4	Chapman	DK	99	6	*	6.42	7
5	Smoky Hill	SA	95	4	*	3.17	12
5			01	16	0.782	3.92	10
6	Chapman Trib	DK	95	5	*	9.7	7
6			01	21	0.061	8.67	6
7	Wolf	RC	95	15	0.485	5.48	7
7			01	0	0	0	
8	Smoky Hill	GE	02	13	0.195	8.55	21
9	Smoky Hill	SA	03	18	0.84	4.65	18

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Efforts should be made to maintain the blue sucker population and SINC species of mussels present in this area.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- Lyon creek drainage represents more of a flint hill stream than the typical stream in this HUC.
- A water quality table is presented on page 2.

Smoky Hill-Saline River Basin
HUC 10260008

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	25	1388	63	684	3.8	8.2	300	60	0.15	2.1	0.12
1	22	1880	74	950	5.4	8.14	NA	NA	NA	NA	NA
2	20	2110	40	1179	7.2	8.2	308	53	0.1	1.9	0.09
2	20	2600	49	1320	8.5	7.99	NA	NA	NA	NA	NA
2	16	2280	26	1150	6.5	7.43	NA	NA	NA	NA	NA
2	16	2630	22	1320	5.1	6.92	NA	NA	NA	NA	NA
3	22	844	32	408	10.2	8.09	338	5.4	0.02	1.3	0.07
4	26	1080	33	524	4.7	8	237	19	0.03	0.3	0.7
5	28	1794	134	1008	6.7	8.2	176	130	0.14	1.7	0.23
5	26	1020	85	510	5	8.15	NA	NA	NA	NA	NA
6	19	NA	NA	NA	7	7.4	406	5	0.18	5.5	0.28
6	23	870	43	440	3.8	7.69	NA	NA	NA	NA	NA
7	18	250	34	130	5.3	6.87	NA	NA	NA	NA	NA
7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8	25	1917	73	971	5.3	8.4	43	43.9	0.1	2.4	0.09

TDS = total dissolved solids

Fish Species Collected

black buffalo
black bullhead
blue sucker
bluegill
bluntnose minnow
bullhead minnow
central stoneroller
channel catfish
common carp
creek chub
emerald shiner
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden shiner
green sunfish
largemouth bass
logperch
longear sunfish
longnose gar
orangespotted sunfish
orangespotted X longear sunfish
orangethroat darter
red shiner
redfin shiner
river carpsucker
sand shiner
shorthead redhorse
shortnose gar
shovelnose sturgeon
smallmouth buffalo
stonecat
suckermouth minnow
western mosquitofish
white bass
white sucker
yellow bullhead

Smoky Hill-Saline River Basin
HUC 10260008

Mussel Species Collected

Asian clam	mapleleaf
creeper	pimpleback
fatmucket	pink papershell
fingernail clam	pondmussel
fragile papershell	threeridge
giant floater	Wabash pigtoe
hickorynut	white heelsplitter
lilliput	yellow sandshell

Smoky Hill-Saline River Basin
HUC 10260008

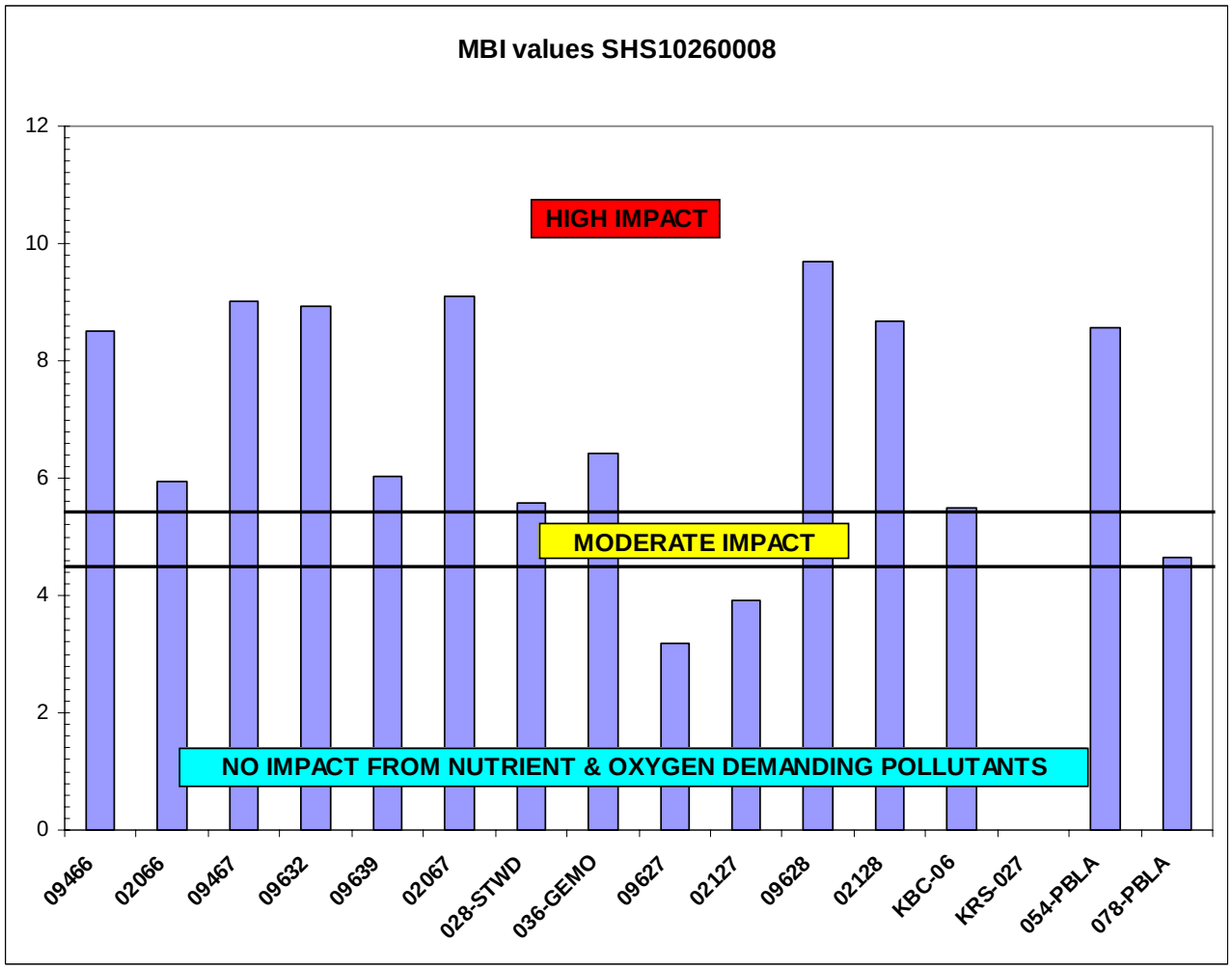


Figure 1. Graph of MBI values for HUC 10260008

Smoky Hill-Saline River Basin
HUC 10260008

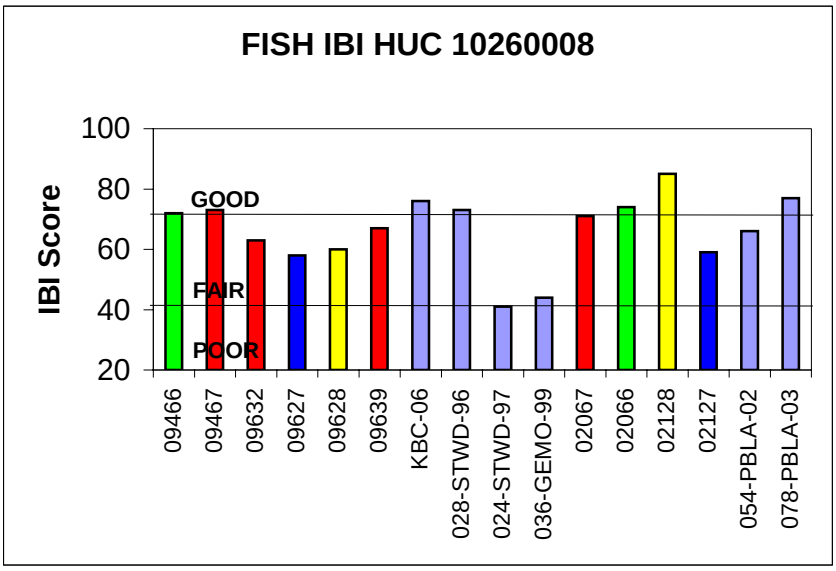
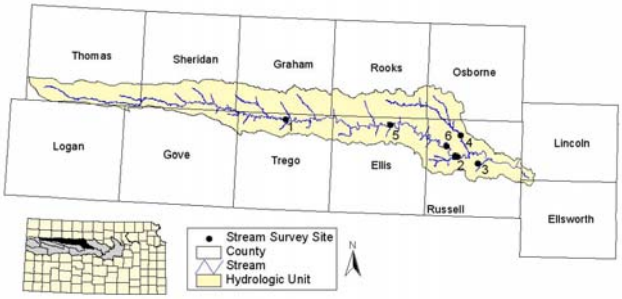


Figure 2. Graph of IBI values for HUC 10260008

Smoky Hill-Saline River Basin
HUC 10260009

LOCATION



- This HUC consists of 7 sites (8 samples).
- Sites were surveyed between 1994-2003.

BIOLOGICAL HIGHLIGHTS

- 2 samples were moderately impacted by nutrient and oxygen demanding pollutants, 6 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 7.73, indicating high impact from nutrient and oxygen demanding pollutants.
- 24 species of fish were surveyed (see fish species collected, page 2)
- 4 species of freshwater mussels were surveyed (see mussel species collected, page 2).

Image 1. Paradise Creek, Russell Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Saline	TR	99	10	*	5.61	11
2	Saline	RS	99	9	*	4.53	11
3	Cedar Trib	RS	94	9	*	6	6
3			00	12	0.029	9.67	
4	Paradise	RS	97	9	*	8.18	13
5	Saline	RS	97	7	*	5.77	18
6	Saline	RS	96	19	*	5.28	13
7	Saline	RS	03	16	0.013	9.07	12

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2.

Smoky Hill-Saline River Basin
HUC 10260009

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	15	731	58	353	4.9	4.7	204	44	0.17	3.5	0.38
2	24	1773	180	870	5.2	6.9	439	185	0.14	5.3	0.39
3	19	1110	29	601	9.8	7.9	249	73	0.09	1.2	0.07
3	18	1100	3	560	9.5	7.54	NA	NA	NA	NA	NA
4	20	1150	209	558	5.9	8.02	263	14	0.23	11.8	0.1
5	22	1575	34	774	7.4	8.09	209	28	0.04	1.9	0.01
6	20	1715	104	841	13.7	8.06	142	32.6	0.08	6.1	0.11
7	19	6920	105	3680	4.3	7.7	273	1703	0.05	2.5	0

TDS = total dissolved solids

Fish Species Collected

black bullhead
bluntnose minnow
bullhead minnow
central stoneroller
channel catfish
common carp
creek chub
fathead minnow
flathead catfish
freshwater drum
gizzard shad
green sunfish
largemouth bass
logperch
orangespotted sunfish
orangethroat darter
plains killifish
red shiner
river carpsucker
sand shiner
suckermouth minnow
western mosquitofish
white sucker
yellow bullhead

Mussel Species Collected

Asian clam
giant floater
mapleleaf
pondhorn

Smoky Hill-Saline River Basin
HUC 10260009

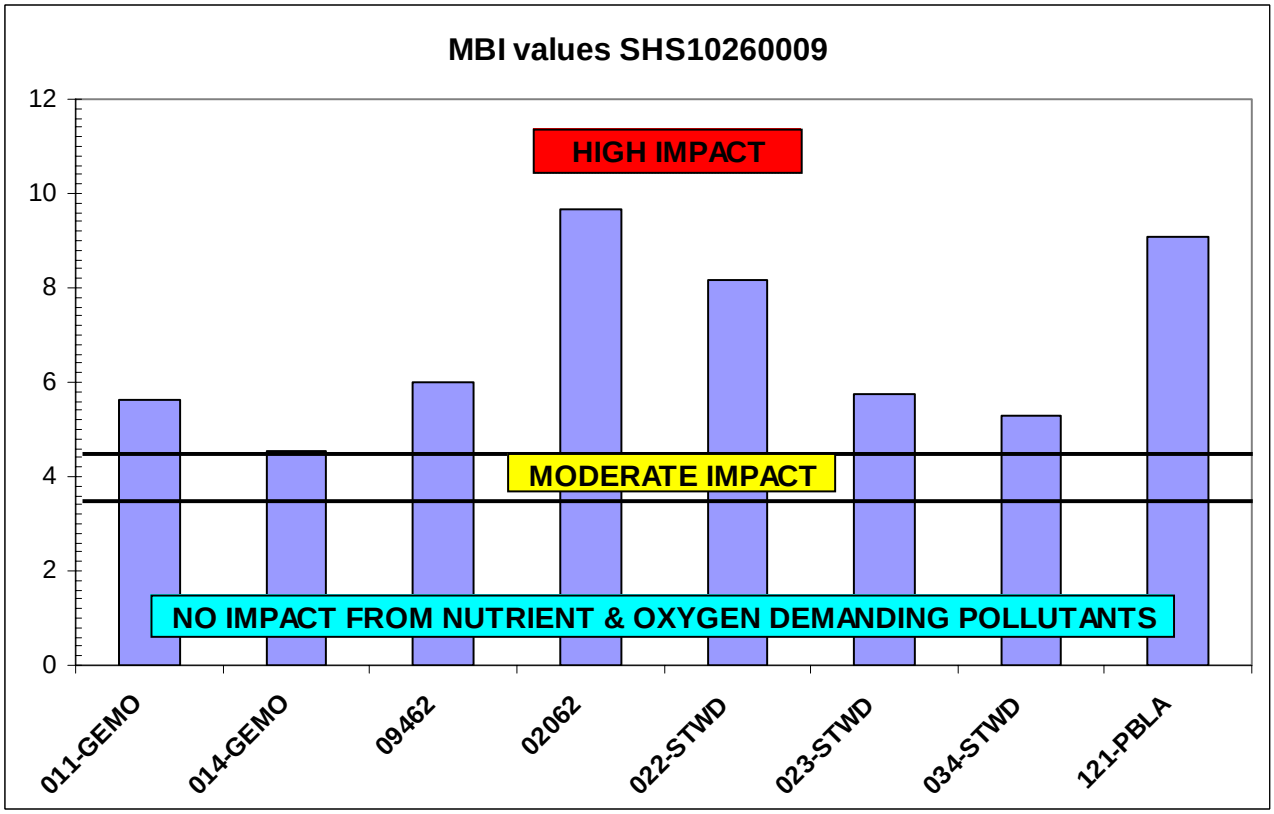


Figure 1. Graph of MBI values for HUC 10260009

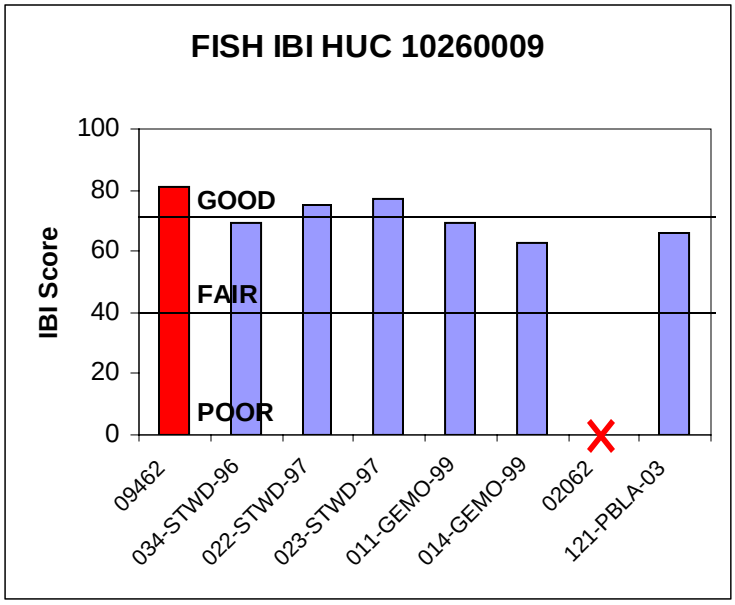
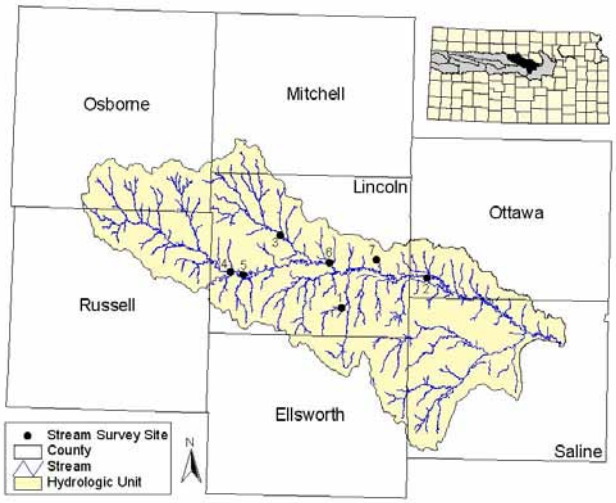


Figure 2. Graph of IBI values for HUC 10260009

Smoky Hill-Saline River Basin
HUC 10260010

LOCATION



- This HUC consists of 7 sites (8 samples).
- Sites were surveyed between 1994-2003.

BIOLOGICAL HIGHLIGHTS

- 1 sample was not impacted by nutrient and oxygen demanding pollutants, 7 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 8.28, indicating that the area has been highly impacted by nutrient and oxygen demanding pollutants.
- 25 species of fish were surveyed (see fish species collected, page 2)
- 11 species of freshwater mussels were surveyed (see mussel species collected, page 2)
    - SINC – cylindrical papershell, fatmucket

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	W Elkhorn	LC	94	13	0.179	9.54	8
1			00	20	0.083	10	9
2	Saline	OT	99	11	*	4.48	5
3	Spillman	LC	97	8	*	6.69	11
4	Saline	LC	96	2	0.423	6.83	12
5	Saline	LC	03	19	0.536	5.65	10
6	Saline	LC	03	17	0.165	7.81	14
7	Twelvemile	LC	03	19	0.031	9.38	7

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair to good condition based on the information available at this time.
- Efforts should be made to maintain the SINC mussel species present in this area.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2.

Image 1. Spillman Creek, Russell Co.

Smoky Hill-Saline River Basin
HUC 10260010

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	21	1197	13	644	6.3	8.1	310	53	0.06	1.9	0.1
1	22	1360	53	680	3.1	7.62	NA	NA	NA	NA	NA
2	27	2010	NA	986	5.4	1.1	290	281	0.17	11.8	0.6
3	25	919	114	405	5.6	7.71	139	5	0.08	5.7	0.12
4	23	1970	43	968	5.8	7.9	212	39	0.04	1.6	0.04
5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7	19	1471	23	731	3.1	8.2	24.7	1.6	0.08	0.3	0.19

TDS = total dissolved solids

Fish Species Collected

bigmouth buffalo
black bullhead
bluegill
bullhead minnow
central stoneroller
channel catfish
common carp
creek chub
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden shiner
green sunfish
logperch
longnose gar
orangespotted sunfish
orangethroat darter
red shiner
river carpsucker
sand shiner
stonecat
suckermouth minnow
white bass
white sucker

Mussel Species Collected

Asian clam
cylindrical papershell
fatmucket
fingernail clam
fragile papershell
giant floater
mapleleaf
pink papershell
pondhorn
pondmussel
white heelsplitter

Smoky Hill-Saline River Basin
HUC 10260010

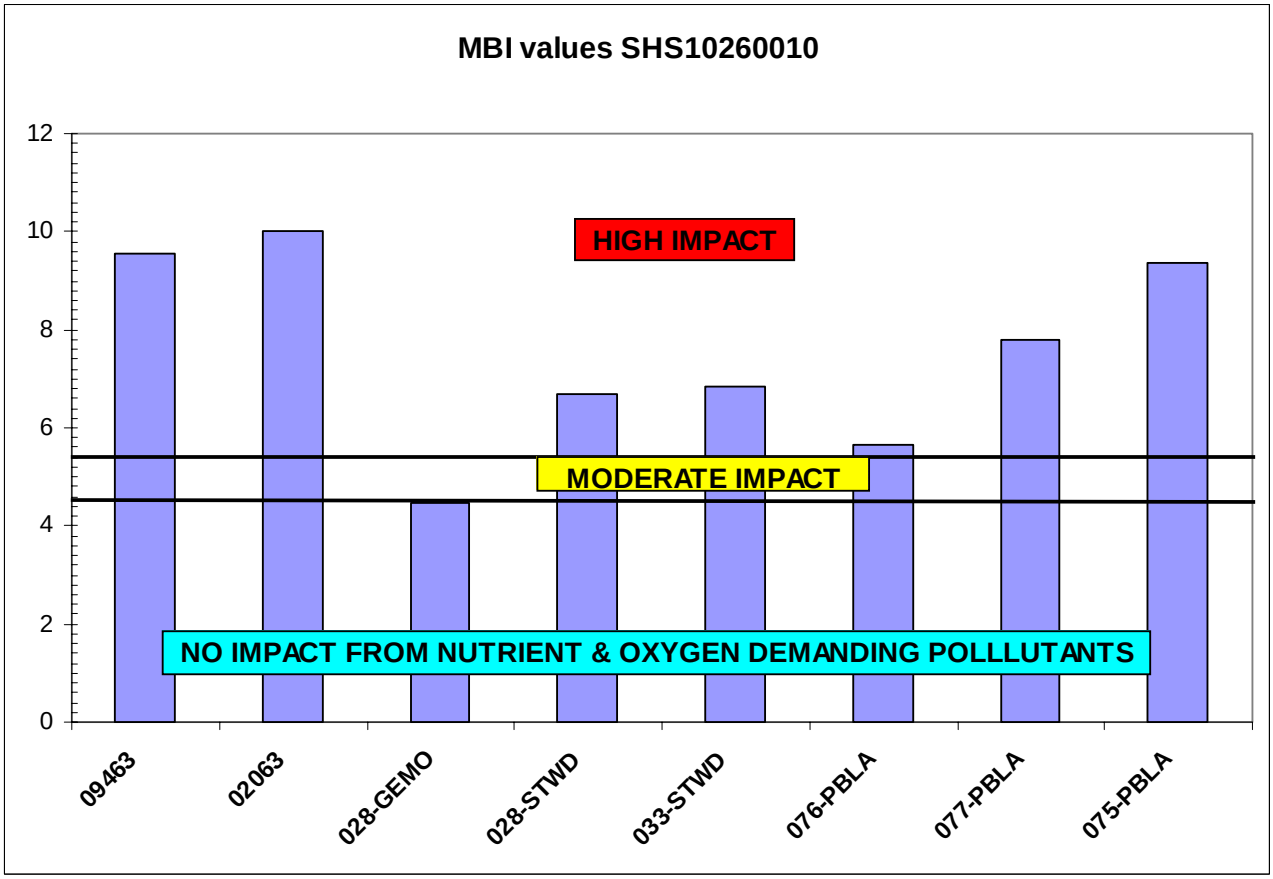


Figure 1. Graph of MBI values for HUC 10260010

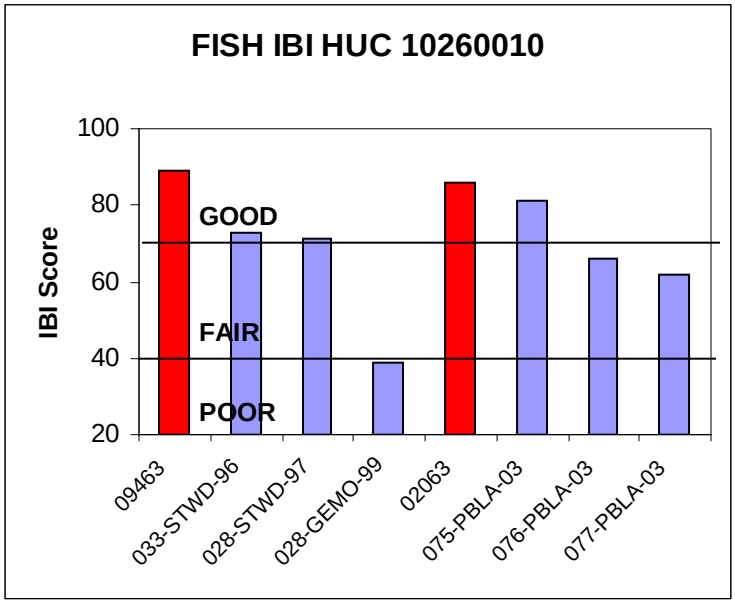
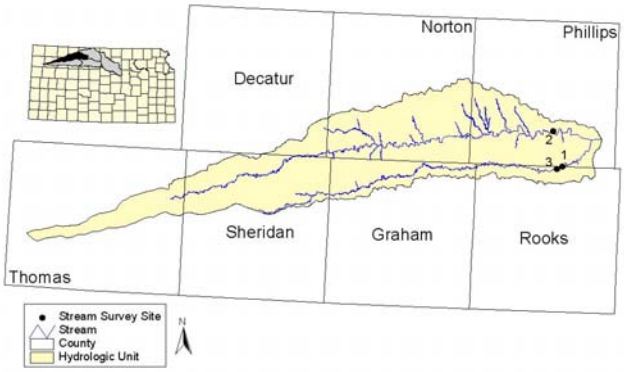


Figure 2. Graph of IBI values for HUC 10260010

Solomon River Basin

HUC 10260011

LOCATION



- This HUC consists of 3 sites (3 samples).
- Sites were surveyed between 1996-2000.

BIOLOGICAL HIGHLIGHTS

- 1 sample was not impacted by nutrient and oxygen demanding pollutants, 2 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 6.13, indicating high impact from nutrient and oxygen demanding pollutants.
- 20 species of fish were surveyed (see fish species collected, page 2)
- No mussel species were surveyed in this HUC

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Bow	RO	96	12	*	9.44	11
2	NF Solomon	PL	99	19	0.365	4.05	18
3	Bow	RO	00	12	*	8.17	9

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in good condition based on the information available at this time.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2.

Solomon River Basin
HUC 10260011

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	18	996	95	481	7.5	8.2	248	7	0.08	0	0.31
2	20	1030	38	499	6.7	9	131	45	0.04	1	0.32
3	20	1043	77	506	6	8.6	270	57	0.12	2.5	0.35

TDS = total dissolved solids

Fish Species Collected

black bullhead
bluegill
central stoneroller
channel catfish
common carp
creek chub
fathead minnow
flathead catfish
freshwater drum
gizzard shad
green sunfish
largemouth bass
logperch
orangespotted sunfish
orangethroat darter
plains killifish
red shiner
sand shiner
white crappie
white sucker

Mussel Species Collected

No mussels were collected in this HUC

Solomon River Basin
HUC 10260011

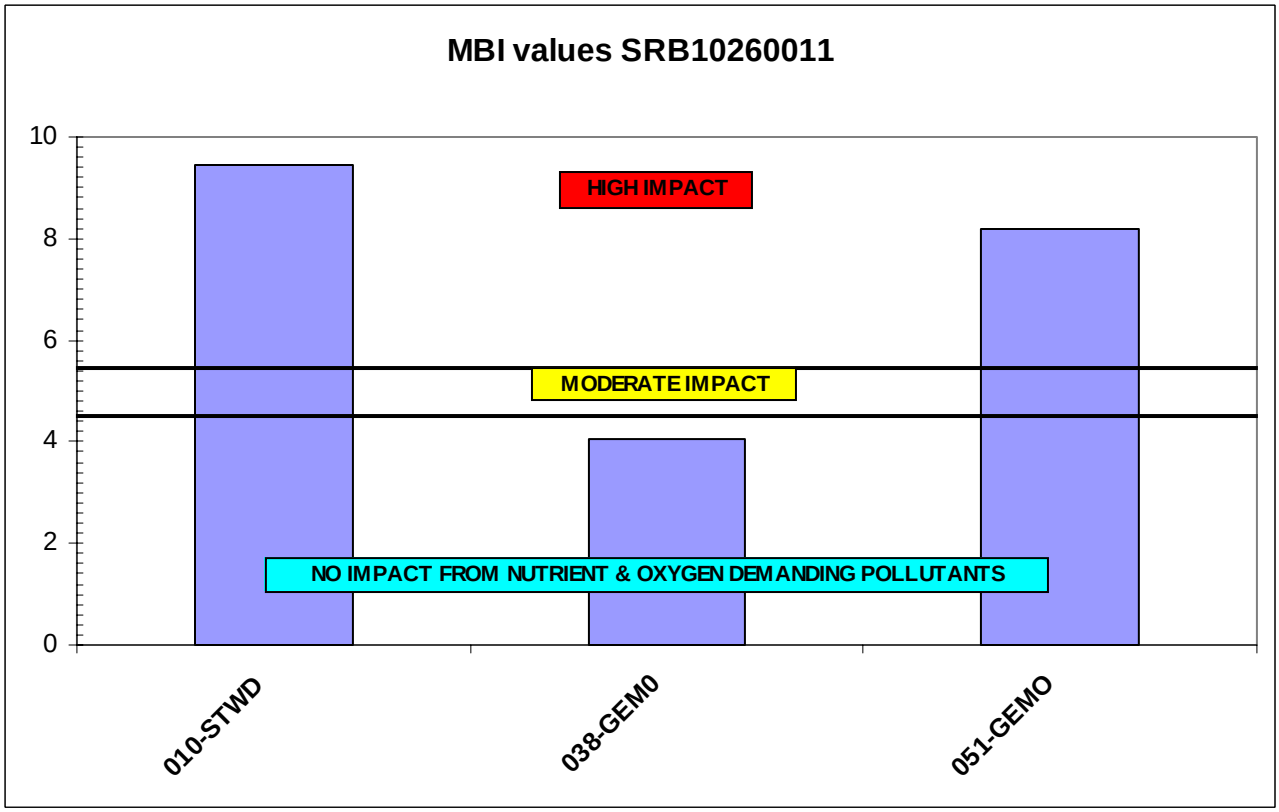


Figure 1. Graph of MBI values for HUC 10260011

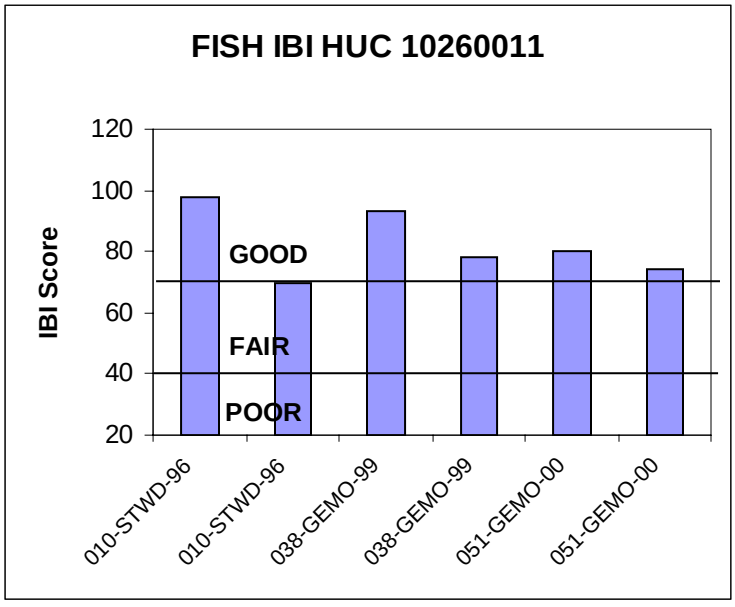
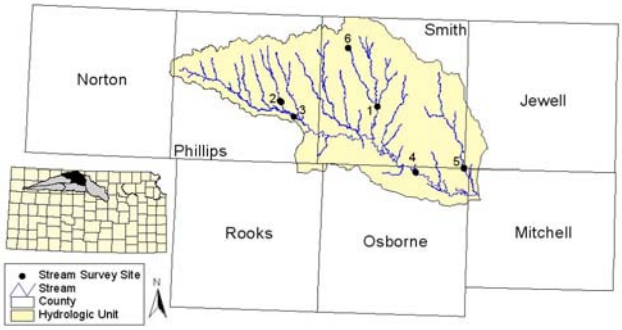


Figure 2. Graph of IBI values for HUC 10260011

Solomon River Basin

HUC 10260012

LOCATION



- This HUC consists of 6 sites (8 samples).
- Sites were surveyed between 1994-2001.

BIOLOGICAL HIGHLIGHTS

- 2 samples were moderately impacted by nutrient and oxygen demanding pollutants, 6 samples showed high impact (see figure 1).
- The overall MBI value for this HUC was 9, indicating high impact from nutrient and oxygen demanding pollutants.
- 18 species of fish were surveyed (see fish species collected, page 2)
- 5 mussel species were surveyed (see mussel species collected, page 2)
    - SINC species – Wabash pigtoe

Image 1. Deer Creek, Phillips Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Beaver	SM	96	3	*	7.25	10
2	Big	PL	94	5	0	10.19	4
2			00	14	0.024	9.92	5
3	Deer	PL	97	11	0.638	5.01	8
4	NF Solomon	OB	99	19	0.719	4.64	10
5	Oak	SM	94	3	*	6	9
6	W Beaver	SM	95	6	0.007	10.84	2
6			01	12	0	10.72	2

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Efforts should be utilized to maintain the population of the SINC mussel species – Wabash pigtoe.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2.

Solomon River Basin
HUC 10260012

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	20	1421	74	693	5.6	8.15	306	5.5	0.07	0	0.86
2	23	499	25	250	8	7.7	353	105	0.55	1.9	0.45
2	20	2000	26	1010	5	7.26	NA	NA	NA	NA	NA
3	22	1234	63	601	NA	8.11	299	19	0.06	1.9	0.31
4	23	1108	45	538	7.3	9	163	89	0.05	0.9	0.51
5	19	1290	78	650	4.2	7.1	NA	NA	NA	NA	NA
6	20	NA	15	NA	10.3	8.3	407	167	0.36	5.6	0.19
6	18	1560	11	790	4.8	7.4	NA	NA	NA	NA	NA

TDS = total dissolved solids

Fish Species Collected

black bullhead
bluegill
central stoneroller
channel catfish
common carp
creek chub
fathead minnow
flathead catfish
freshwater drum
gizzard shad
green sunfish
largemouth bass
orangespotted sunfish
red shiner
river carpsucker
sand shiner
suckermouth minnow
yellow bullhead

Mussel Species Collected

fingernail clam
fragile papershell
mapleleaf
pink papershell
Wabash pigtoe

Solomon River Basin
HUC 10260012

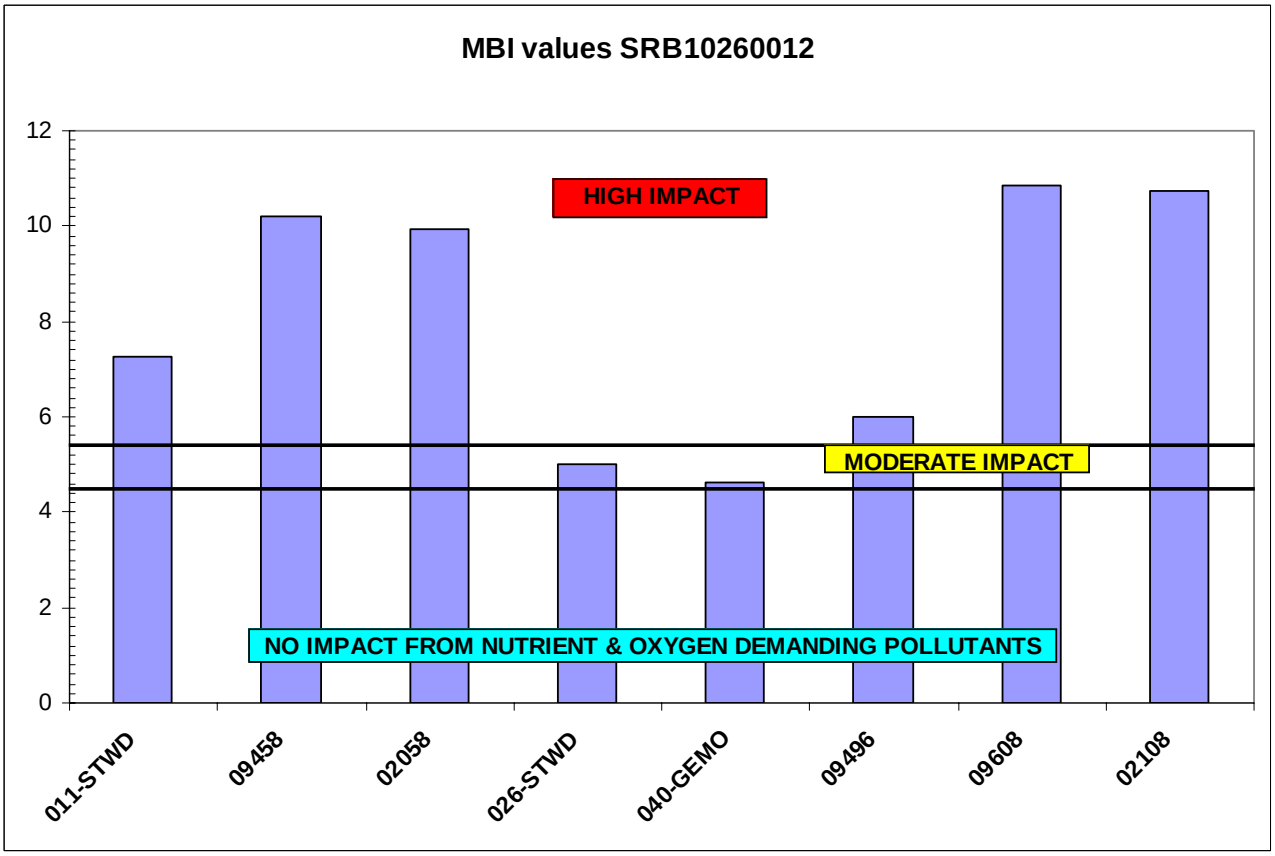


Figure 1. Graph of MBI values for HUC 10260012

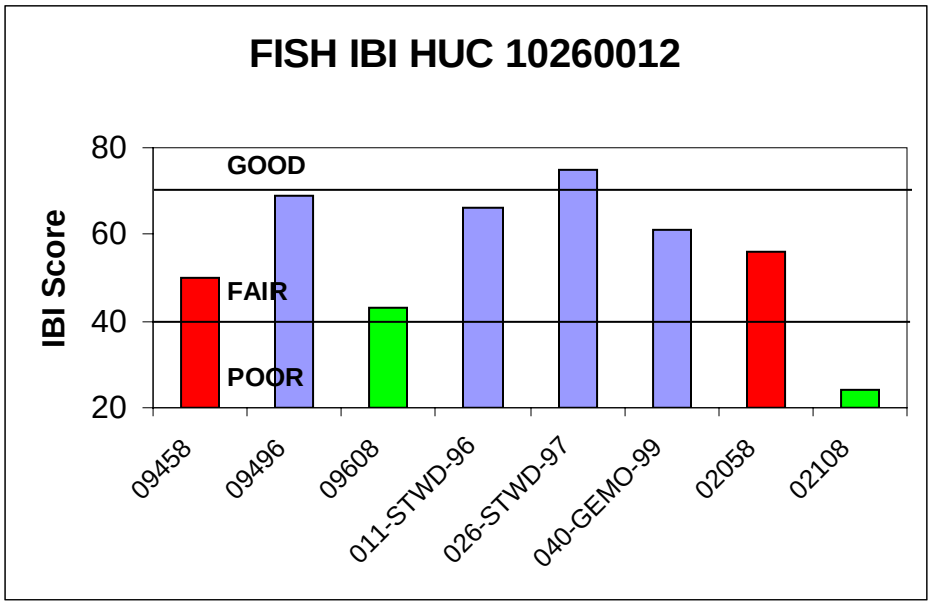
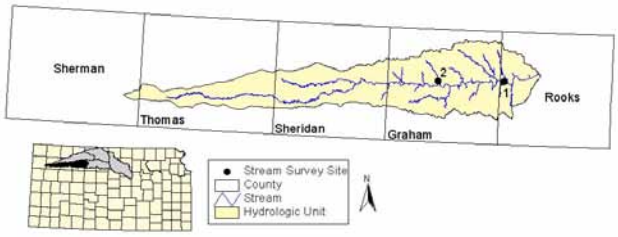


Figure 2. Graph of IBI values for HUC 10260012

Solomon River Basin
HUC 10260013

LOCATION



- This HUC consists of 2sites (4samples).
- Sites were surveyed between 19952001

BIOLOGICAL HIGHLIGHTS

- 3 samples from this HUC were moderately impacted by nutrient and oxygen demanding pollutants, 1 sample was highly impacted (see figure 1).
- The overall MBI value for this HUC was 4.9, indicating this area has been moderately impacted by nutrient and oxygen demanding pollutants.
- 21 species of fish were surveyed (see fish species collected, page 2)
- 1 species of freshwater mussel was surveyed, (see mussel species collected, page 2)

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	SF Solomon	RO	00	17	0.741	4.67	18
2	Sand	GH	95	10	*	6.15	14
2			95	8	*	4.73	14
2			01	21	0.761	4.69	10

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2.

Solomon River Basin
HUC 10260013

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	22	1350	18	657	5.7	NA	198	90	0.04	1	0.1
2	20	819	24	4.52	7.4	8.5	254	60	0.07	2	0.13
2	18	1140	43	580	5.6	7.53	NA	NA	NA	NA	NA
2	22	1020	45	510	4.8	7.76	NA	NA	NA	NA	NA

TDS = total dissolved solids

Fish Species Collected

black bullhead
bluegill
bluntnose minnow
central stoneroller
channel catfish
common carp
creek chub
fathead minnow
flathead catfish
gizzard shad
golden redhorse
green sunfish
largemouth bass
orangespotted sunfish
orangethroat darter
plains killifish
red shiner
sand shiner
smallmouth buffalo
western mosquitofish
white sucker

Mussel Species Collected

fingernail clam

Solomon River Basin
HUC 10260013

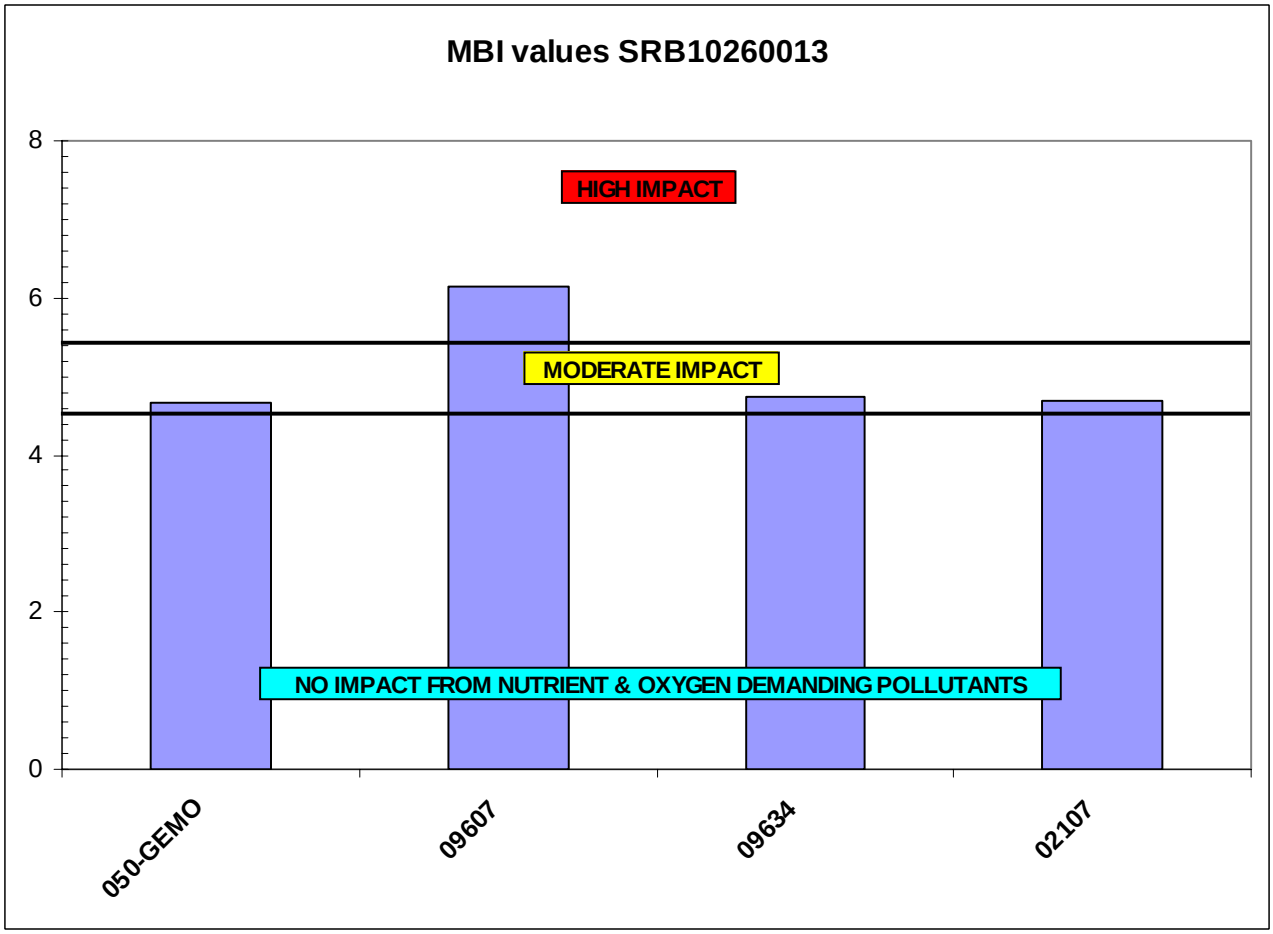


Figure 1. Graph of MBI values for HUC 10260013

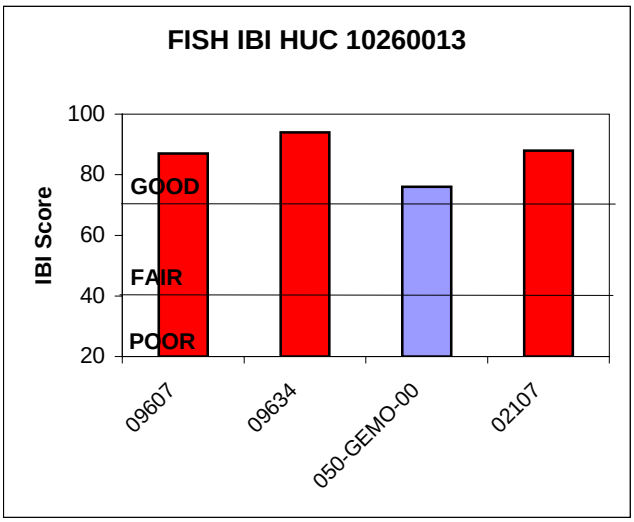
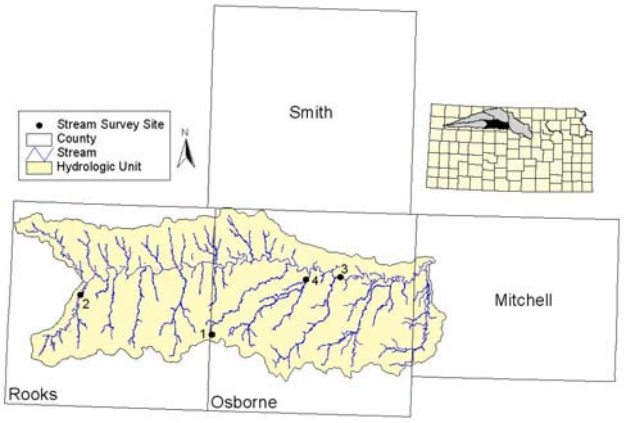


Figure 2. Graph of IBI values for HUC 10260013

Solomon River Basin

HUC 10260014

LOCATION



- This HUC consists of 4 sites (6 samples).
- Sites were surveyed between 1994-2001.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Medicine Trib	OB	94	2	*	11	1
1			00	11	*	7.09	4
2	Lost	RO	94	3	*	10.01	9
2			00	9	0.157	8.15	10
3	SF Solomon	OB	00	10	0.19	5.86	14
4	Kill	OB	01	16	0.026	8.75	10

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

BIOLOGICAL HIGHLIGHTS

- All 5 samples within this HUC have been highly impacted by nutrient and oxygen demanding pollutants. The overall MBI value for this HUC is 7.99 (see figure 1).
- 21 species of fish were surveyed in this area (see fish species collected, page 2)
- 2 species of freshwater mussels were surveyed (see mussel species collected, page 2)

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2.

Solomon River Basin
HUC 10260014

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	26	999	3	500	10.3	7.35	NA	NA	NA	NA	NA
2	16	2640	33	1623	7	7.8	258	349	0.06	1.2	0.07
2	22	333	29	166	5	7.5	NA	NA	NA	NA	NA
3	26	1479	46	725	4.7	8.4	173	103	0.05	0	0.08
4	28	NA	87	NA	4.2	8.4	228	140	0.15	3.7	0.15

TDS = total dissolved solids

Fish Species Collected

bigmouth buffalo
black bullhead
bluegill
central stoneroller
channel catfish
common carp
creek chub
fathead minnow
flathead catfish
freshwater drum
gizzard shad
green sunfish
largemouth bass
orangespotted sunfish
orangethroat darter
red shiner
river carpsucker
sand shiner
suckermouth minnow
western mosquitofish
white sucker

Mussel Species Collected

fragile papershell
pink papershell

Solomon River Basin
HUC 10260014

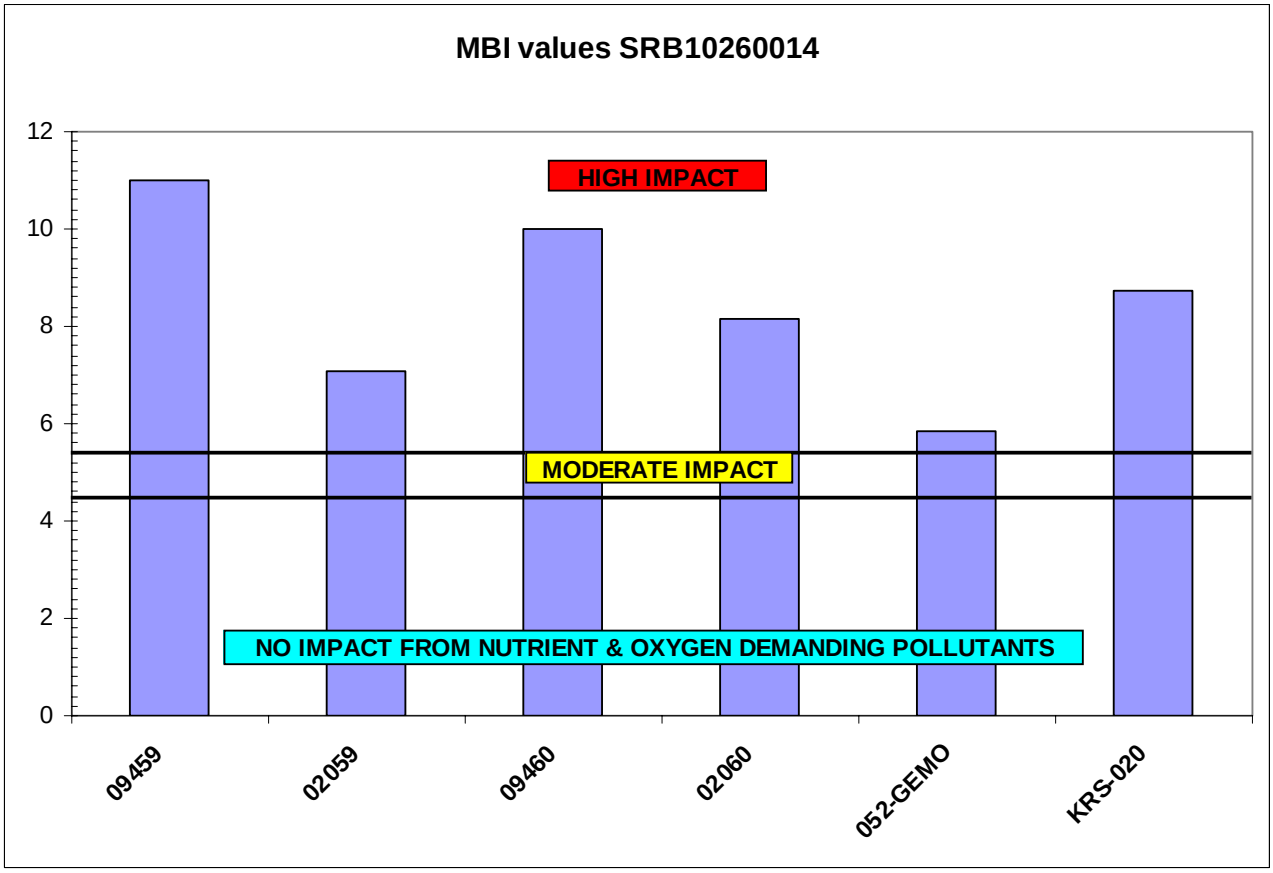


Figure 1. Graph of MBI values for HUC 10260014

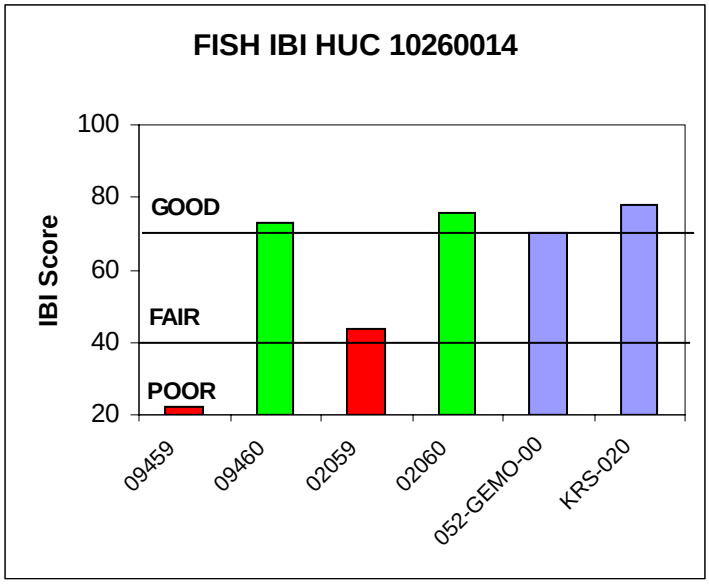
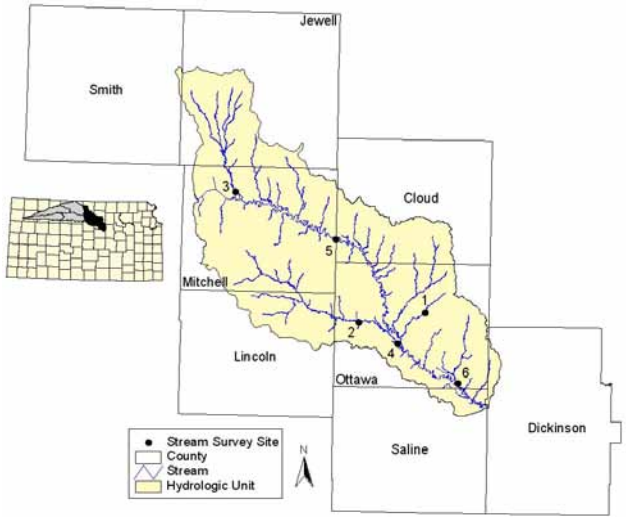


Figure 2. Graph of IBI values of HUC 10260014

Solomon River Basin
HUC 10260015

LOCATION



- This HUC consists of 6sites (7 samples).
- Sites were surveyed between 1999-2000

BIOLOGICAL HIGHLIGHTS

- 2 samples within this HUC were moderately impacted by nutrient and oxygen demanding pollutants, 5 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 7.36, indicating high impact from nutrient and oxygen demanding pollutants.
- 26 species of fish were surveyed (see fish species collected, page 2)
- 9 species of freshwater mussels were surveyed (see mussel species collected, page 2)
    - SINC – yellow sandshell

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Lindsey	OT	94	17	0.364	7.44	9
1			00	14	0.169	8.09	6
2	Salt	OT	99	3	*	5.17	9
3	Limestone	MC	97	8	*	6.98	13
4	Salt	OT	97	7	*	4.82	5
5	Solomon	CD	00	16	0.278	6.79	16
6	Solomon	OT	00	9	0.073	7.44	8

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2.

Image 1. Salt Creek, Ottawa Co.

Solomon River Basin
HUC 10260015

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	19	276	13	152	4.1	7.7	125	13	0.06	1.7	0.08
1	19	300	60	160	3.8	7.23	NA	NA	NA	NA	NA
2	22	1899	139	936	5.5	1.2	345	258	0.19	8.7	1.02
3	23	1036	39	506	NA	7.96	164	10	0.04	0.6	0.2
4	25	2140	155	1040	4.2	7.97	129	40	0.13	9.8	0.15
5	22	1808	44	888	5.4	NA	204	243	0.04	0.5	0.04
6	23	1916	153	946	5.8	NA	261	315	0.11	0.3	0.41

TDS = total dissolved solids

Fish Species Collected

bigmouth buffalo
black bullhead
bluegill
bullhead minnow
central stoneroller
channel catfish
common carp
creek chub
fathead minnow
flathead catfish
freshwater drum
gizzard shad
golden shiner
green sunfish
largemouth bass
longnose gar
orangespotted sunfish
red shiner
river carpsucker
sand shiner
shortnose gar
stonecat
suckermouth minnow
walleye
white bass
white crappie

Mussel Species Collected

Asian clam
fragile papershell
giant floater
mapleleaf
pimpleback
pink papershell
pondhorn
white heelsplitter
yellow sandshell

Solomon River Basin
HUC 10260015

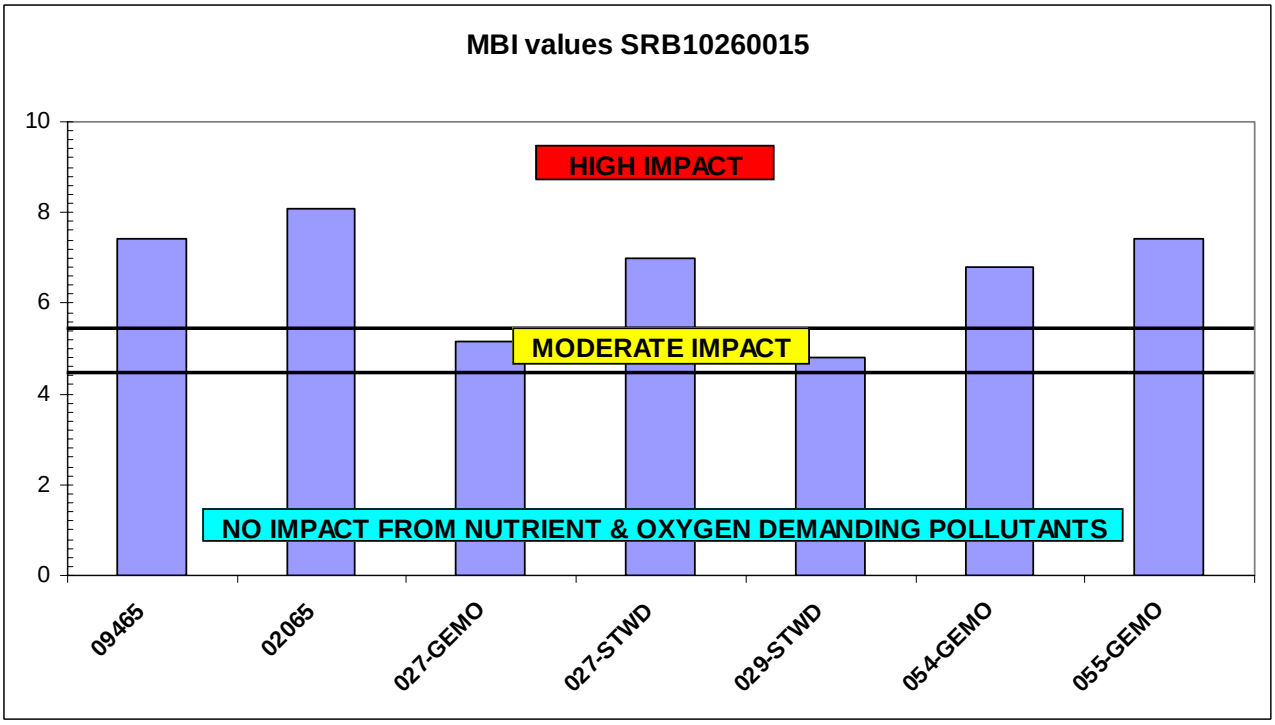


Figure 1. Graph of MBI values for HUC 10260015

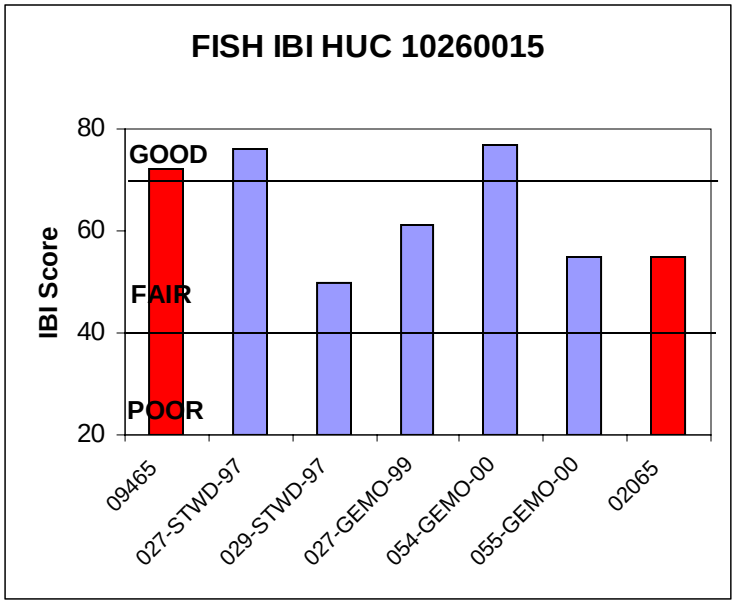


Figure 2. Graph of IBI values of HUC 10260015

Upper Arkansas River Basin
HUC 11020009

LOCATION

- This HUC consists of 1 site (2 samples).
- Sites were surveyed between 2002-2003.

BIOLOGICAL HIGHLIGHTS

- The MBI value for this HUC was 3.95, indicating no impact from nutrient and oxygen demanding pollutants (see figure 1).
- 20 species of fish were surveyed (see fish species collected, page 2)
    - Colorado state endangered – suckermouth minnow
- 1 species of freshwater mussels were surveyed (see mussel species collected, page 2)

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Cheyenne	HM	02	4	*	3.95	5
1			03	1	*		5

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair to good condition based on the information available at this time.
- The main water source for this HUC is from the Amity Canal in Colorado. Cheyenne creek flows from and then back into Colorado.
- This stream often goes dry.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

Image 1. Cheyenne Creek, Hamilton Co., 2002

Image 2. Cheyenne Creek, Hamilton Co. 2003

Upper Arkansas River Basin
HUC 11020009

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	31	3810	24	2150	6.4	7.8	136	194	0.04	1.2	0.09
1	21	3140	16	1600	5.6	8.6	118	141	0.11	3	0.07

TDS = total dissolved solids

Fish Species Collected

central stoneroller
fathead minnow
plains killifish
red shiner
sand shiner
suckermouth minnow

Mussel Species Collected

Asian clam

Upper Arkansas River Basin
HUC 11020009

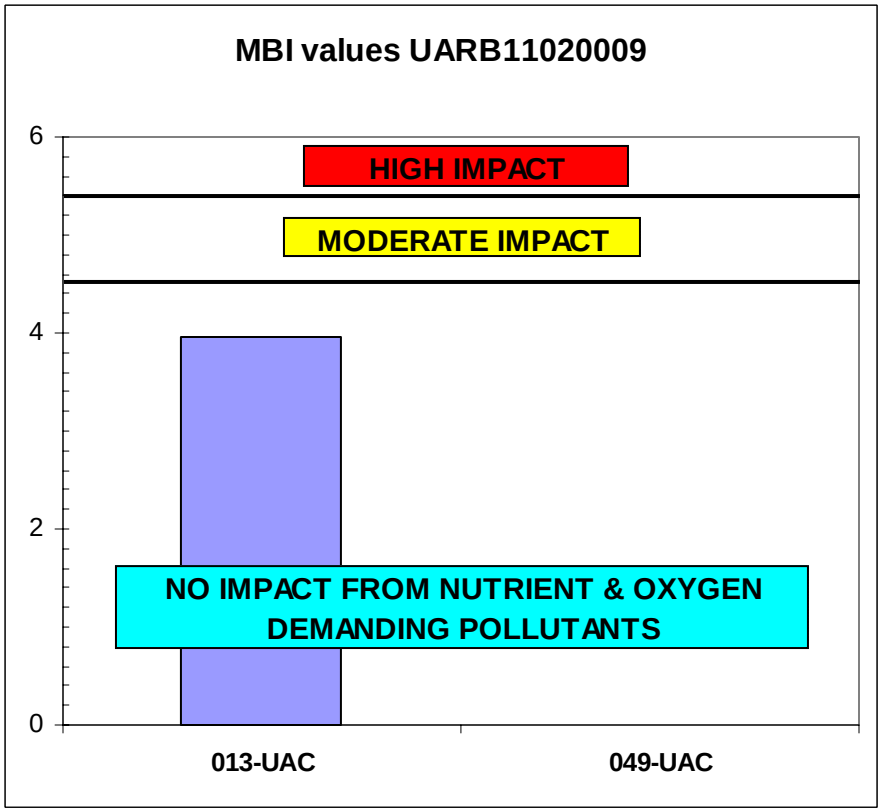


Figure 1. Graph of MBI values for HUC 11020009

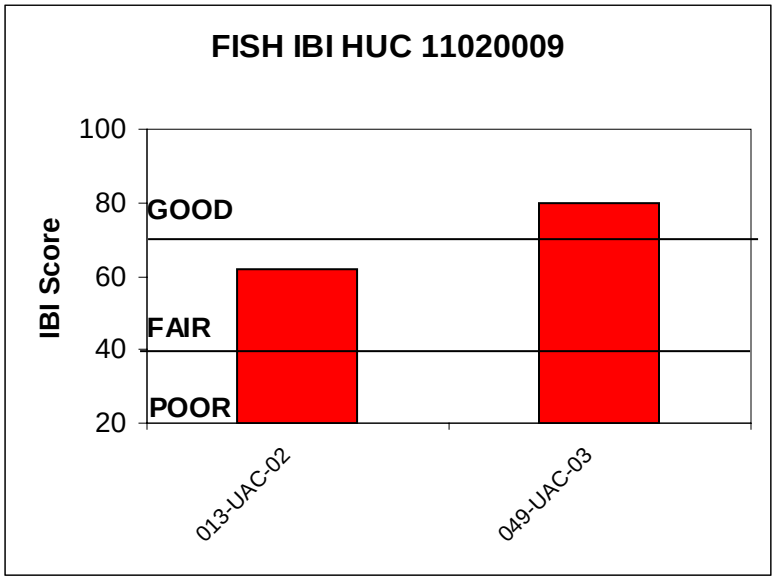
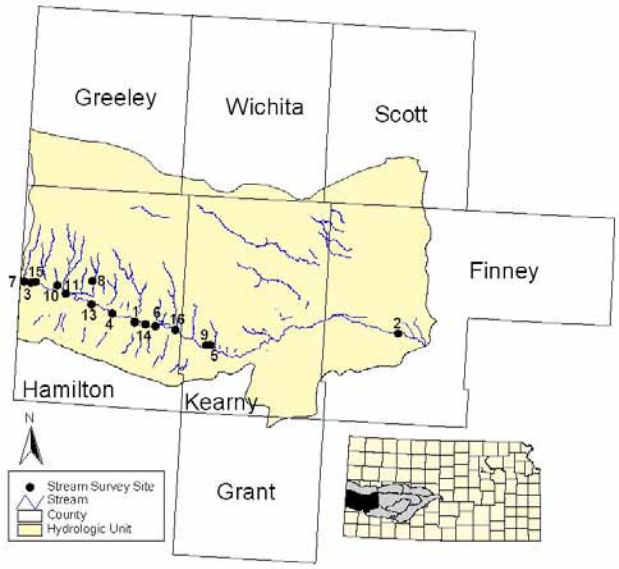


Figure 2. Graph of IBI values of HUC 11020009

Upper Arkansas River Basin
HUC 11030001

LOCATION



- This HUC consists of 15 sites (18 samples).
- Sites were surveyed between 1997-2004.

BIOLOGICAL HIGHLIGHTS

- 2 samples within this area showed no impact from nutrient and oxygen demanding pollutants, 4 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC is 7.21, indicating high impact by nutrient and oxygen and demanding pollutants.
- 20 species of fish were surveyed (see fish species collected, page 2)
- State threatened species – flathead chub
  - ° First one collected in 30 years
- 1 species of freshwater mussel was surveyed (see mussel species collected, page 2)

Image 1. (above) Arkansas River, Kearney Co.
Image 2. (above right) Amazon Ditch, Kearney Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Arkansas	HM	97	4	*	9.58	8
1			04				15
2	Arkansas	FI	99	11	0.454	6.83	14
3	Arkansas	HM	00	5	*	8.21	7
4	Arkansas	HM	00	8	*	7.56	9
5	Arkansas	KE	25				11
6	Arkansas	HM	25				13
6			03	3	*	4.38	12
7	Arkansas	HM	02				14
7			04				10
8	Plum	HM	03	3		4	
9	Arkansas	KE	03				11
10	Arkansas	HM	03				10
11	Arkansas	HM	02				9
12	Arkansas	HM	03				10
13	Arkansas	HM	04				8
14	Arkansas	HM	04				12
15	Arkansas	HM	04				9

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair to good condition based on the information available at this time.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- Amazon Ditch contributes to the dewatering of the Arkansas River in the HUC.
- Perennial flow is from stateline to Lakin
- Very high conductivity readings for this HUC
- A water quality table is presented on page 2

Upper Arkansas River Basin
HUC 11030001

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	18	3520	141	1780	11.4	8.1	312	16.8	0.05	5.3	0.06
1	21	2580	72	1300	6.3	7.8	192	91	0.06	2.6	0.02
2	16	3300	24	1650	5.5	9	154	98	0.26	0	0.05
3	19	3580	28	1850	4.5	8.4	21.1	226	1.6	0.03	0.16
4	22	3710	48	1880	5.7	8.4	208	108	0.05	2.2	0.09
5	21	3740	11	1890	6.3	7.9	180	154	0.02	2.1	0.02
6	20	3280	6	1690	5.8	7.7	193	135	0	1.9	0.02
6	18	3470	11	2000	6.6	7.9	204	119	0.05	1.4	0.02
7	19	3910	22	1970	5.3	7.2	240	196	0.04	2.1	0.04
7	15	3950	11	2000	8.2	8.4	266	500	0.05	1.5	0
8	20	4160	7	2410	2.3	6.7	285	422	0	0.07	0.03
9	21	4170	8	2410	5.7	8	179	163	0	2.2	0
10	20	5550	6	3290	6.1	7.1	376	219	0.01	6.9	0.05
11	17	4890	2	2890	4.3	7.1	263	185	0.01	1.4	0.01
12	20	4720	27	2790	4.8	7.2	250	208	0.04	0.2	0.01
13	14	3650	7	1840	6.9	8.5	120	500	0	2	0
14	22	2700	89	1370	6.3	8	162	122	0.02	2.9	0.04
15	24	2990	65	1510	7.1	8	165	134	0.04	0.8	0.01

TDS = total dissolved solids

Fish Species Collected

black bullhead
black crappie
central stoneroller
channel catfish
common carp
fathead minnow
flathead chub
freshwater drum
gizzard shad
green sunfish
orangespotted sunfish
plains killifish
red shiner
river carpsucker
sand shiner
suckermouth minnow
western mosquitofish
white bass
white sucker
yellow bullhead

Mussel Species Collected

Asian clam

Upper Arkansas River Basin
HUC 11030001

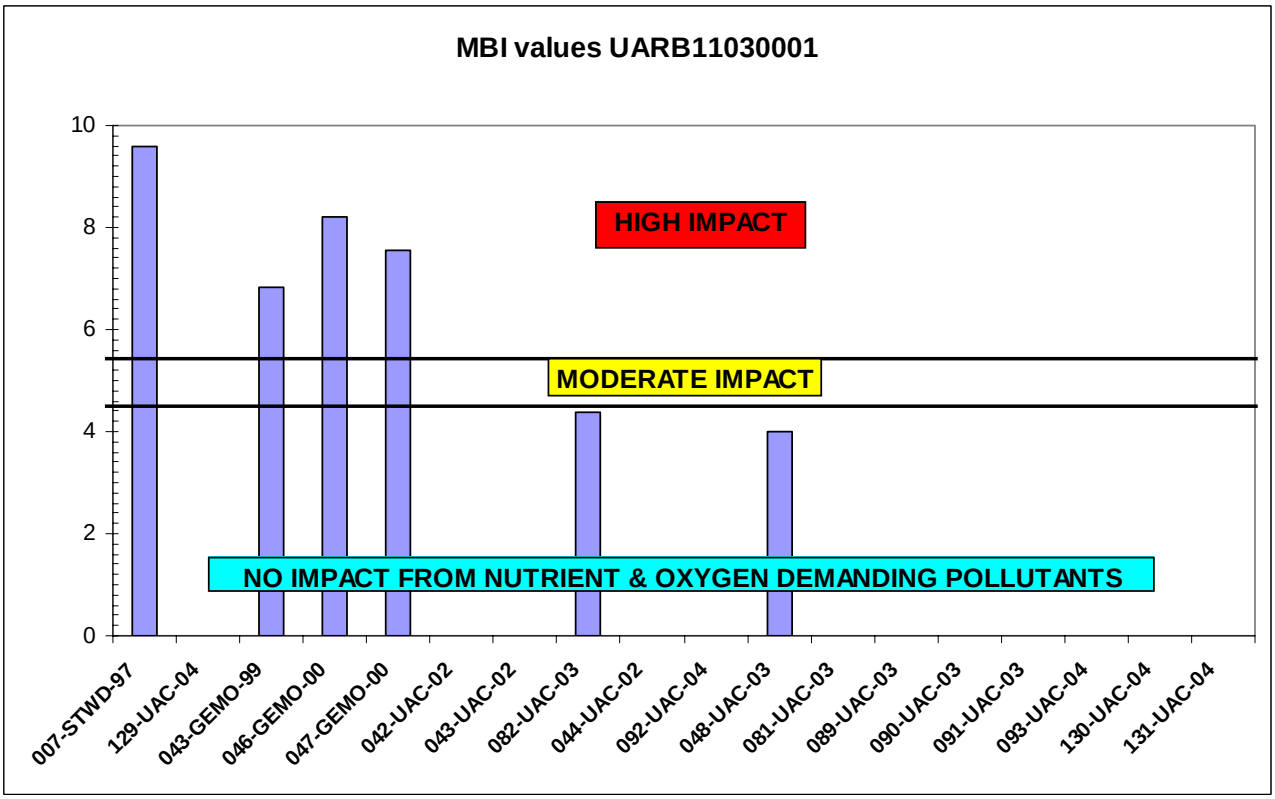


Figure 1. Graph of MBI values for HUC 11030001

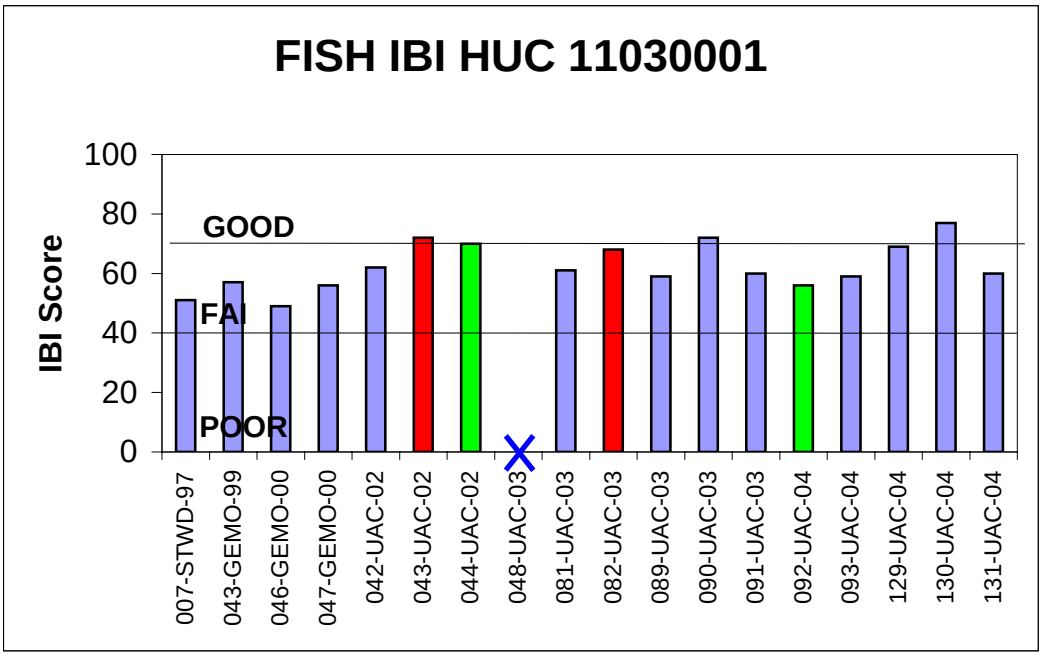
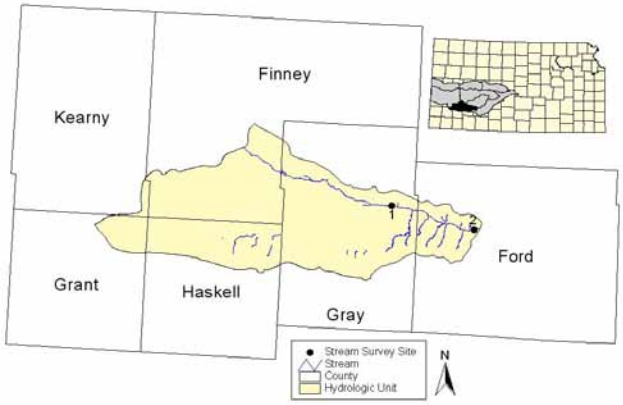


Figure 2. Graph of IBI values for HUC 11030001

Upper Arkansas River Basin
HUC 11030003

LOCATION



- This HUC consists of 2 sites (2 samples).
- Sites were surveyed between 1997-1999.

BIOLOGICAL HIGHLIGHTS

- The 2 samples available from this area both were highly impacted by nutrient and oxygen demanding pollutants (see figure 1).
- The overall MBI value for this HUC was 7.23, indicating the area is highly impacted by nutrient and oxygen demanding pollutants.
- 15 species of fish were surveyed (see fish species collected, page 2)
- no freshwater mussels were collected in this HUC.

Image 1. Arkansas River, Gray Co., 1997

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Arkansas	GY	97	7	*	9.65	7
2	Arkansas	FO	99	11	*	6.42	13

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- Arkansas River is usually dry throughout this HUC
- A water quality table is presented on page 2

Upper Arkansas River Basin
HUC 11030003

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	16	3570	113	1810	12.1	8.32	231	18.3	0.02	1.6	0.07
2	23	2690	14	1340	5.1	8.2	147	53	0.01	0.5	0.09

TDS = total dissolved solids

Fish Species Collected

black bullhead
channel catfish
common carp
fathead minnow
gizzard shad
green sunfish
largemouth bass
orangespotted sunfish
plains killifish
red shiner
river carpsucker
sand shiner
suckermouth minnow
western mosquitofish
yellow bullhead

Mussel Species Collected

No mussels were collected in this HUC

Upper Arkansas River Basin
HUC 11030003

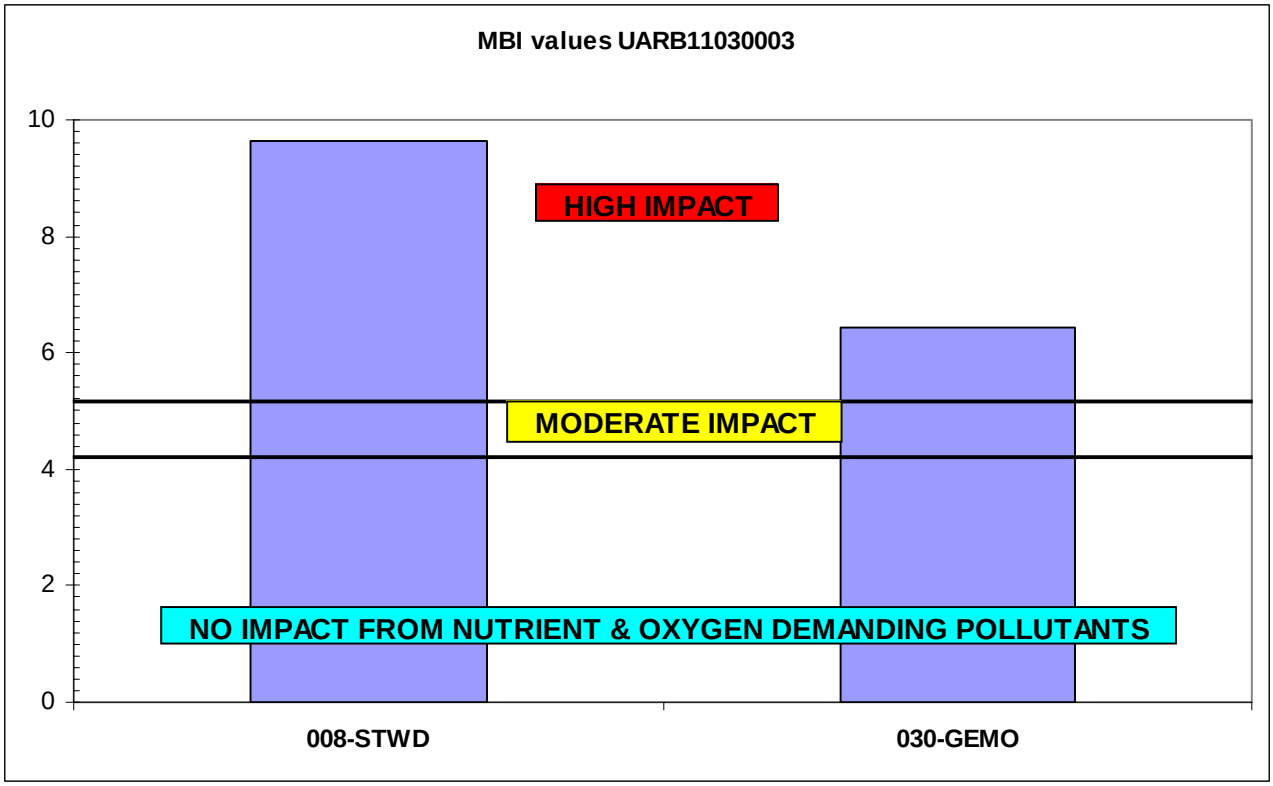


Figure 1. Graph of MBI values for HUC 11030003

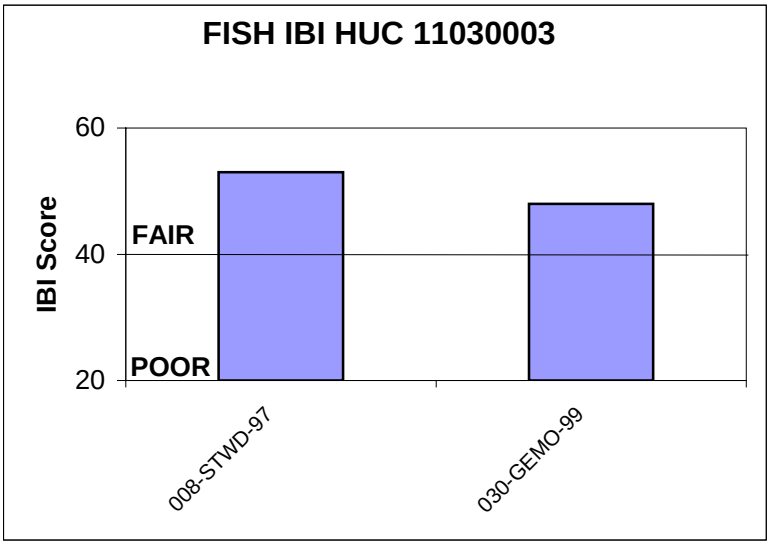
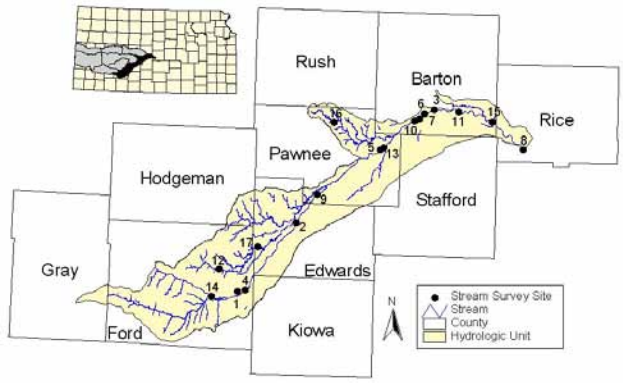


Figure 2. Graph of IBI values for HUC 11030003

Upper Arkansas River Basin
HUC 11030004

LOCATION



- This HUC consists of 17 sites (18 samples).
- Sites were surveyed between 1997-2004.

BIOLOGICAL HIGHLIGHTS

- 5 samples showed no impact by nutrient and oxygen demanding pollutants, 1 sample was moderately impacted, 4 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 5.34 indicating moderate impact by nutrient and oxygen demanding pollutants.
- 28 species of fish were surveyed (see fish species collected, page 2)
    - Threatened – Arkansas darter
- 8 species of freshwater mussels were surveyed (see mussel species collected, page 3)


Image 1. Arkansas River, Ford Co.


Image 2. Arkansas River, Rice Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Arkansas	FO	97	13	0.397	6.08	8
2	Arkansas	ED	99	21	0.727	4.89	12
3	Arkansas	BT	99	13	*	5.49	12
4	Arkansas	FO	02	14	0.024	7.55	4
5	Arkansas	PN	02	6	*	3.77	10
6	Arkansas	BT	02				10
7	Arkansas	BT	02				16
8	Arkansas	RC	02				18
8			03	8	0.857	4.31	16
9	Arkansas	PN	03	3	*	3.5	12
10	Arkansas	BT	03				10
11	Arkansas	BT	03	6	*	4.23	9
12	Coon	FO	04				8
13	Arkansas	PN	04				16
14	Arkansas	FO	04				7
15	Arkansas	BT	04				19
16	Ash	PN	02	7	*	5.73	4
17	Coon	ED	02	5	0.107	4.04	10

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair to good condition based on the information available at this time.
- Protection efforts should be utilized to maintain the Arkansas darter population.
- Intermittent flow throughout this HUC with perennial flow beginning about Great Bend
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

Upper Arkansas River Basin
HUC 11030004

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	24	2630	24	1360	5.2	8.04	152	6.7	0.02	1.3	0.02
2	19	2640	68	1310	9.4	8.8	180	154	0.21	1.8	0.02
3	20	2370	69	1180	7.5	9	293	88	0.01	2.4	0.12
4	23	861	10	411	3	7.5	264	85	0.01	1.4	0.1
5	21	1547	14	762	1.9	7.3	246	124	0.37	1.1	0.18
6	24	744	4	360	3.5	7.4	282	123	0.09	6.7	0.01
7	22	856	4	409	4.2	7.6	198	76	0.05	5.1	0.06
8	24	2110	7	1050	4.6	7.7	230	540	0.02	2.1	0.03
8	24	2630	5	1470	5	7.3	204	564	0.55	2	0.04
9	21	1183	12	640	1.5	7.5	227	32	0.09	0.8	0.09
10	18	721	6	390	2.4	7.3	196	13	0.02	9.2	0.26
11	22	1514	5	830	5	7.2	215	130	0.01	1	0.05
12	22	825	22	396	2.5	7.8	199	150	0.55	1.1	0.22
13	20	899	35	432	5.1	8.1	155	61	0.05	0.7	0
14	22	1776	17	876	2.2	7.3	253	110	0.01	0.6	0.08
15	20	1090	9	529	5	7.6	183	142	0.04	2.4	0.14
16	11	1170	11	562	4.2	7.9	283	161	0.55	1.8	0.15
17	17	845	137	403	4.5	9.1	175	59	0.12	2.4	0.1

TDS = total dissolved solids

Fish Species Collected

Arkansas darter
black buffalo
black bullhead
black crappie
bluegill
bullhead minnow
central stoneroller
channel catfish
common carp
fathead minnow
flathead catfish
freshwater drum
gizzard shad
goldfish
green sunfish
largemouth bass
longear sunfish
orangespotted sunfish
plains killifish
quillback
red shiner
river carpsucker
sand shiner
shorthead redhorse
suckermouth minnow
western mosquitofish
white crappie
yellow bullhead

Upper Arkansas River Basin
HUC 11030004

Mussel Species Collected

Asian clam	paper pondshell
fragile papershell	pink papershell
giant floater	pondhorn
mapleleaf	white heelsplitter

Upper Arkansas River Basin
HUC 11030004

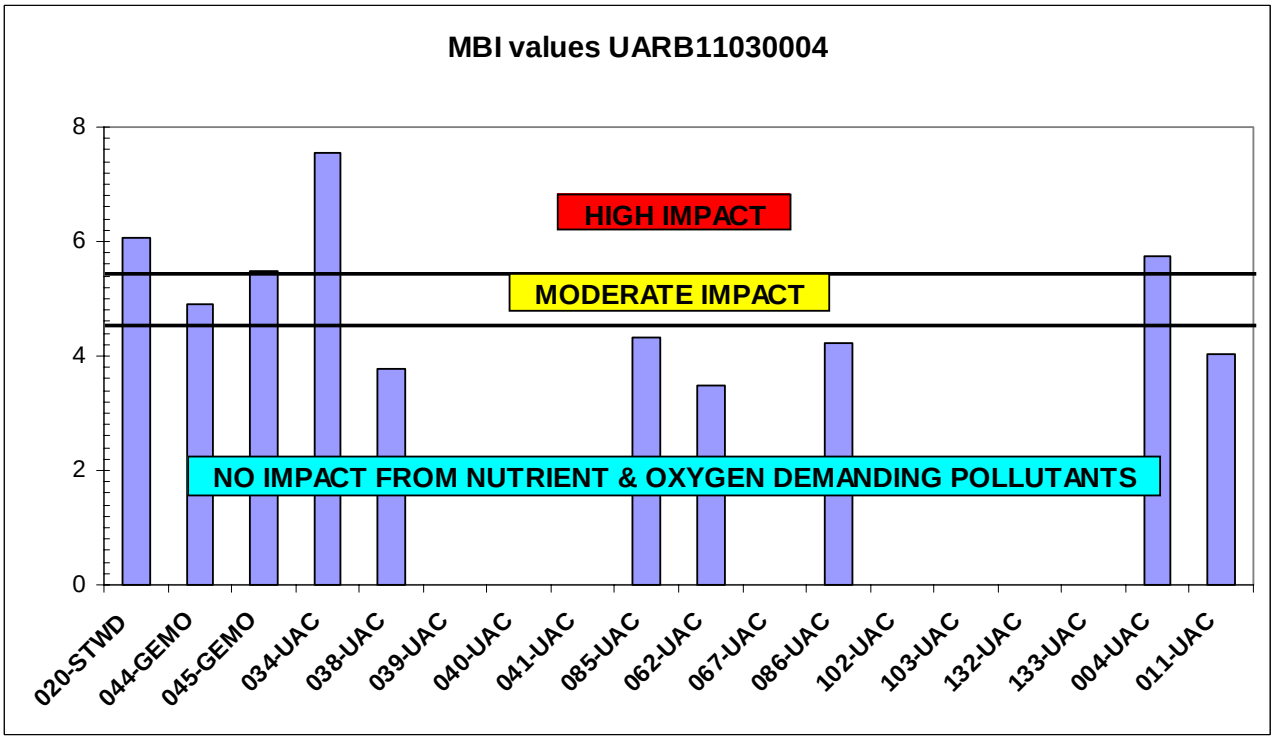


Figure 1. Graph of MBI values for HUC 11030004

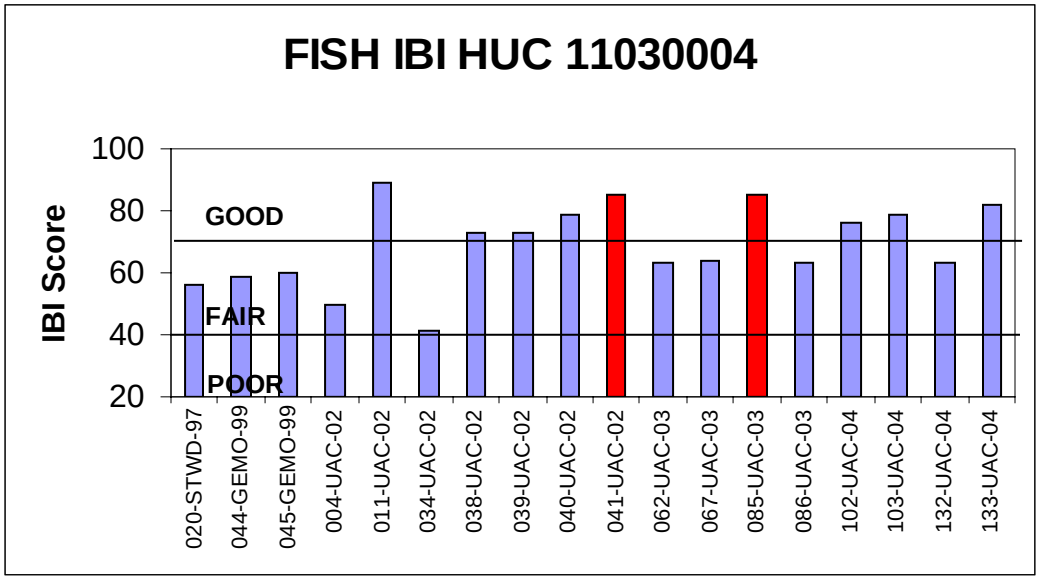
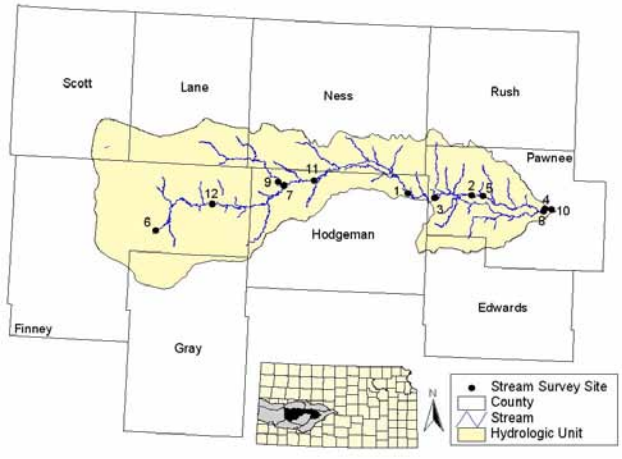


Figure 2. Graph of IBI values for HUC 11030004

Upper Arkansas River Basin
HUC 11030005

LOCATION



- This HUC consists of 12 sites (13 samples).
- Sites were surveyed between 1995-2004.

BIOLOGICAL HIGHLIGHTS

- 4 samples were not impacted by nutrient and oxygen demanding pollutants, 5 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 6.29, indicating high impact by nutrient and oxygen demanding pollutants.
- 23 species of fish were surveyed (see fish species collected, page 2)
- 11 species of freshwater mussels were surveyed (see mussel species collected, page 2)
    - SINC – yellow sandshell


Image 1 Pawnee River Hodgeman Co.


Image 2. Pawnee River, Pawnee Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Pawnee	HG	99	7	0.544	6.07	6
2	Pawnee	PN	99	8	*	6.03	10
3	Pawnee	PN	95	3	*	9.93	6
3			01	16	0.07	7.02	9
4	Pawnee	PN	02	5	*	4.36	13
5	Pawnee	PN	02				9
6	Pawnee	FI	03	4	*	4	
7	Pawnee	HG	03	6	0.044	3.99	2
8	Pawnee	PN	03				12
9	Hackberry	NS	04				4
10	Pawnee	PN	04				18
11	Pawnee	HG	02	4	*	4.5	11
12	Pawnee	FI	02	12	0.092	8.19	7

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- This HUC is usually dry with the occasional oasis of water. Permanent water begins below Larned State Hospital on the Pawnee River.
- Efforts should be utilized to maintain the SINC yellow sandshell.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2


Image 3. Hackberry Creek, Ness Co.

Upper Arkansas River Basin
HUC 11030005

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	24	775	190	372	3.8	0.7	106	51	0.29	14.3	0.26
2	21	887	191	429	4.7	2.5	179	72	0.21	14.8	0.76
3	25	NA	126	NA	2.8	8.6	85	90	0.19	3.3	0.21
3	23	660	134	340	3.9	7.7	NA	NA	NA	NA	NA
4	23	1230	69	599	3.7	7.7	240	85	0.08	1.9	0.09
5	21	755	29	364	1.9	7.5	237	72	0.02	1	0.18
6	19	1860	24	1030	2.3	7.7	343	42	0.05	0.4	0.44
7	19	1250	20	686	3.2	7.5	218	112	0.05	0.6	0.06
8	24	1474	92	802	5.5	7.2	215	65	0.16	4.2	0.02
9	22	1354	175	662	3.2	8.2	246	159	0.18	8.2	0.01
10	21	523	64	248	4.9	7.4	158	42	0.06	2.3	0.18
11	23	452	285	215	4.3	8	132	23	0.49	9.2	0.14
12	25	767	72	338	3.8	7.9	210	45	0.06	0.9	0.18

TDS = total dissolved solids

Fish Species Collected

black buffalo
black bullhead
bluegill
channel catfish
common carp
fathead minnow
flathead catfish
freshwater drum
gizzard shad
goldfish
green sunfish
largemouth bass
longear sunfish
orangespotted sunfish
quillback
red shiner
river carpsucker
sand shiner
spotted bass
suckermouth minnow
western mosquitofish
white crappie
yellow bullhead

Mussel Species Collected

fingernail clam
giant floater
lilliput
mapleleaf
paper pondshell
pimpleback
pink papershell
pondhorn
pondmussel
white heelsplitter
yellow sandshell

Upper Arkansas River Basin
HUC 11030005

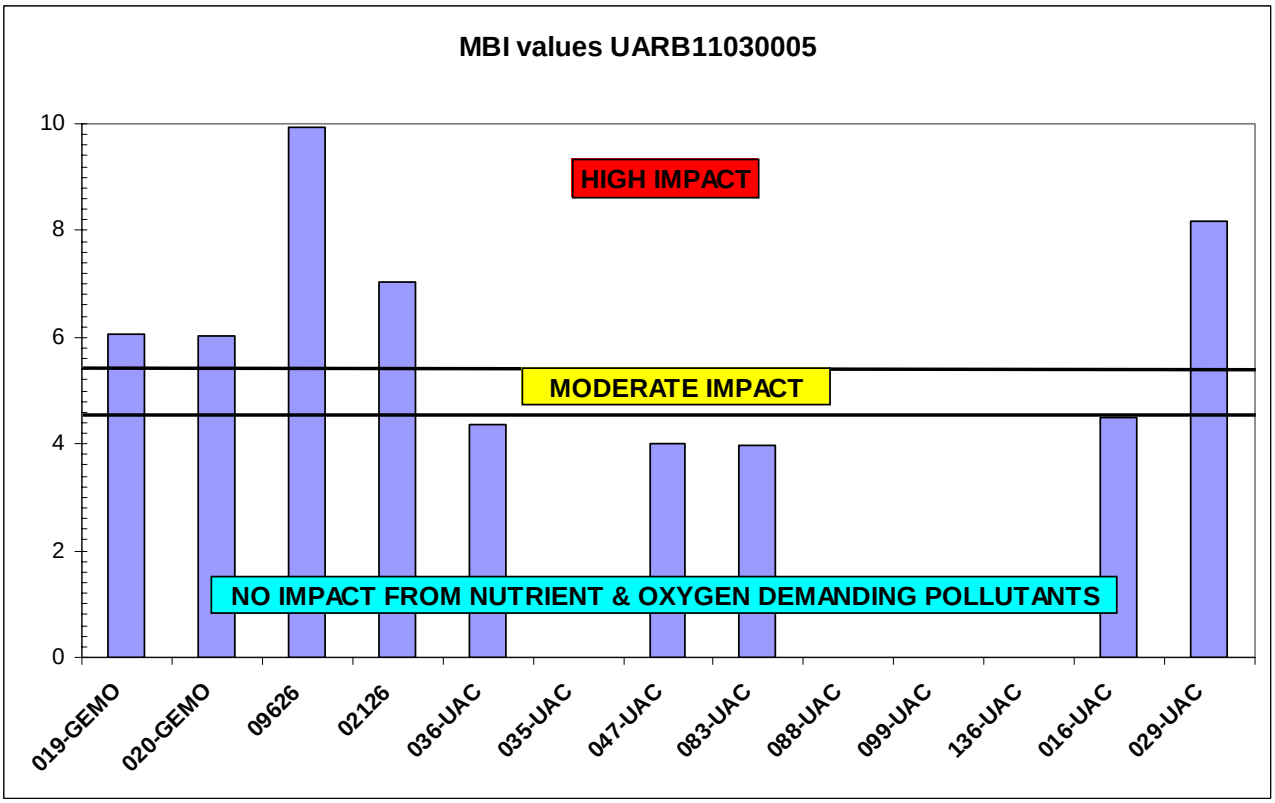


Figure 1. Graph of MBI values for HUC 11030005

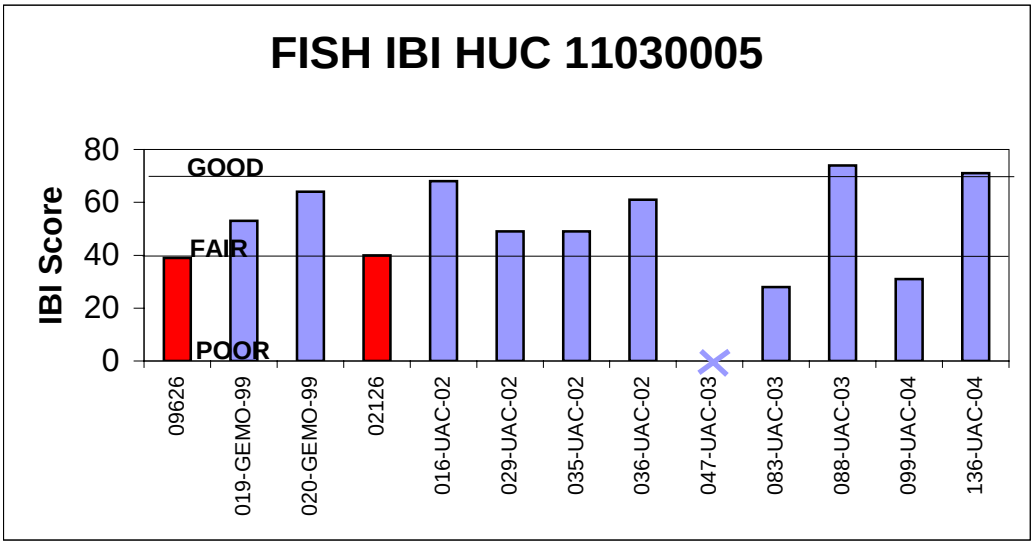
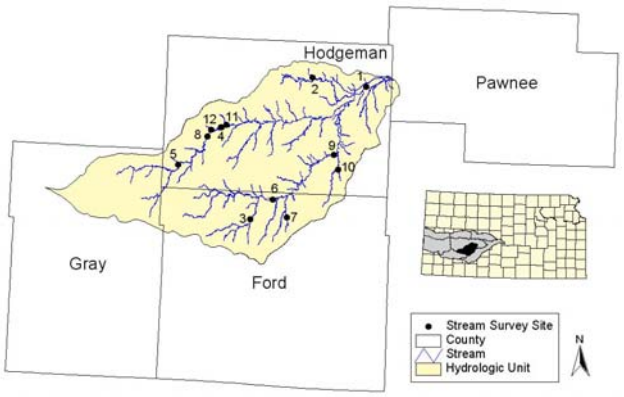


Figure 2. Graph of IBI values for HUC 11030005

Upper Arkansas River Basin
HUC 11030006

LOCATION



- This HUC consists of 12 sites (14 samples).
- Sites were surveyed between 1995-2004.

BIOLOGICAL HIGHLIGHTS

- 3 samples were not impacted by nutrient and oxygen demanding pollutants, 4 were moderately impacted, 2 were highly impacted (see figure 1).
- The overall MBI value for this HUC was 5.11, indicating it has been moderately impacted by nutrient and oxygen demanding pollutants.
- 18 species of fish were surveyed within this HUC (see fish species collected, page 2)
- Farthest west stream record in Kansas of spotted bass collected from Buckner Creek.
- 3 species of freshwater mussels were surveyed (see mussel species collected page 2)

Image 1. Buckner Creek, Hodgeman Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Buckner	HG	99	5	*	8.4	7
2	Dry	HG	95	6	*	6.4	3
3	Duck	FO	95	8	0.005	4.68	8
4	Buckner	HG	02	19	0.387	4.94	13
4			03				13
4			04	3	*	4	12
5	Buckner	HG	03				7
6	Saw Log	FO	03				2
7	Hain	FO	03				12
8	Buckner	HG	04	4	*	4.03	8
9	Saw Log	HG	04	4	*	4.01	10
10	Saw Log Trib	HG	02				
11	Buckner	HG	02	18	0.351	5.27	11
12	Buckner	HG	02	15	0.377	5.06	11

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- This HUC is the site of the future Horsetheif Reservoir on Buckner creek.
- A water quality table is presented on page 2

Image 2. Saw-Log Creek, Hodgeman Co.

Upper Arkansas River Basin
HUC 11030006

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	26	743	110	360	4.7	2	170	4.5	0.32	6	1.76
2	19	1190	23	600	1.1	6.99	NA	NA	NA	NA	NA
3	17	780	54	400	4.3	7.81	NA	NA	NA	NA	NA
4	27	686	25	333	3.9	7.5	245	37	0.05	1.4	0.17
4	21	728	57	391	3	7.3	210	27	0.02	14	0.44
4	22	528	212	253	3.9	7.7	172	41	0.26	13.1	0.15
5	21	559	16	300	1.4	7.3	182	33	0.01	0.7	0.1
6	23	688	23	371	2.9	7.7	246	56	0.39	0.6	0.31
7	22	947	58	514	4.3	7.8	177	108	0.07	1.8	0.06
8	22	473	226	218	4	7.6	162	59	0.38	14.9	0.08
9	22	880	63	425	2.4	7.7	248	117	0.2	2.1	0.17
10	14	1023	3	490	2.6	7.7	216	119	0.16	1.2	0.32
11	23	870	53	415	1.7	7.5	210	62	0.06	0.8	0.06
12	24	628	305	299	2	7.8	203	35	0.35	16.9	0.04

TDS = total dissolved solids

Fish Species Collected

black bullhead
black crappie
bluegill
channel catfish
common carp
fathead minnow
golden shiner
green sunfish
green sunfish X bluegill hybrid
largemouth bass
longear sunfish
orangespotted sunfish
red shiner
sand shiner
spotted bass
suckermouth minnow
western mosquitofish
white crappie
yellow bullhead

Mussel Species Collected

fingernail clam
giant floater
pondhorn

Upper Arkansas River Basin
HUC 11030006

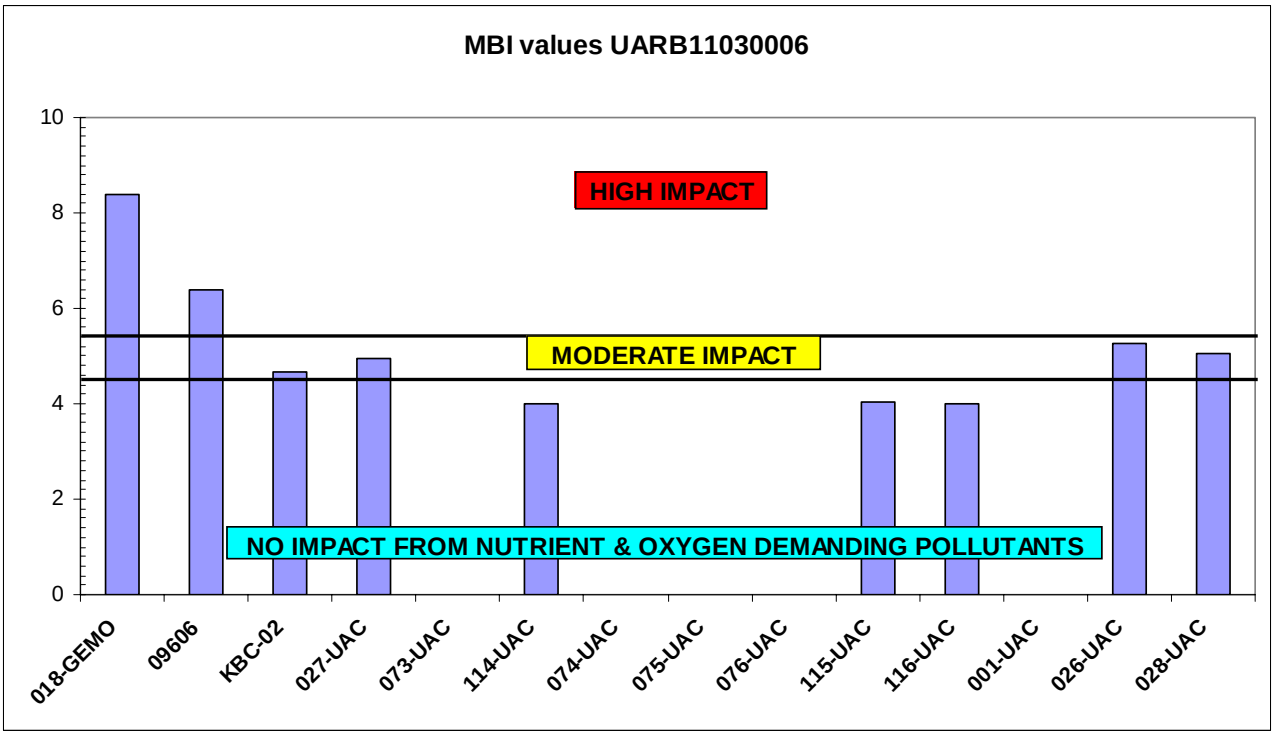


Figure 1. Graph of MBI values for HUC 11030006

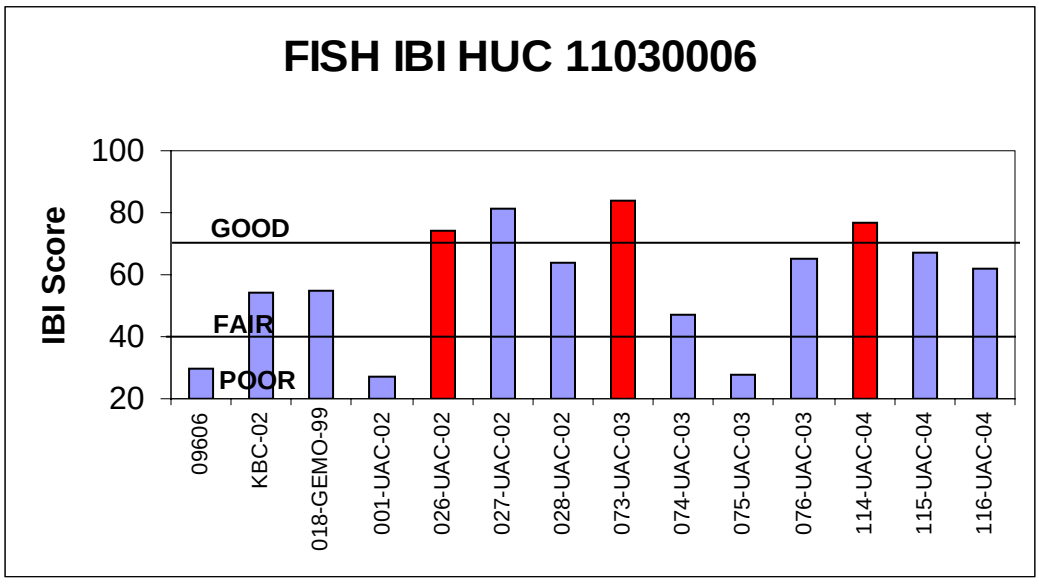
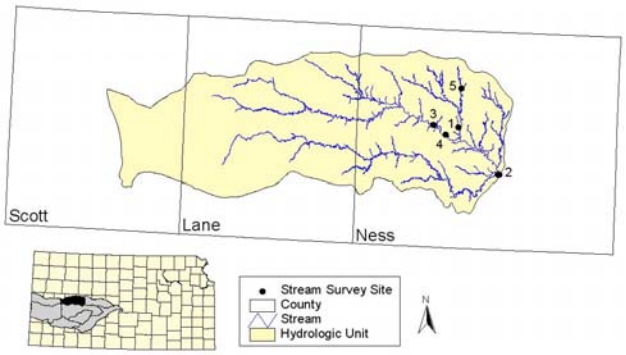


Figure 2. Graph of IBI values for HUC 11030006

Upper Arkansas River Basin
HUC 11030007

LOCATION



- This HUC consists of 5 sites (6 samples).
- Sites were surveyed between 2002-2004.

BIOLOGICAL HIGHLIGHTS

- The 3 samples with available MBI data, all showed no impact from nutrient and oxygen demanding pollutants (see figure 1). The overall MBI value for this HUC was 4.14.
- 15 species of fish were surveyed (see fish species collected, page 2)
    - Threatened species – Arkansas darter
    - Fist record of the Arkansas darter collected from this part of Kansas.
    - First record of an Arkansas darter collected on a north tributary to the Arkansas River.
    - Arkansas darter was collected in two different locations.
- 3 species of freshwater mussels were surveyed (see mussel species collected, page 2)

Image 1. South Fork Walnut Creek, Ness Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Wild Horse	NS	03	4	*	4.5	12
2	SF Walnut	NS	02	5	*	3.63	7
2			03	5	*	4	7
3	NF Walnut	NS	04				7
4	Wild Horse	NS	04				6
5	NF Walnut	NS	02				7

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair to good condition based on the information available at this time.
- Protection efforts should be utilized to maintain the Arkansas darter population.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- Further surveys will be conducted to find the range of the Arkansas darter in this HUC
- A water quality table is presented on page 2

Image 2. North Fork Walnut Creek, Ness Co.

Upper Arkansas River Basin
HUC 11030007

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	24	1464	29	796	2.4	7.2	188	186	0.01	0.7	0.02
2	21	1090	107	528	3.9	8.3	179	98	0.55	2.5	0.2
2	27	1385	20	746	5.2	7.2	221	133	0.19	0.3	0.3
3	20	1177	16	573	4.4	7.9	255	164	0.01	0.9	0.01
4	24	1346	30	655	1.4	7.9	229	184	0.17	1.8	0.13
5	15	2080	16	1040	2.8	8	311	251	0.01	0.7	0.11

TDS = total dissolved solids

Fish Species Collected

Arkansas darter
black bullhead
channel catfish
common carp
fathead minnow
green sunfish
largemouth bass
longear sunfish
orangespotted sunfish
plains killifish
red shiner
sand shiner
western mosquitofish
white crappie
yellow bullhead

Mussel Species Collected

fingernail clam
giant floater
pondhorn

Upper Arkansas River Basin
HUC 11030007

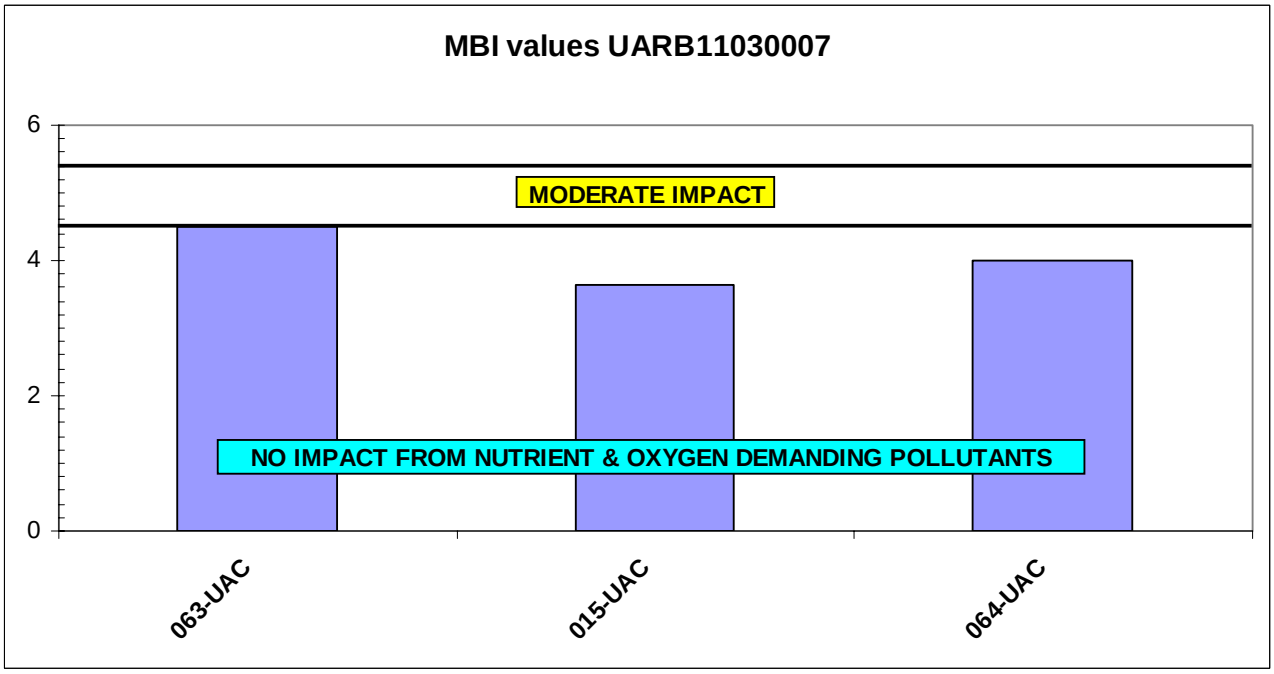


Figure 1. Graph of MBI values for HUC 11030007

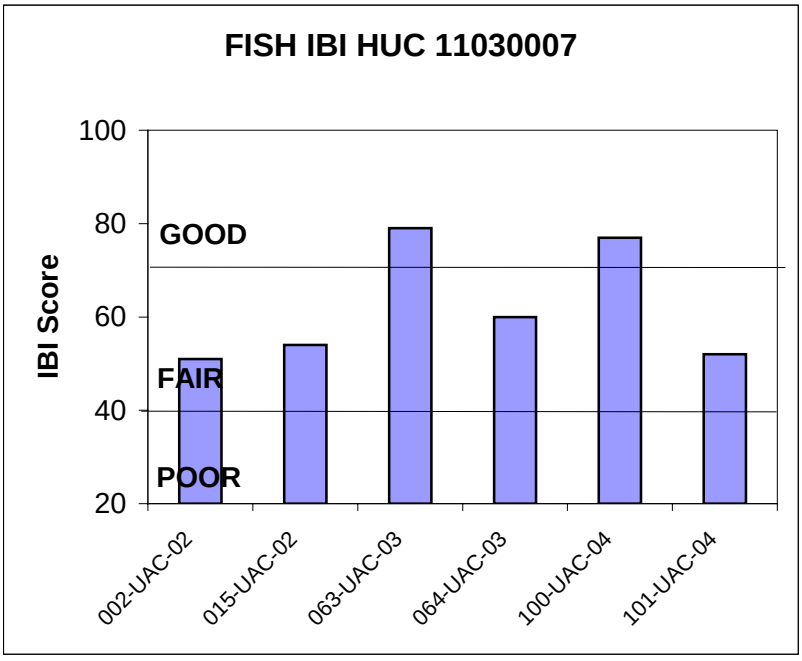
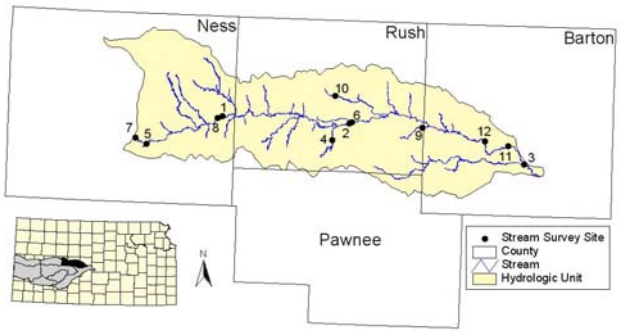


Figure 2. Graph of IBI values for HUC 11030007

Upper Arkansas River Basin
HUC 11030008

LOCATION



- This HUC consists of 12 sites (13 samples).
- Sites were surveyed between 1997-2004.

BIOLOGICAL HIGHLIGHTS

- 3 samples showed no impact by nutrient and oxygen demanding pollutants, 1 showed moderate impact, and 4 showed high impact (see figure 1).
- The overall MBI value for this HUC was 5.64, indicating high impact from nutrient and oxygen demanding pollutants.
- 20 species of fish were surveyed (see fish species collected page 2)
- 10 species of freshwater mussels were surveyed (see mussel species collected, page 2)
    - SINC – yellow sandshell
    - Good mussel diversity in extreme lower Walnut Creek.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Walnut	NS	99	7	*	7.17	21
2	Walnut	RH	97	10	*	6.54	5
3	Walnut	BT	02	3	*	5	17
3			03	2	*		4
4	Otter	RH	03	3	*	4	9
5	Walnut	NS	03	7	*	4.13	7
6	Walnut	RH	03	2	*		9
7	Walnut	NS	04				9
8	Walnut	NS	04				8
9	Dry	RH	02	3	*		4
10	Sand	RH	02	8	*	4.06	12
11	Walnut	BT	02	15	*	6.98	8
12	Walnut	BT	02	11	0.352	6.82	6

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Streams are intermittent throughout this HUC.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2


Image 1. Walnut Creek, Ness Co.


Image 2. Otter Creek, Rush Co.

Upper Arkansas River Basin
HUC 11030008

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	21	1068	108	519	5.2	1.8	201	103	0.13	7.8	0.47
2	23	649	165	311	5.5	7.73	85	33	0.2	11.3	0.16
3	24	993	213	481	1.7	7.7	336	54	0.55	8.8	0.44
3	25	751	31	398	2.4	6.3	262	44	0.01	0.1	0.51
4	21	1526	101	835	3.2	7.6	232	144	0.55	1.5	0.16
5	24	1399	71	762	2.6	7.3	213	159	0.26	2.6	0.6
6	23	1526	101	831	1.5	7	257	141	0.55	4.9	0.1
7	20	1367	59	666	4.6	7.6	159	206	0.2	1.5	0.08
8	19	674	65	322	4.8	7.7	152	75	0.12	2.4	0.05
9	17	1589	108	779	3.3	8.2	80	212	0.14	1.7	0.02
10	20	706	311	339	4.9	8.6	99	89	0.55	20.1	0.89
11	22	1234	53	599	4.4	7.8	240	136	0.8	0.6	0.14
12	24	1302	173	635	3.5	7.8	170	135	0.31	10.4	0.25

TDS = total dissolved solids

Fish Species Collected

black bullhead
black crappie
bluegill
bullhead minnow
channel catfish
common carp
fathead minnow
flathead catfish
gizzard shad
green sunfish
largemouth bass
longear sunfish
orangespotted sunfish
red shiner
river carpsucker
sand shiner
suckermouth minnow
western mosquitofish
white crappie
yellow bullhead

Mussel Species Collected

bleufer
fingernail clam
fragile papershell
giant floater
mapleleaf
pimpleback
pink papershell
pondhorn
white heelsplitter
yellow sandshell

Upper Arkansas River Basin
HUC 11030008

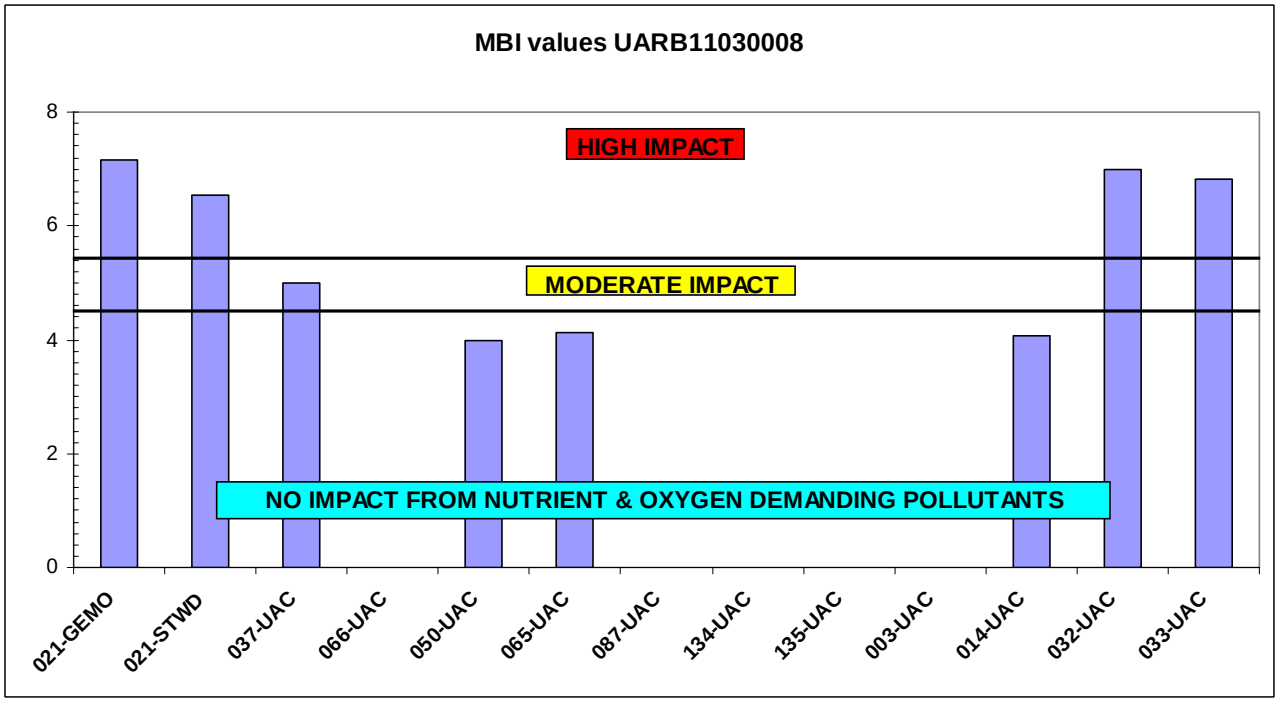


Figure 1. Graph of MBI values for HUC 11030008

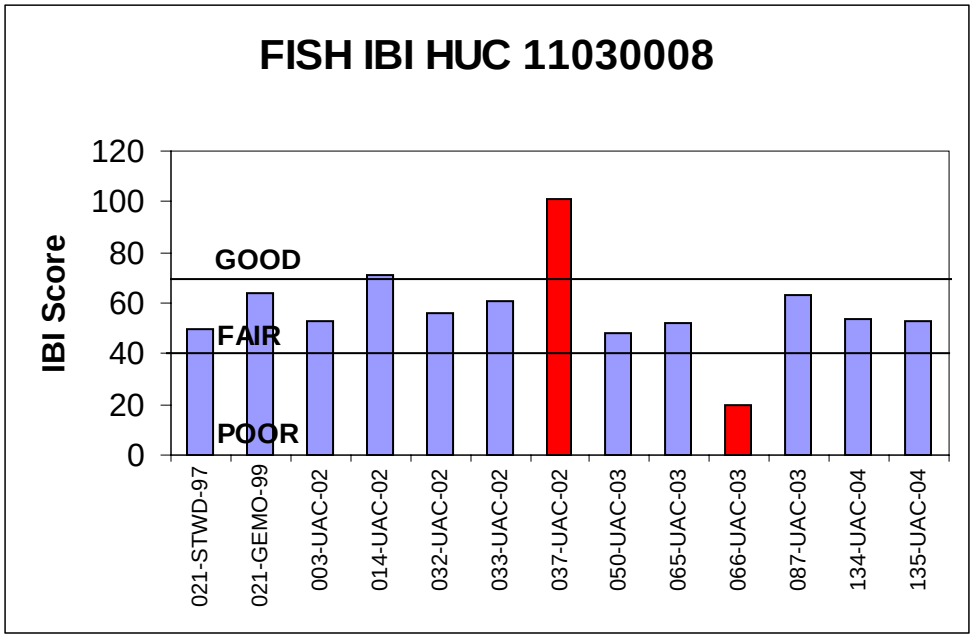
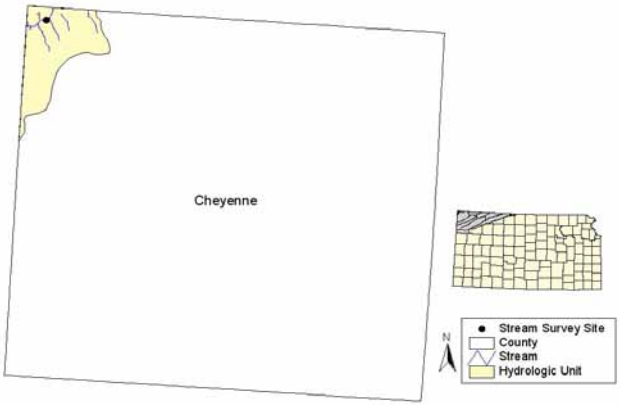


Figure 2. Graph of IBI values for HUC 11030008

Upper Republican River Basin
HUC 10250001

LOCATION



- This HUC consists of 1 site (1 sample).
- Site was surveyed in 1996.

BIOLOGICAL HIGHLIGHTS

- The only sample from this HUC indicated high impact from nutrient and oxygen demanding pollutants (see figure 1). The MBI value was 9.75.
- 9 species of fish were surveyed (see fish species collected, page 2)
    - SINC – brassy minnow
- No freshwater mussel species were collected in this HUC

Image 1. Arikaree River, Cheyenne Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Arikaree	CN	96	4	*	9.75	9

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Efforts should be utilized to maintain the SINC population of brassy minnow within this HUC.
- Arikaree River has very intermittent stream flow throughout this HUC.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

Upper Republican River Basin
HUC 10250001

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	19	723	67	349	12.1	8.3	253	16	0	0	0.07

TDS = total dissolved solids

Fish Species Collected

brassy minnow
central stoneroller
creek chub
fathead minnow
gizzard shad
green sunfish
plains killifish
red shiner
sand shiner

Mussel Species Collected

No mussels were collected in this HUC

Upper Republican River Basin
HUC 10250001

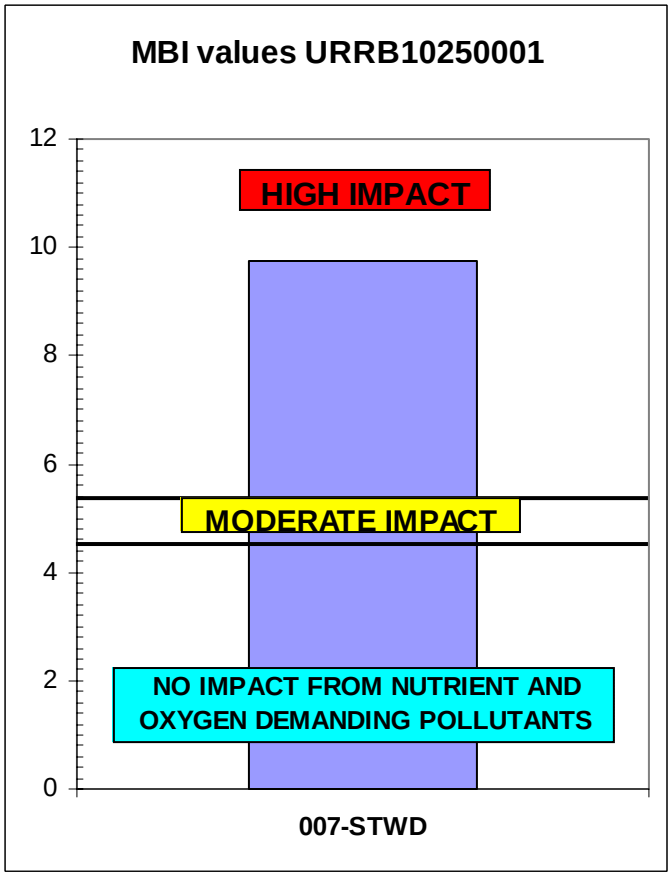


Figure 1. Graph of MBI values for HUC 10250001

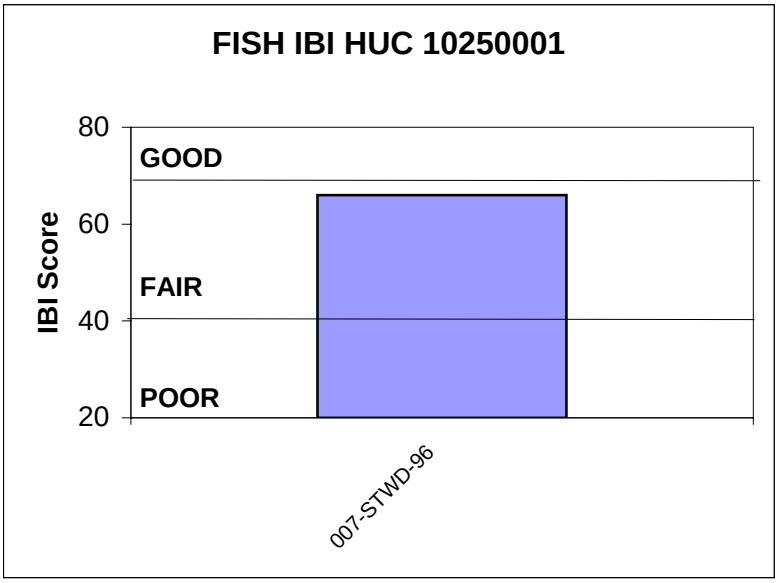
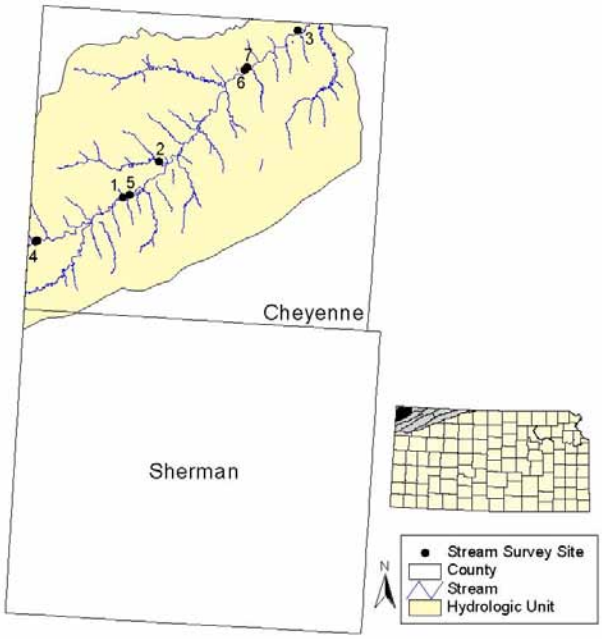


Figure 2. Graph of IBI values of HUC 10250001

Upper Republican River Basin
HUC 10250003

LOCATION



- This HUC consists of 7 sites (11 samples).
- Sites were surveyed between 1994-2003.

BIOLOGICAL HIGHLIGHTS

- 4 samples were not impacted by nutrient and oxygen demanding pollutants, 1 sample was moderately impacted, and 6 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 7.44, indicating a high impact from nutrient and oxygen demanding pollutants.
- 19 species of fish were surveyed (see fish species collected page 2)
    - SINC – brassy minnow
- 7 species of freshwater mussels were surveyed (see mussel species collected, page 2)
    - SINC – Wabash pigtoe

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	SF Republican	CN	97	14	*	4.25	8
1	SF Republican	CN	03	17	0.187	9.11	11
2	Cherry	CN	97	8	0.214	7.93	12
3	SF Republican	CN	96	10	*	4.04	12
4	SF Republican	CN	94	11	NA	5.08	7
4			95	13	0.878	7.33	7
4			95	10	0.512	4	10
4			00	16	0.711	4.42	11
5	SF Republican	CN	03	18	0.135	9.39	6
6	SF Republican	CN	03	22	0.151	7.92	3
7	SF Republican	CN	03	19	0.09	7.06	4

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair to good condition based on the information available at this time.
- Efforts should be utilized to maintain the SINC population of brassy minnow and Wabash pigtoe mussel within this HUC.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

Image 1. South Fork Republican River, Cheyenne Co.

Upper Republican River Basin
HUC 10250003

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	16	544	28	269	9.8	NA	212	6.9	0.05	0.1	0.03
1	17	669	16	327	3.6	7	28.4	1.2	0.04	1.2	0.01
2	18	829	12	400	6.6	NA	362	54	0.08	0.3	0.11
3	19	733	31	351	10.1	8.1	181	1.1	0	0	0.1
4	15	404	33	246	7.2	8.3	251	12	0.1	2.6	0.08
4	18	520	21	270	7.2	7.94	NA	NA	NA	NA	NA
4	18	540	22	280	4.2	7.78	NA	NA	NA	NA	NA
4	20	540	20	280	5.9	7.78	NA	NA	NA	NA	NA
5	18	695	5	338	2.5	6.9	25	0.6	0.04	0.9	0.03
6	19	846	10	414	1.47	6.9	4.7	1.9	0	0.9	0.05
7	17	849	6	415	1.5	7	19.7	1.4	0.01	1.5	0.01

TDS = total dissolved solids

Fish Species Collected

black bullhead
bluegill
brassy minnow
central stoneroller
channel catfish
common carp
creek chub
fathead minnow
green sunfish
largemouth bass
orangespotted sunfish
orangethroat darter
plains killifish
red shiner
sand shiner
stonecat
suckermouth minnow
western mosquitofish
white sucker

Mussel Species Collected

fragile papershell
giant floater
pimpleback
pistolgrip
pondhorn
threeridge
Wabash pigtoe

Upper Republican River Basin
HUC 10250003

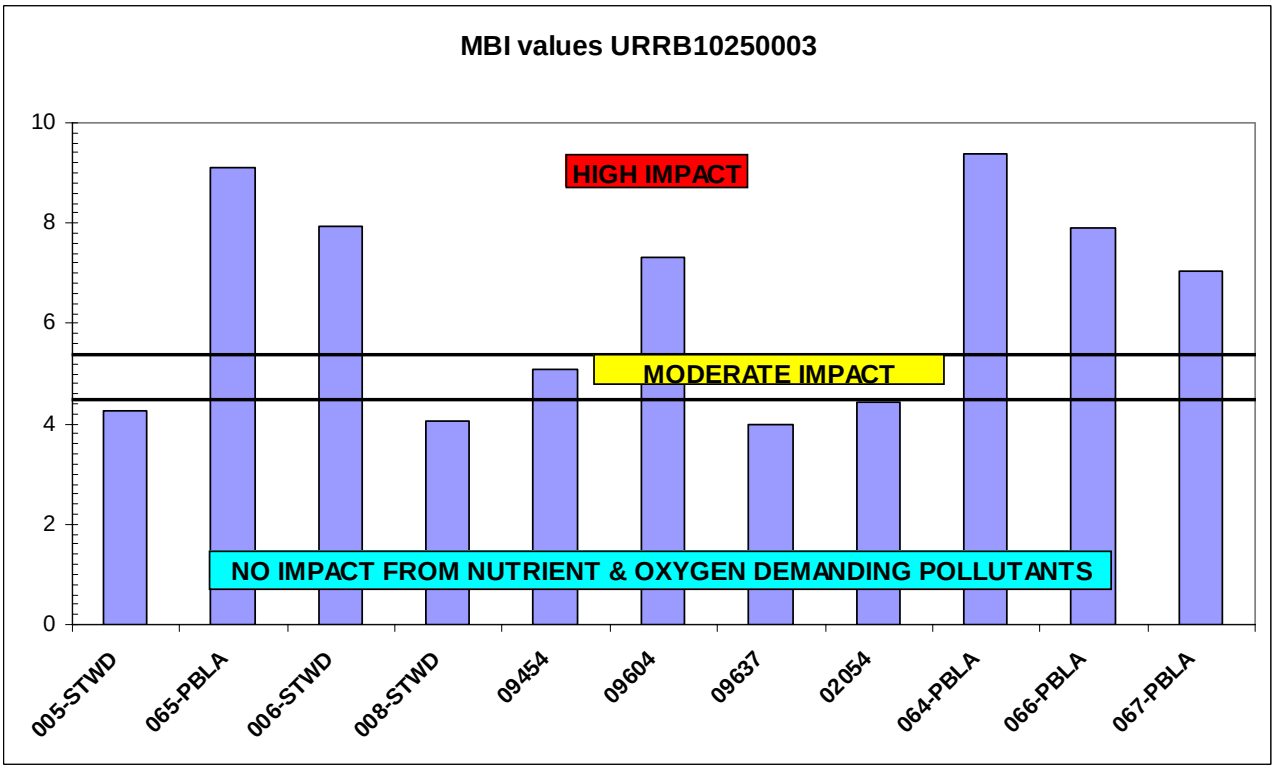


Figure 1. Graph of MBI values for HUC 10250003

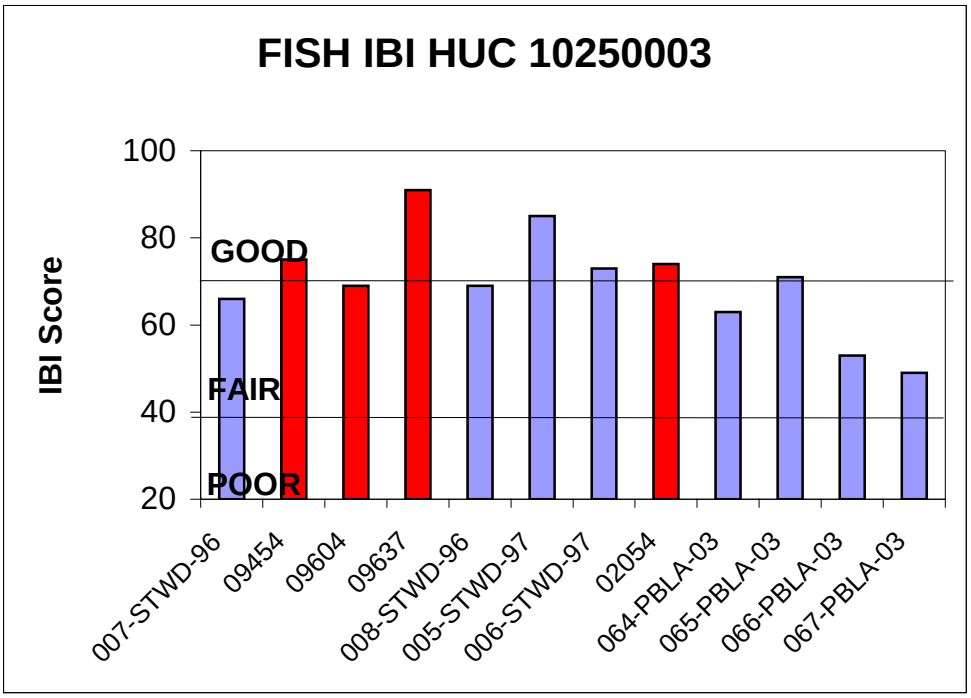
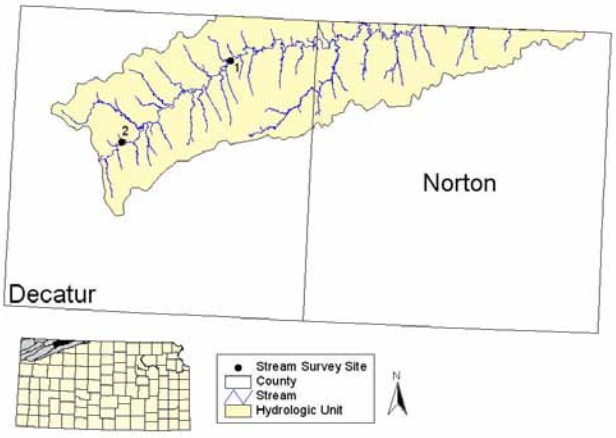


Figure 2. Graph of IBI values of HUC 10250003

Upper Republican River Basin
HUC 10250011

LOCATION



- This HUC consists of 2 sites (2 samples).
- Sites were surveyed between 1996-2000.

BIOLOGICAL HIGHLIGHTS

- The 2 samples within this HUC were both highly impacted by nutrient and oxygen demanding pollutants (see figure 1). The overall MBI value for this HUC was 10.55.
- 8 species of fish were surveyed (see fish species collected, page 2)
- No mussel species were collected in this HUC

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Sappa	DC	96	5	*	10.99	6
2	Sappa	DC	00	8	0.009	9.11	5

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

Upper Republican River Basin
HUC 10250011

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	16	959	94	462	5.8	7.8	279	7.7	0.39	0	0.9
2	15	1180	119	556	3.1	NA	370	45	0.52	3.1	0.85

TDS = total dissolved solids

Fish Species Collected

black bullhead
common carp
creek chub
fathead minnow
green sunfish
red shiner
sand shiner
yellow bullhead

Mussel Species Collected

No mussels were collected in this HUC

Upper Republican River Basin
HUC 10250011

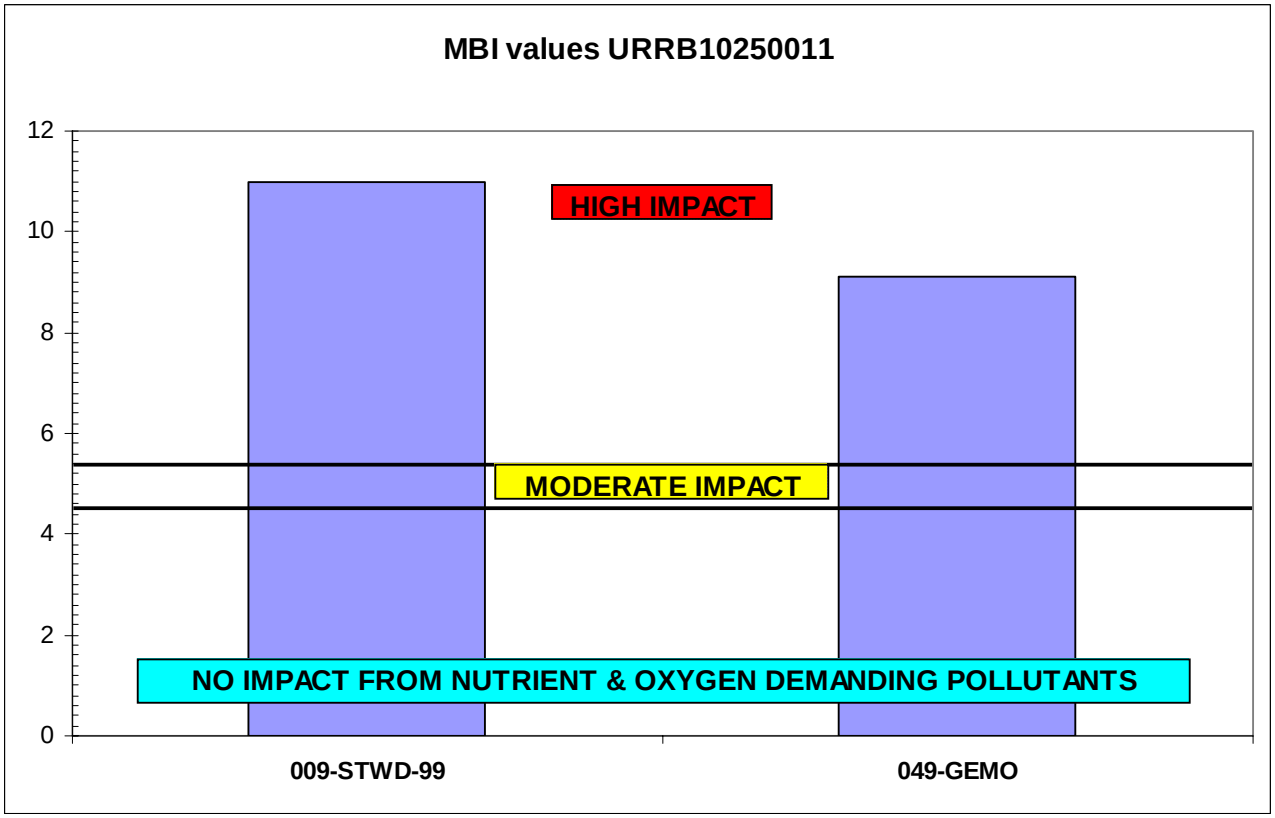


Figure 1. Graph of MBI values for HUC 10250011

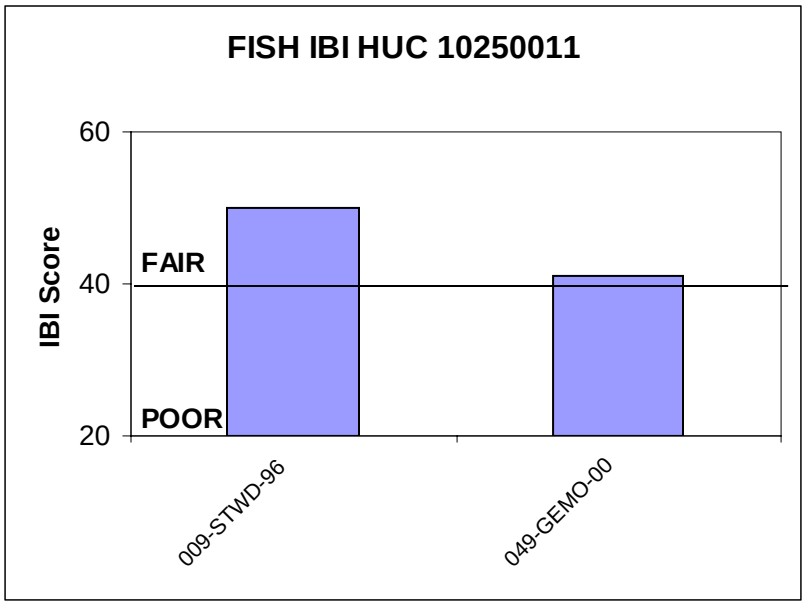
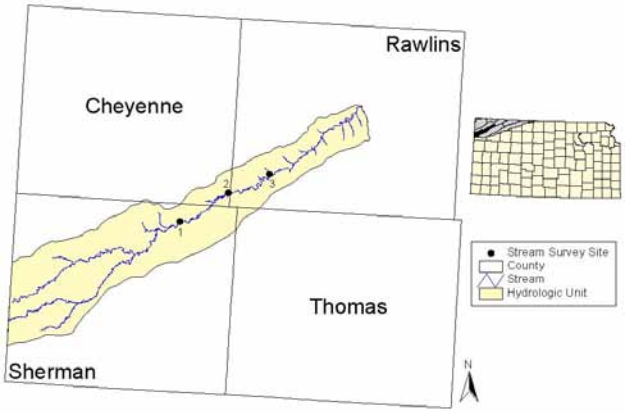


Figure 2. Graph of IBI values for HUC 10250011

Upper Republican River Basin
HUC 10250012

LOCATION



- This HUC consists of 3 sites (4 samples).
- Sites were surveyed between 1995-2001.

BIOLOGICAL HIGHLIGHTS

- All 4 samples within this HUC were highly impacted by nutrient and oxygen demanding pollutants (see figure1).
- The overall MBI value for this HUC was 7.94, indicating that the HUC was highly impacted from nutrient and oxygen demanding pollutants.
- 8 species of fish were surveyed (see fish species collected, page 2)
- No mussels were collected in this HUC.

Image 1. South Beaver Creek, Sherman Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	S Beaver	SH	97	6	*	6.05	6
2	Beaver	CN	95	7	*	6.4	4
2			01	16	0.020	9.52	
3	Beaver	RA	95	6	*	7.87	6

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in poor to fair condition based on the information available at this time.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

Upper Republican River Basin
HUC 10250012

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	19	529	38	253	10.7	7	197	13	0.1	0.1	0.06
2	19	954	57	4.66	1.5	8	617	4	0.1	6	0.59
2	18	1120	13	570	1.4	7.81	NA	NA	NA	NA	NA
3	21	690	17	350	4.8	7.58	NA	NA	NA	NA	NA

TDS = total dissolved solids

Fish Species Collected

black bullhead
common carp
fathead minnow
golden shiner
green sunfish
largemouth bass
red shiner
white sucker

Mussel Species Collected

No mussels were collected in this HUC

Upper Republican River Basin
HUC 10250012

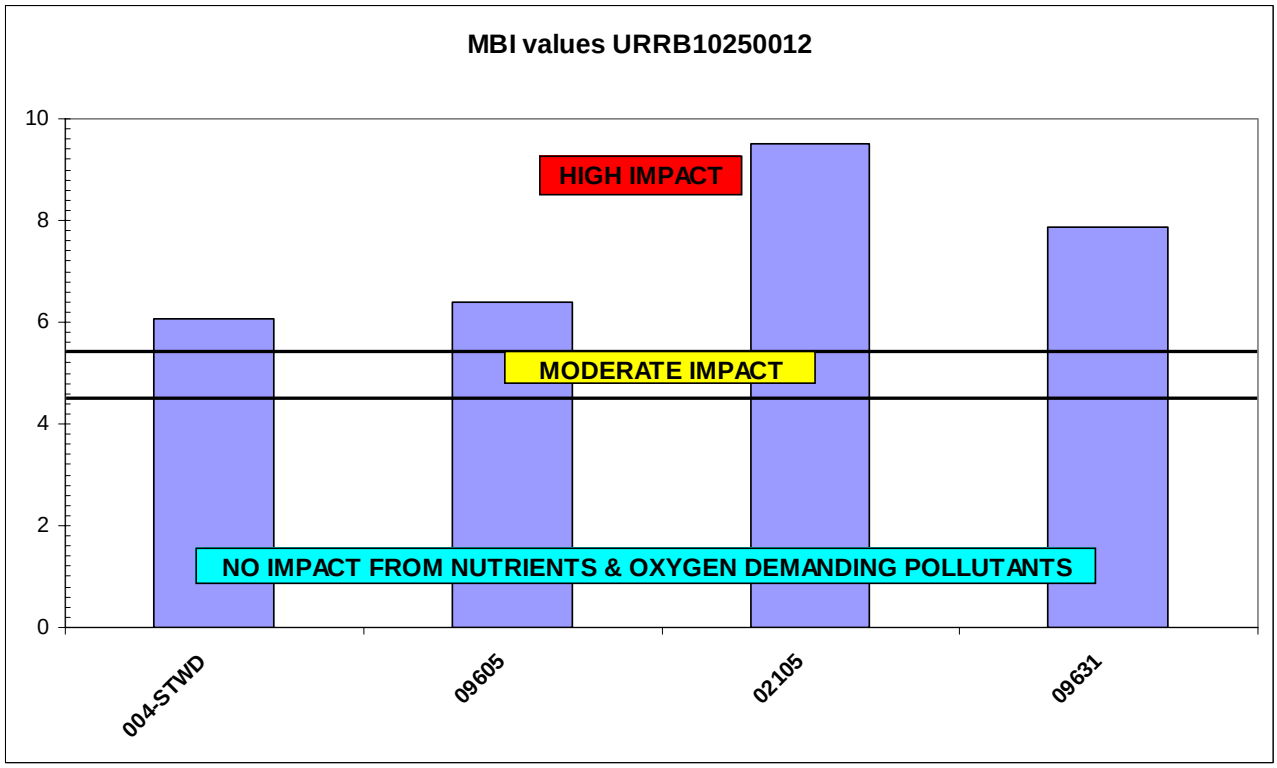


Figure 1. Graph of MBI values for HUC 10250012

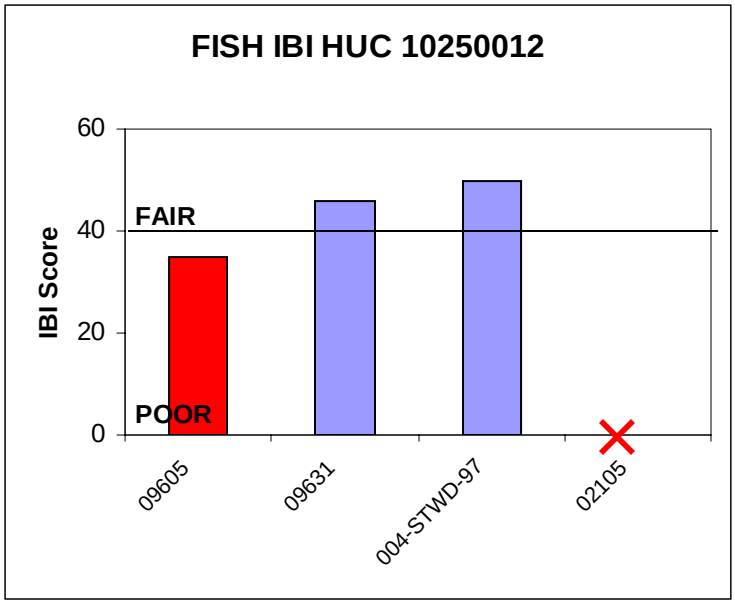
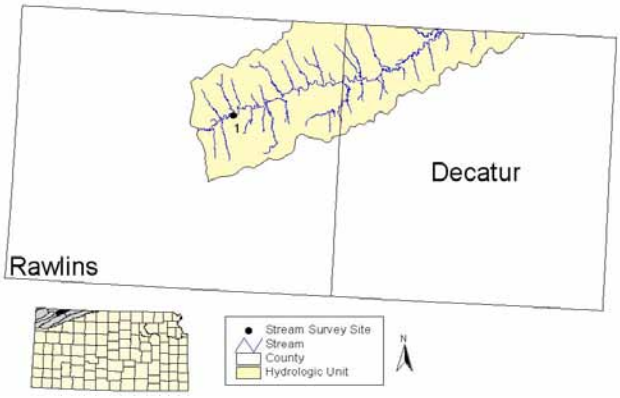


Figure 2. Graph of IBI values of HUC 10250012

Upper Republican River Basin
HUC 10250014

LOCATION



- This HUC consists of 1 site (1 sample).
- Site was surveyed in 2000.

BIOLOGICAL HIGHLIGHTS

- The one sample from this area indicated high impact from nutrient and oxygen demanding pollutants (see figure 1). The MBI value for this HUC was 9.1.
- 7 species of fish were surveyed (see fish species collected, page 2)
- 1 species of freshwater mussel was surveyed (see mussel species collected, page 2)

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Beaver	RA	00	11	0.200	9.1	7

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

Upper Republican River Basin
HUC 10250014

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	16	1006	198	486	3.7	NA	320	37	0.55	3.2	0.09

TDS = total dissolved solids

Fish Species Collected

central stoneroller
creek chub
fathead minnow
green sunfish
orangethroat darter
sand shiner
white sucker

Mussel Species Collected

giant floater

Upper Republican River Basin
HUC 10250014

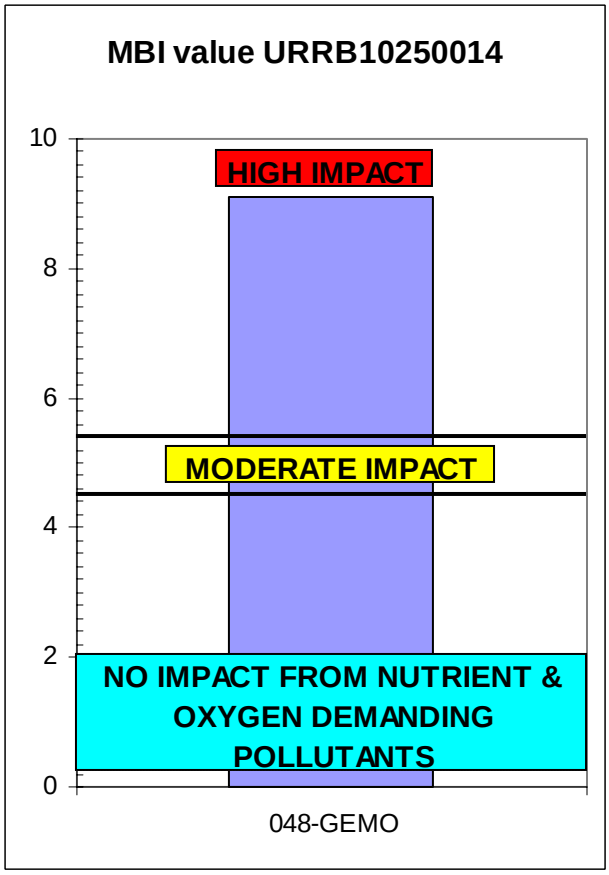


Figure 1. Graph of MBI value for HUC 10250014

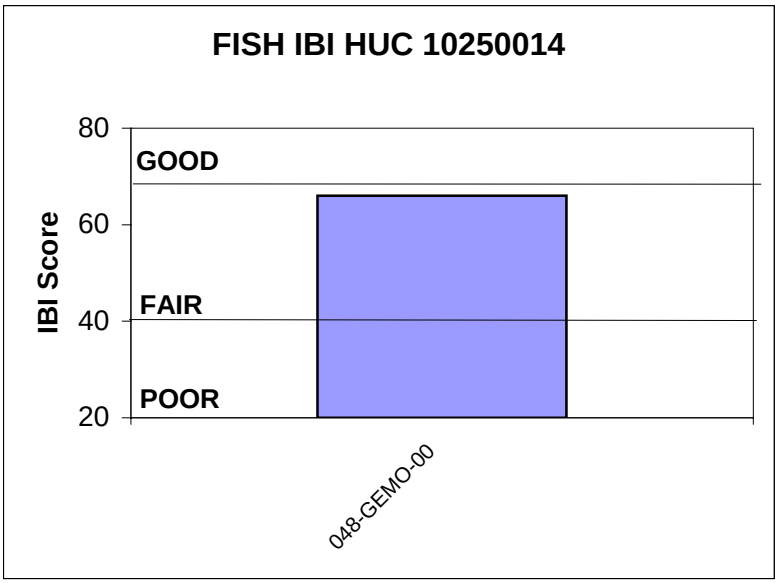


Figure 2. Graph of IBI values for HUC 10250014

Upper Republican River Basin
HUC 10250015

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	16	791	33	382	6.4	8.7	238	13.2	0.03	0.1	0.37
2	21	865	81	417	7.1	8.9	181	22	0.11	3.5	0.45
3	20	950	247	480	5.4	7.76	NA	NA	NA	NA	NA

TDS = total dissolved solids

Fish Species Collected

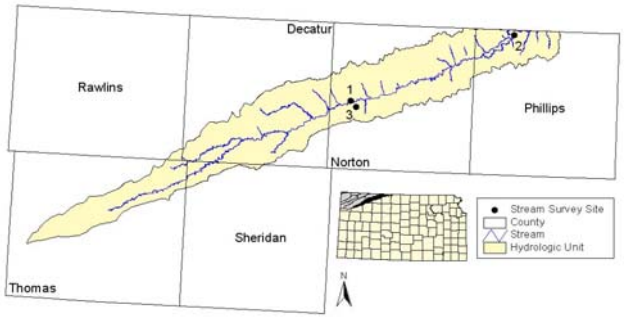
black bullhead
bluegill
channel catfish
common carp
creek chub
fathead minnow
gizzard shad
green sunfish
largemouth bass
orangethroat darter
red shiner
sand shiner
white sucker

Mussel Species Collected

pondhorn

Upper Republican River Basin
HUC 10250015

LOCATION



- This HUC consists of 3 sites (3 samples).
- Sites were surveyed between 1995-1999.

BIOLOGICAL HIGHLIGHTS

- 1 sample was moderately impacted by nutrient and oxygen demanding pollutants, 2 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 5.72, indicating high impact from nutrient and oxygen demanding pollutants.
- 13 species of fish were surveyed (see fish species collected, page 2)
- 1 species of mussel was surveyed (see mussel species collected, page 2)

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Prairie Dog	NT	99	14	*	5.12	12
2	Prairie Dog	PL	99	8	0.726	5.69	7
3	Prairie Dog	NT	95	5	*	8.37	7

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

Upper Republican River Basin
HUC 10250015

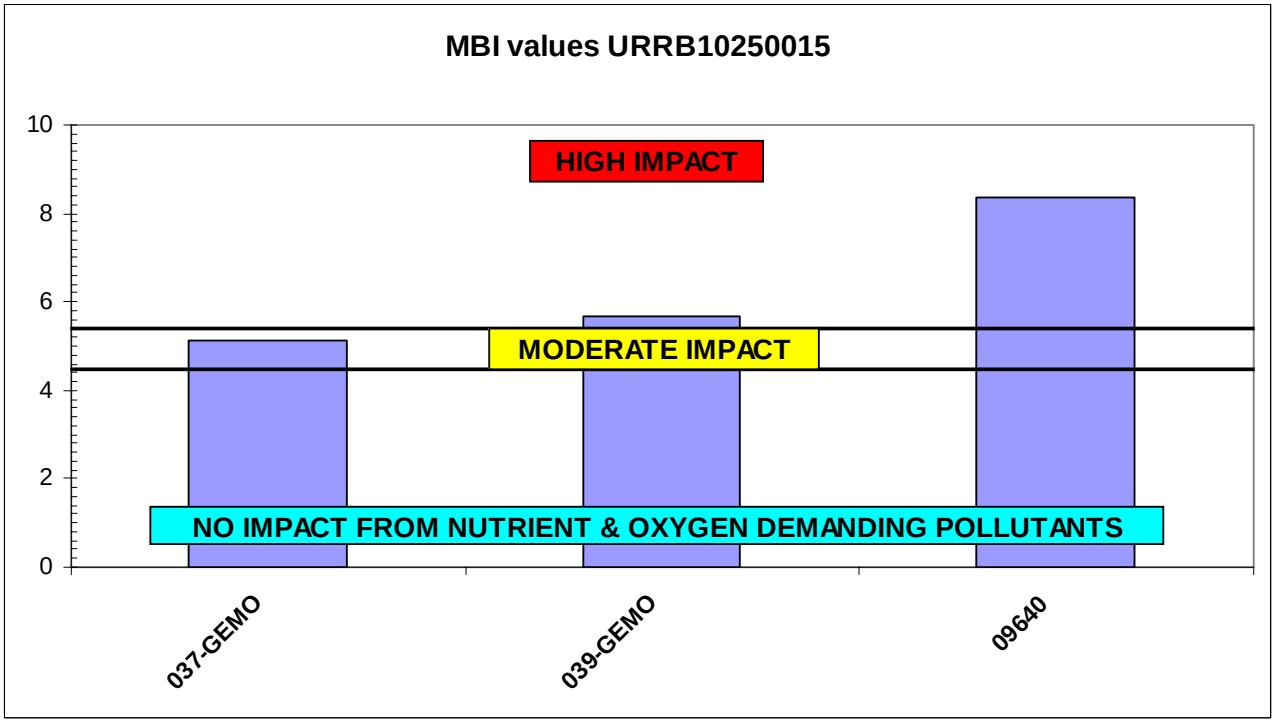


Figure 1. Graph of MBI values for HUC 10250015

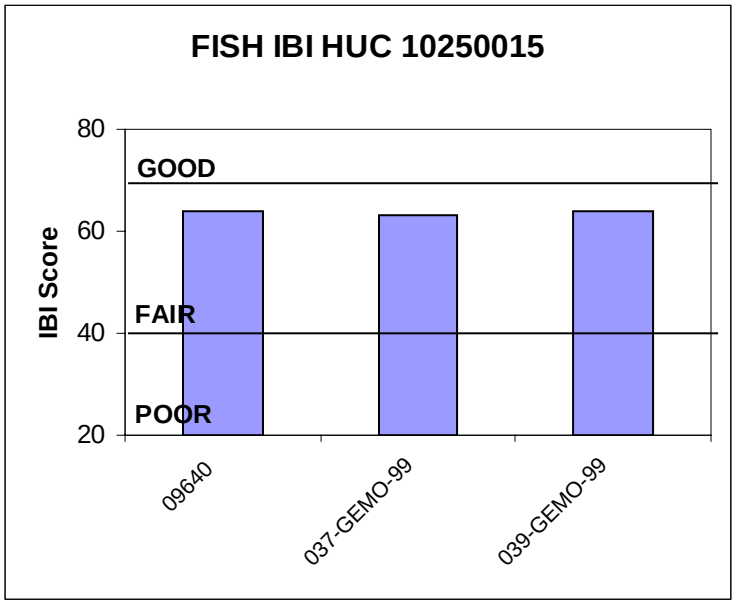
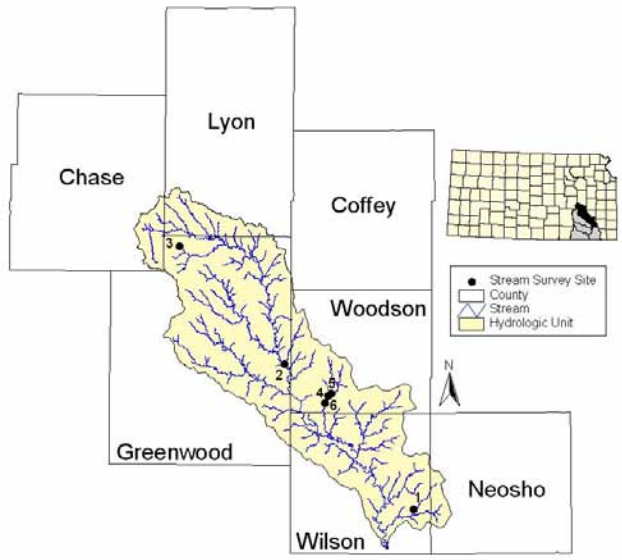


Figure 2. Graph of IBI values for HUC 10250015

Verdigris River Basin
HUC 11070101

LOCATION



- This HUC consists of 6 sites (7 samples).
- Sites were surveyed between 1995-2003.

BIOLOGICAL HIGHLIGHTS

- 2 samples were not impacted by nutrient and oxygen demanding pollutants, 1 sample was moderately impacted, and 4 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 5.94, indicating high impact from nutrient and oxygen demanding pollutants.
- 47 species of fish were surveyed (see fish species collected, page 2)
- 20 species of freshwater mussels were surveyed (see mussel species collected, page 3)
    - SINC – creeper, deertoe, fatmucket, washboard, yellow sandshell

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Chetopa	WL	96	10	*	7.19	20
2	Verdigris	GW	97	20	0.775	4.15	30
3	SB Verdigris Trib	GW	95	5	*	8.67	8
3			95	9	*	4.04	7
4	Sandy	WO	01	22	0.599	5.13	23
5	Sandy	WO	03	25	0.124	7.78	28
6	Sandy	WO	03	25	0.178	7.6	30

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in good condition based on the information available at this time.
- Efforts should be utilized to further study the SINC mussel populations within this area.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

Image 1. Verdigris River, Greenwood Co.

Verdigris River Basin
HUC 11070101

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	26	520	51	249	4.4	7.84	148	3.9	0.02	0	0.01
2	23	576	53	276	5.3	6.7	156	9.3	0.03	2.2	0.05
3	25	770	13	390	6.5	7.92	NA	NA	NA	NA	NA
3	20	860	11	440	4.2	7.54	NA	NA	NA	NA	NA
4	27	NA	30	NA	6.4	8.3	92	14	0.06	2.3	0.03
5	24	214	19	151	4.8	7.6	110	19	0.05	0.3	0
6	25	196	31	93.5	4.1	7.4	64	7	0.11	0.3	0.02

TDS = total dissolved solids

Fish Species Collected

black buffalo
black bullhead
black crappie
blackstripe topminnow
bluegill
bluegill X green sunfish hybrid
bluntface shiner
bluntnose minnow
brook silverside
bullhead minnow
central stoneroller
channel catfish
channel darter
common carp
fantail darter
fathead minnow
flathead catfish
freckled madtom
freshwater drum
ghost shiner
gizzard shad
golden redhorse
golden shiner
green sunfish
largemouth bass
logperch
longear sunfish
longnose gar
orangespotted sunfish
orangethroat darter
red shiner
redear sunfish
redfin darter
redfin shiner
river carpsucker
rosyface shiner
shorthead redhorse
shortnose gar
slenderhead darter
slim minnow
smallmouth buffalo
spotted bass
stonecat
suckermouth minnow
western mosquitofish
white bass
white crappie
yellow bullhead

Verdigris River Basin
HUC 11070101

Mussel Species Collected

Asian clam	lilliput	pondmussel
bleufer	mapleleaf	threehorn wartyback
creeper	paper pondshell	threeridge
deertoe	pimpleback	washboard
fatmucket	pink papershell	white heelsplitter
fragile papershell	pistolgrip	yellow sandshell
giant floater	plain pocketbook	

Verdigris River Basin
HUC 11070101

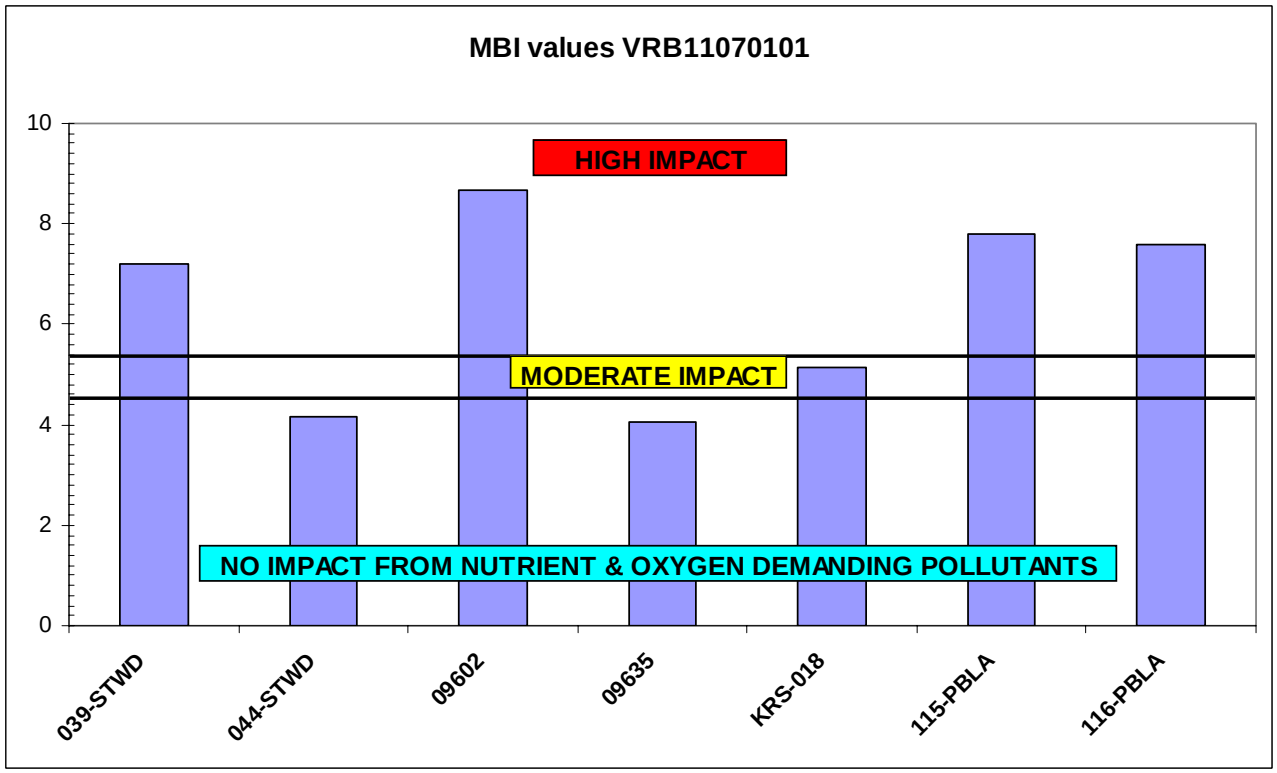


Figure 1. Graph of MBI values for HUC 11070101

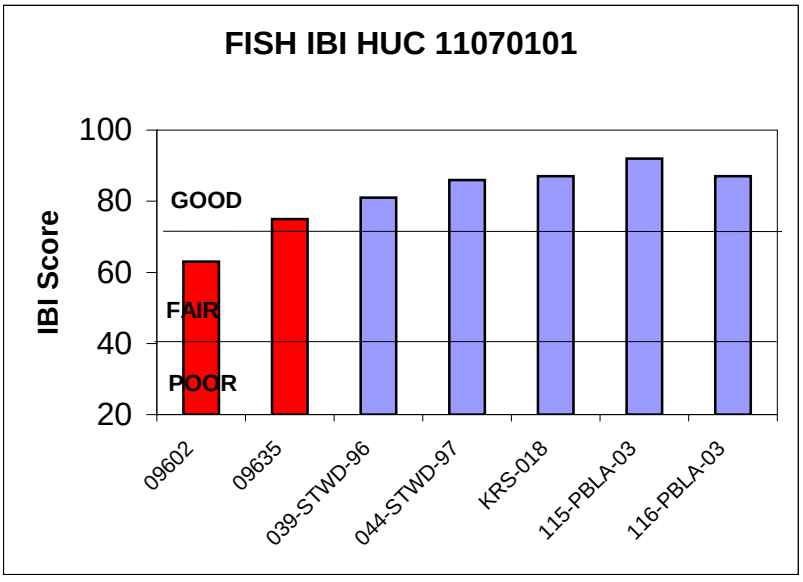
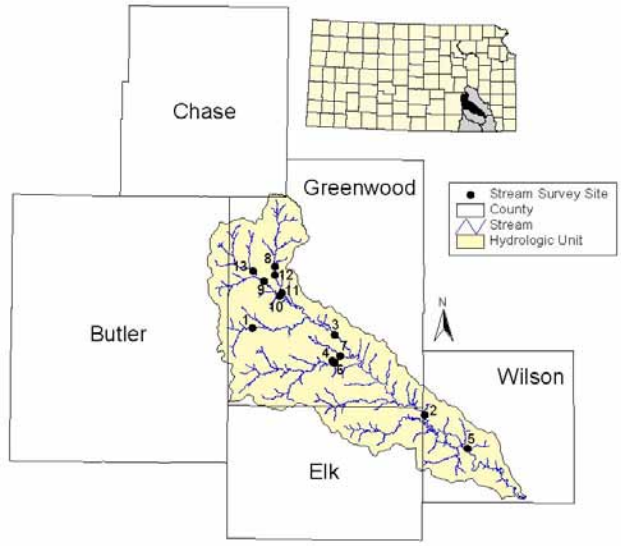


Figure 2. Graph of IBI values for HUC 11070101

Verdigris River Basin
HUC 11070102

LOCATION



- This HUC consists of 13 sites (14 samples).
- Sites were surveyed between 1994-2003.

BIOLOGICAL HIGHLIGHTS

- 3 samples were not impacted by nutrient and oxygen demanding pollutants, 7 samples were moderately impacted, 4 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 5.22, indicating moderate impact from nutrient and oxygen demanding pollutants.
- 49 species of fish were surveyed (see fish species collected, page 2).
    - SINC – banded darter, spotted sucker
    - Record of a yellow perch collected
- 32 species of freshwater mussels were surveyed (see mussel species collected, page 3)
    - Endangered – Neosho mucket, western fanshell
    - Threatened – flutedshell, Ouachita kidneyshell
    - SINC – creeper, deertoe, fatmucket, fawnsfoot, round pigtoe, Wabash pigtoe, washboard, yellow sandshell

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Spring	GW	96	15	0.168	7.35	26
2	Fall	WL	97	12	0.654	3.38	21
3	Fall	GW	97	17	0.668	3.81	28
4	Otter	GW	00	21	0.444	5.17	27
5	Fall	WL	00	17	0.322	6.75	17
6	Otter	GW	94	24	0.158	8.08	25
6			00	17	0.388	4.18	26
7	Honey	GW	03	30	0.517	4.82	35
8	EB Fall	GW	03	21	0.671	5.21	28
9	WB Fall	GW	03	28	0.486	4.98	25
10	WB Fall	GW	03	22	0.389	5.35	27
11	EB Fall	GW	03	28	0.397	5.24	31
12	EB Fall	GW	03	20	0.424	6.76	29
13	WB Fall	GW	03	19	0.556	5.39	27

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in good condition based on the information available at this time.
- Protection efforts should be utilized to maintain the threatened flutedshell and Ouachita kidneyshell mussels, and the endangered Neosho mucket and western fanshell mussels.
- Efforts should be utilized to further study the SINC mussel and fish populations within this area.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

Stream Photo (see page 3)

Verdigris River Basin
HUC 11070102

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	21	437	39	208	8.5	7.82	191	20.1	0.03	1.6	0.02
2	27	357	53	170	6.5	7.14	56	4.4	0.04	2.4	0.03
3	24	428	33	204	7	6.85	146	20.3	0.07	0.6	0.05
4	23	327	63	156	7.5	NA	140	8	0.11	1	0.04
5	26	512	12	244	4.1	NA	175	13	0.07	4.4	0.15
6	24	500	16	250	3.9	6.96	NA	NA	NA	NA	NA
6	28	604	25	278	8.1	8.2	285	17	0.05	1.9	0.06
7	25	627	21	305	3.4	7.8	25.8	0.1	0.03	0	0.01
8	27	686	14	334	2.8	8.1	18.5	1.6	0.02	0.2	0.01
9	28	914	NA	448	3.5	8.1	19.3	7.4	0.01	0	0
10	29	742	11	362	4	8.1	14.9	2.3	0	0.9	0.01
11	28	669	26	325	2.5	8.2	13.7	1.9	0.01	0.1	0.01
12	26	819	14	400	2.9	7.6	3.4	0.3	0.03	0.3	0.01
13	24	607	12	295	3.1	7.7	13	0.1	0.03	0.2	0.01

TDS = total dissolved solids

Fish Species Collected

banded darter
black buffalo
blackstripe topminnow
bluegill
bluntface shiner
bluntnose minnow
brook silverside
bullhead minnow
carmine shiner
central stoneroller
channel catfish
channel darter
common carp
fathead minnow
flathead catfish
freckled madtom
freshwater drum
gizzard shad
golden redhorse
golden shiner
green sunfish
green sunfish X bluegill hybrid
largemouth bass
logperch
longear sunfish
longnose gar
mimic shiner
orangespotted sunfish
orangespotted X longear sunfish hybrid
orangethroat darter
quillback
red shiner
redear sunfish
redear X green sunfish hybrid
redfin darter
redfin shiner
river carpsucker
rosyface shiner
shorthead redhorse
slenderhead darter
slim minnow
smallmouth buffalo
spotted bass
spotted sucker
stonecat
suckermouth minnow
western mosquitofish
white bass
white crappie
yellow bullhead
yellow perch

Verdigris River Basin
HUC 11070102

Mussel Species Collected

Asian clam	fluted shell	paper pondshell	threeridge
black sandshell	fragile papershell	pimpleback	Wabash pigtoe
bleufer	giant floater	pistolgrip	washboard
creeper	lilliput	plain pocketbook	western fanshell
deertoe	mapleleaf	pondhorn	white heelsplitter
fatmucket	monkeyface	pondmussel	yellow sandshell
fawnsfoot	Neosho mucket	round pigtoe	
fingernail clam	Ouachita kidneyshell	threehorn wartyback	

Image 1. Fall River, Greenwood Co.

Verdigris River Basin
HUC 11070102

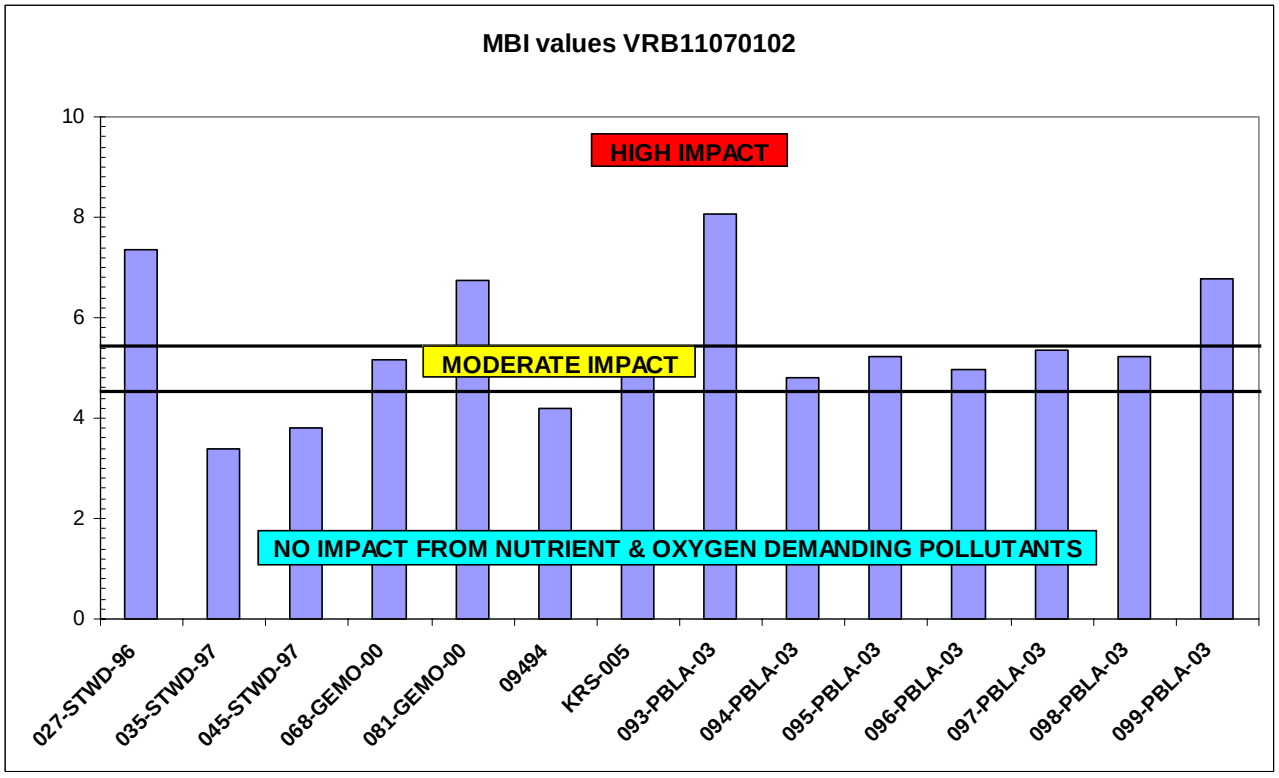


Figure 1. Graph of MBI values for HUC 11070102

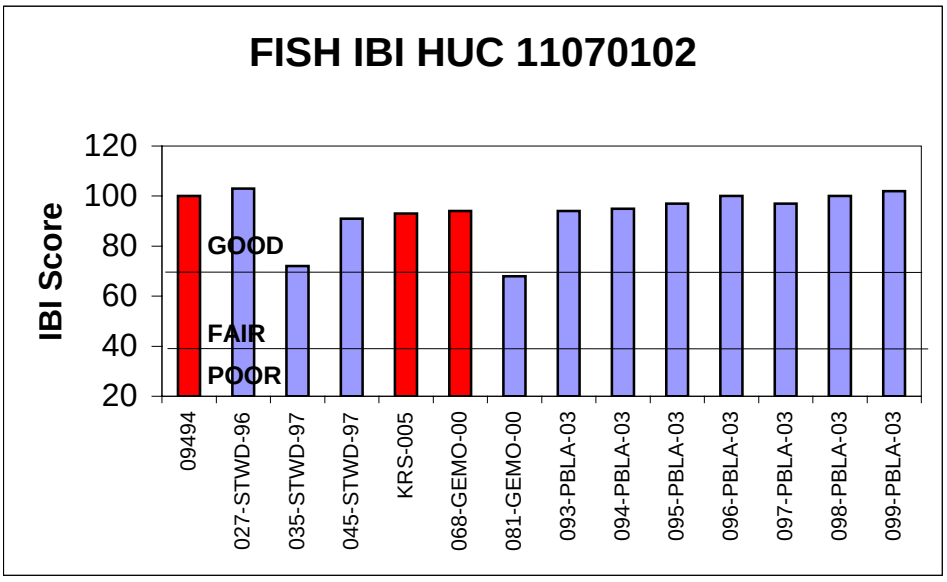
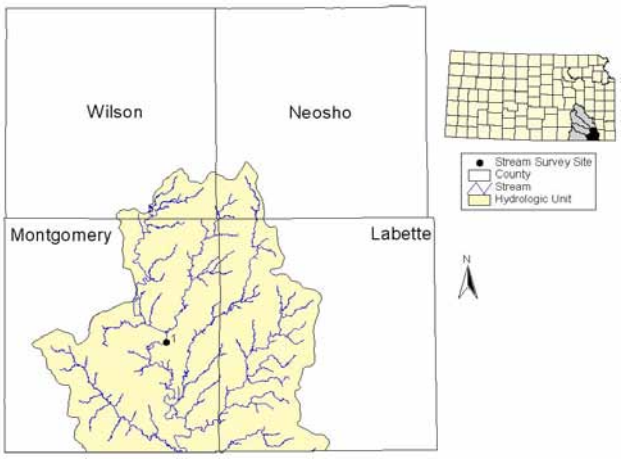


Figure 2. Graph of IBI values for HUC 11070102

Verdigris River Basin
HUC 11070103

LOCATION



- This HUC consists of 1 sites (1 sample).
- Site was surveyed in 1996.

BIOLOGICAL HIGHLIGHTS

- The only sample within this area was moderately impacted by nutrient and oxygen demanding pollutants (see figure 1). The MBI value for this area was 4.52.
- 43 species of fish were sampled in this HUC (see fish species collected, page 2)
    - SINC – spotted sucker
- 15 species of freshwater mussels were surveyed (see mussel species collected, page 2)
    - Threatened – Ouachita kidneyshell
    - SINC – round pigtoe, Wabash pigtoe, yellow sandshell

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Verdigris	MG	96	19	0.821	4.52	43

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in good condition based on the information available at this time.
- Efforts should be utilized to further study the SINC mussel and fish populations within this area.
- Protection efforts should be utilized to maintain the Ouachita kidneyshell population.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

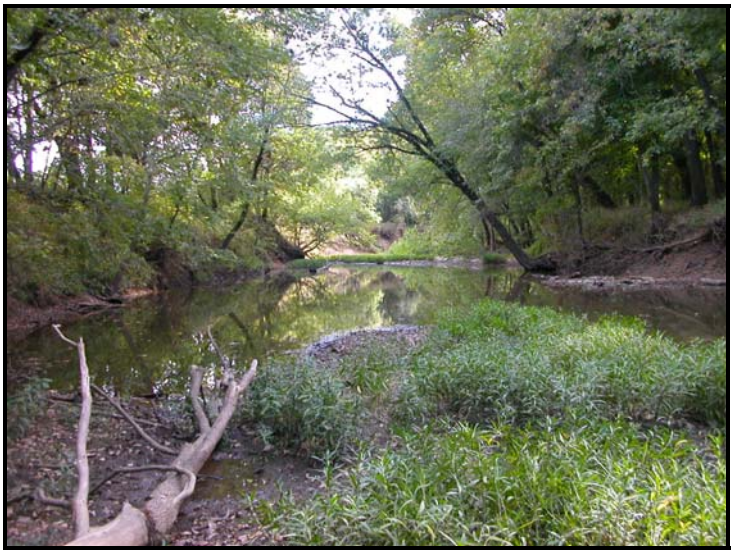


Image 1. Drum Creek, Montgomery Co.

Verdigris River Basin
HUC 11070103

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	25	432	33	207	6	7.66	110	5	0.02	1.3	0.04

TDS = total dissolved solids

Fish Species Collected

bigmouth buffalo
black buffalo
black bullhead
black crappie
bluegill
bluegill X warmouth hybrid
bluntface shiner
bluntnose minnow
brook silverside
bullhead minnow
central stoneroller
channel catfish
channel darter
common carp
flathead catfish
freckled madtom
freshwater drum
ghost shiner
gizzard shad
golden redhorse
green sunfish
largemouth bass
logperch
longear sunfish
longnose gar
orangespotted sunfish
orangethroat darter
red shiner
redear sunfish
redfin shiner
river carpsucker
shorthead redhorse
slenderhead darter
slim minnow
smallmouth buffalo
smallmouth X black buffalo hybrid
spotted bass
spotted sucker
stonecat
suckermouth minnow
warmouth
western mosquitofish
white bass
white crappie
yellow bullhead

Mussel Species Collected

black sandshell
bleufer
fragile papershell
mapleleaf
monkeyface
Ouachita kidneyshell
pimpleback
pistolgrip
plain pocketbook
round pigtoe
threehorn wartyback
threeridge
Wabash pigtoe
white heelsplitter
yellow sandshell

Verdigris River Basin
HUC 11070103

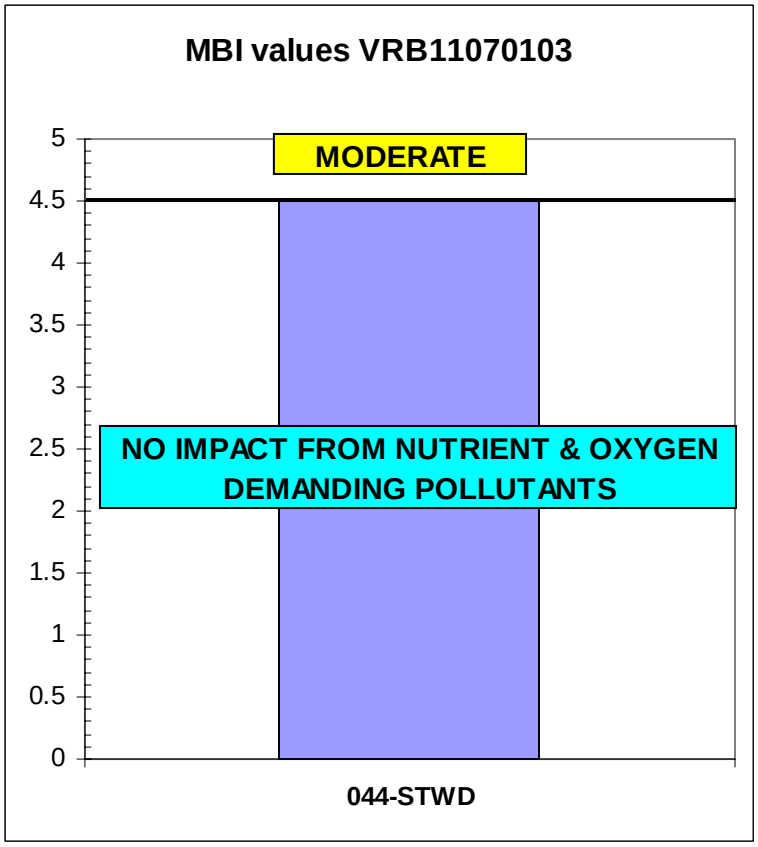


Figure 1. Graph of MBI value for HUC 11070103

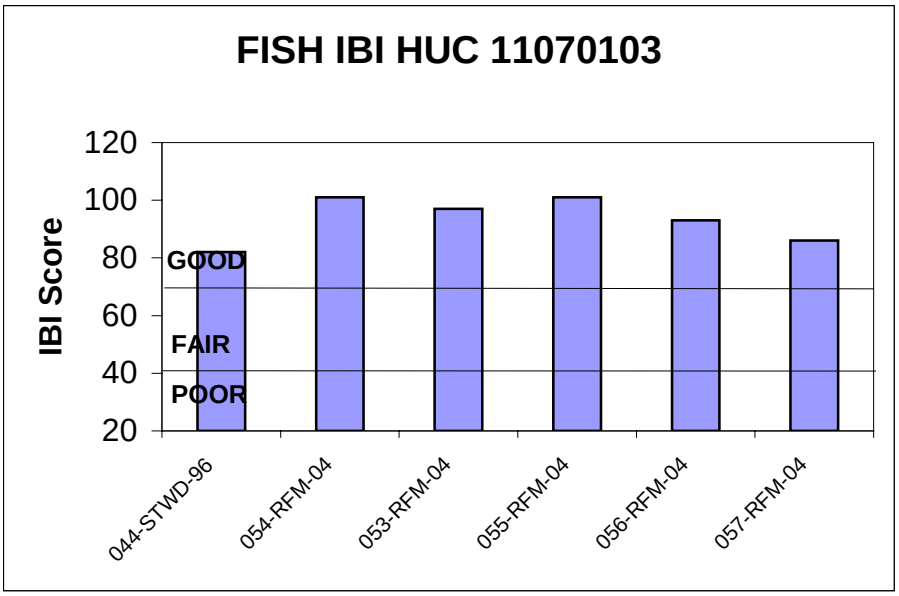
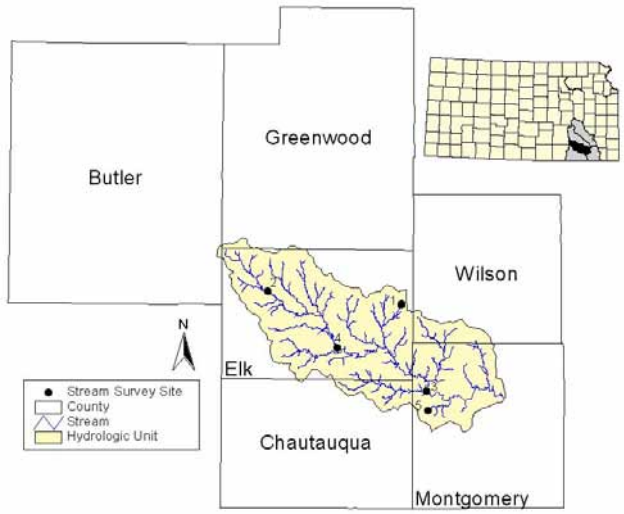


Figure 2. Graph of IBI values for HUC 11070103

Verdigris River Basin
HUC 11070104

LOCATION



- This HUC consists of 5 sites (7 samples).
- Sites were surveyed between 1994-2001.

BIOLOGICAL HIGHLIGHTS

- 4 samples were moderately impacted by nutrient and oxygen demanding pollutants, 3 samples were highly impacted (see figure 1)
- The overall MBI value for this HUC was 5.5, indicating high impact from nutrient and oxygen demanding pollutants.
- 41 species of fish were surveyed (see fish species collected, page 2)
- 22 species of freshwater mussels were surveyed (see mussel species collected, page 2)
    - SINC – creeper, deertoe, fatmucket, Wabash pigtoe, yellow sandshell

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	E Painterhood	EK	94	12	*	5.1	14
1			00	8	*	6.1	15
2	Elk	EK	97	15	0.676	5.2	25
3	Elk	MG	96	13	0.649	4.51	32
4	Elk	EK	00	23	0.505	5.43	26
5	Card	MG	95	11	*	7.03	4
5			01	6	*	9.5	1

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in good condition based on the information available at this time.
- Efforts should be utilized to further study the SINC mussel populations within this area.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

Image 1. Elk River, Elk Co.

Verdigris River Basin
HUC 11070104

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	24	209	42	102	7.9	8	105	49	0.12	2.2	0.05
1	24	240	22	130	8	6.97	NA	NA	NA	NA	NA
2	24	427	14	202	6.6	7.16	139	2.9	0.06	0.5	0.01
3	22	458	23	218	10.4	7.67	183	6.9	0.1	0.1	0.03
4	28	438	28	209	6.4	NA	183	10	0.09	0	0.01
5	25	NA	106	NA	1.2	8.2	215	73	0.55	2.4	0.11
5	21	920	265	460	5.2	7.58	NA	NA	NA	NA	NA

TDS = total dissolved solids

Fish Species Collected

bigeye shiner
bigmouth buffalo
black bullhead
blackstripe topminnow
bluegill
bluntface shiner
bluntnose minnow
brook silverside
bullhead minnow
central stoneroller
channel catfish
channel darter
common carp
flathead catfish
freckled madtom
freshwater drum
gizzard shad
golden redhorse
golden shiner
green sunfish
largemouth bass
logperch
longear sunfish
longnose gar
mimic shiner
orangespotted sunfish
orangethroat darter
red shiner
redfin darter
redfin shiner
shorthead redhorse
slenderhead darter
slim minnow
smallmouth buffalo
spotted bass
stonecat
warmouth
western mosquitofish
white bass
white crappie
yellow bullhead

Mussel Species Collected

Asian clam
bleufer
creeper
deertoe
fatmucket
fingernail clam
fragile papershell
giant floater
lilliput
mapleleaf
paper pondshell
pimpleback
pink papershell
pistolgrip
plain pocketbook
Pondhorn
pondmussel
threehorn wartyback
threeridge
Wabash pigtoe
white heelsplitter
yellow sandshell

Verdigris River Basin
HUC 11070104

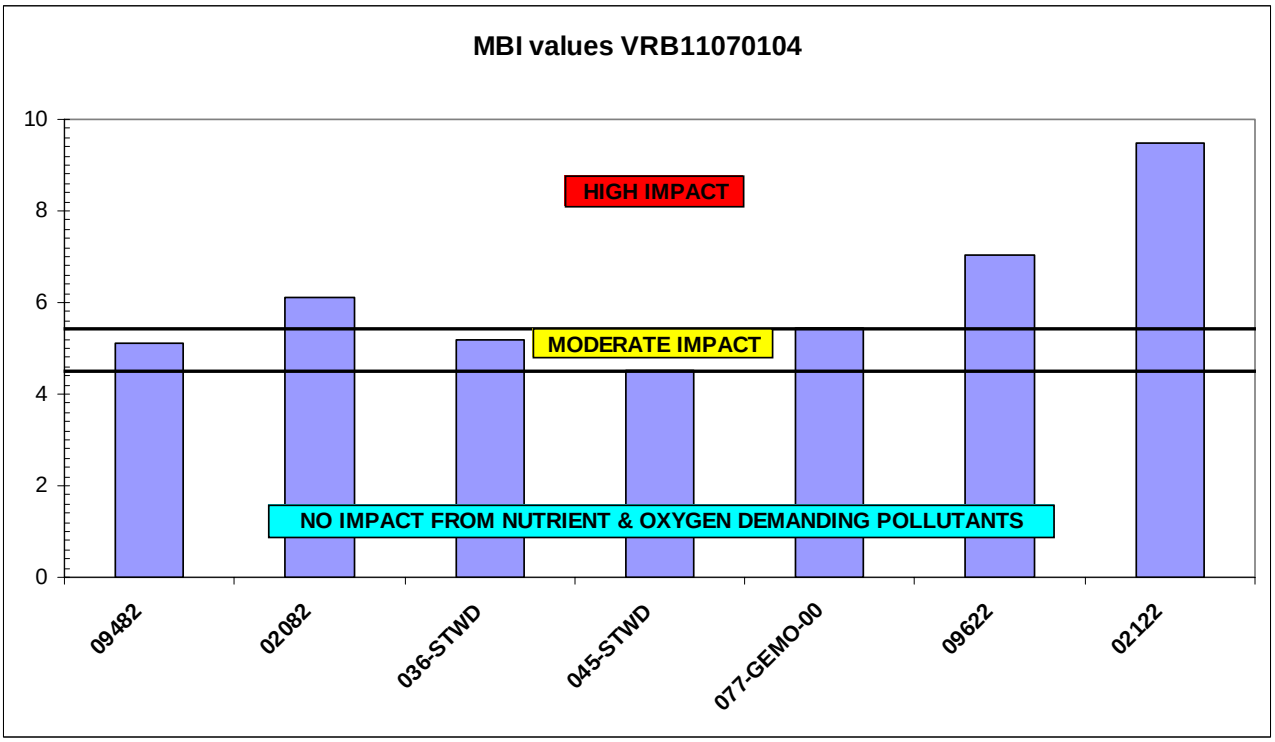


Figure 1. Graph of MBI values for HUC 11070104

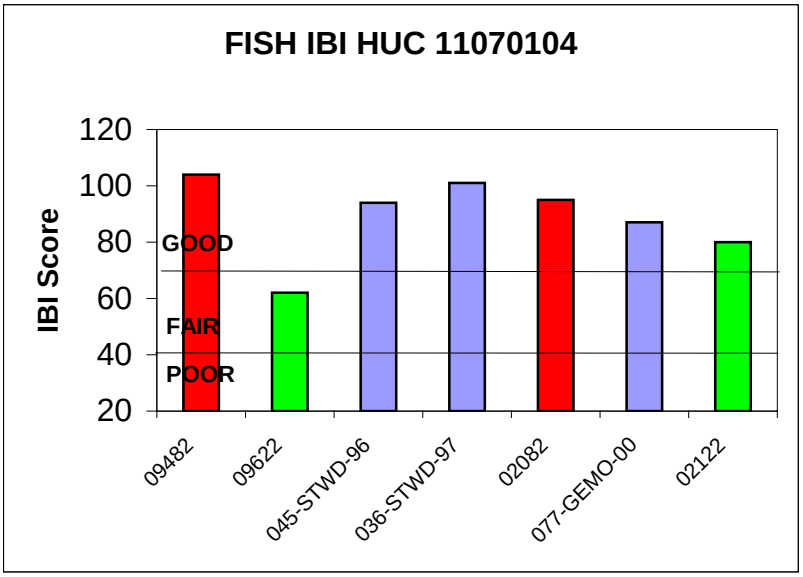
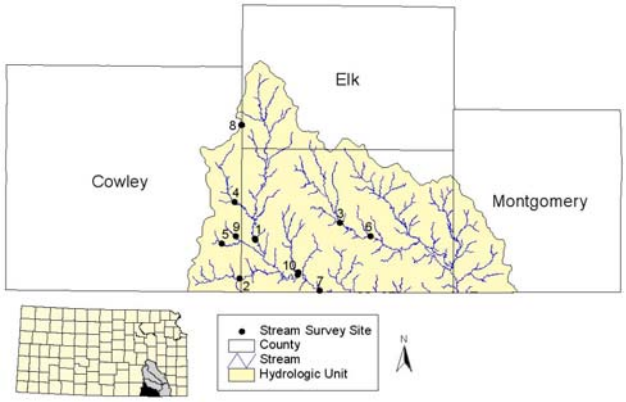


Figure 2. Graph of IBI values for HUC 11070104

Verdigris River Basin
HUC 11070106

LOCATION



- This HUC consists of 10 sites (14 samples).
- Sites were surveyed between 1995-2001.

BIOLOGICAL HIGHLIGHTS

- 3 samples were not impacted by nutrient and oxygen demanding pollutants, 4 samples were moderately impacted, and 7 samples were highly impacted (see figure 1)
- 43 species of fish were surveyed (see fish species collected, page 2)
- 23 species of freshwater mussels were surveyed (see mussel species collected, page 3)
    - Endangered – Neosho mucket
    - Threatened – Ouachita kidneyshell
    - SINC – creeper, deertoe, fatmucket, round pigtoe, Wabash pigtoe, yellow sandshell

Image 1. Caney River, Chautauqua Co.

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Caney	CQ	97	21	0.559	4.47	25
1			00	24	0.547	5.11	28
2	Rock	CL	97	16	0.785	4.43	26
3	Middle Caney	CQ	96	18	0.074	8.03	31
4	Otter	CL	96	18	*	7.08	18
5	Cedar	CL	96	10	0.059	8.26	20
6	Middle Caney	CQ	00	21	0.659	5.27	27
7	Caney	CQ	00	21	0.431	5.83	29
8	Spring	CL	95	5	*	4.77	3
8			01	13	0.025	9.01	2
9	N Cedar Trib	CL	95	9	*	4.83	
9			01	10	*	8.39	2
10	Caney	CQ	95	16	*	3.93	27
10			01	24	0.079	6.54	26

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair to good condition based on the information available at this time.
- Protection efforts should be utilized to maintain the endangered Neosho mucket population and the threatened Ouachita kidneyshell.
- Efforts should be utilized to further study the SINC mussel populations within this area.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

Verdigris River Basin
HUC 11070106

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	27	454	16	275	7.3	6.95	124	0	0.01	1.3	0.12
1	26	470	12	225	7.1	NA	200	15	0.03	0.5	0.02
2	25	380	7	190	5.5	7.05	93	6.3	0.01	0.2	0.01
3	27	400	31	190	5.8	7.65	152	1.1	0.08	0.8	0.02
4	26	466	13	220	6.7	7.76	130	6.7	0.03	0	0.02
5	26	717	19	342	6.1	7.56	134	8.5	0.03	0.4	0.02
6	25	502	12	237	7.4	NA	205	53	0.06	0.7	0.02
7	28	442	15	210	8.2	NA	182	28	0.03	0	0.02
8	19	1300	NA	6.02	9.1	8.2	209	40	0.04	1.1	0.02
8	19	450	30	230	6.3	7.76	NA	NA	NA	NA	NA
9	20	3890	45	207	9.7	8.5	54	8	0.02	1.3	0.01
9	25	350	42	180	3.9	7.7	NA	NA	NA	NA	NA
10	23	350	75	170	5.4	7.23	NA	NA	NA	NA	NA
10	24	486	9	231	3.1	8	164	38	0.03	2	0.02

TDS = total dissolved solids

Fish Species Collected

bigeye shiner
black buffalo
blackstripe topminnow
bluegill
bluntface shiner
bluntnose minnow
brook silverside
bullhead minnow
central stoneroller
channel catfish
channel darter
common carp
flathead catfish
freckled madtom
freshwater drum
gizzard shad
golden redhorse
green sunfish
inland silverside
largemouth bass
logperch
longear sunfish
longnose gar
mimic shiner
orangespotted sunfish
orangethroat darter
red shiner
redfin darter
redfin shiner
river carpsucker
rosyface shiner
shorthead redhorse
shortnose gar
slenderhead darter
slim minnow
smallmouth buffalo
spotted bass
suckermouth minnow
warmouth
western mosquitofish
white bass
white crappie
yellow bullhead

Verdigris River Basin
HUC 11070106

Mussel Species Collected

Asian clam	lilliput	pondmussel
bleufer	mapleleaf	round pigtoe
creeper	Neosho mucket	threehorn wartyback
deertoe	Ouachita kidneyshell	threeridge
fatmucket	pimpleback	Wabash pigtoe
fingernail clam	pistolgrip	white heelsplitter
fragile papershell	plain pocketbook	yellow sandshell
giant floater	pondhorn	

Verdigris River Basin
HUC 11070106

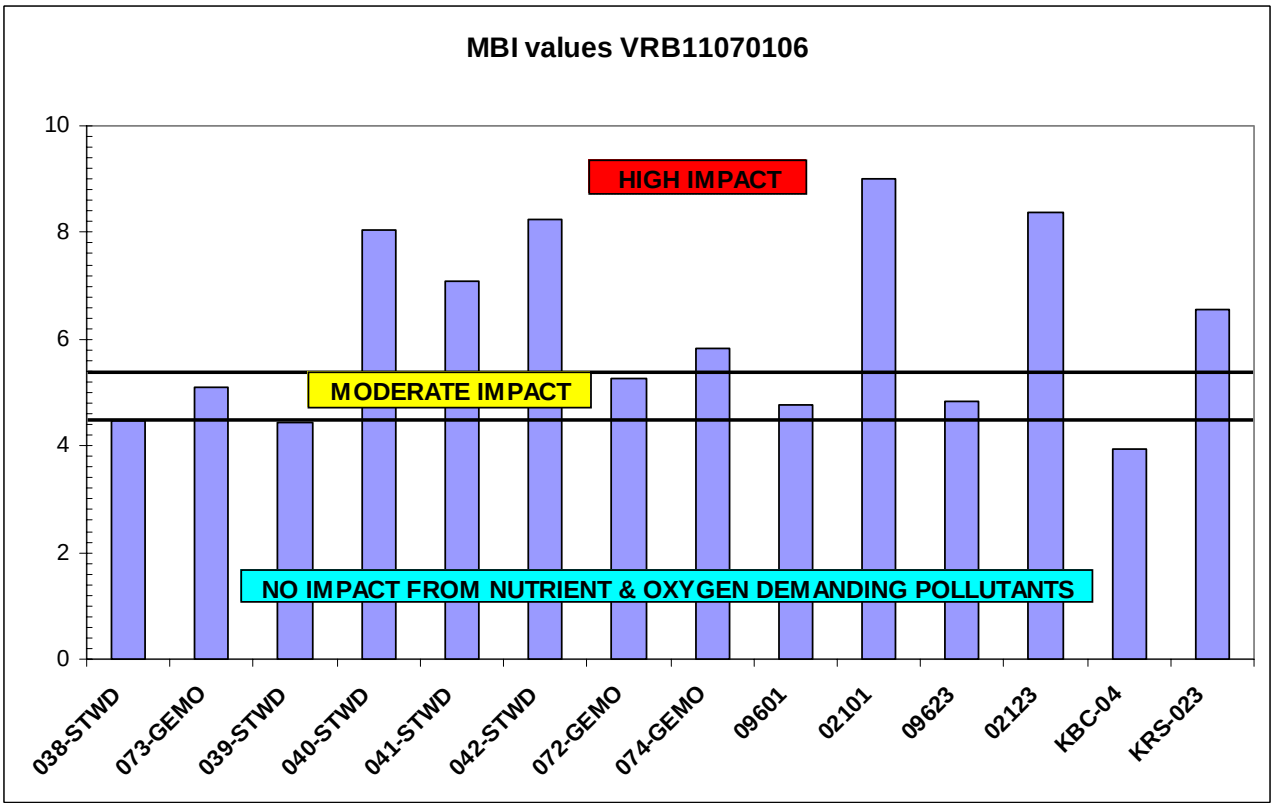


Figure 1. Graph of MBI values for HUC 11070106

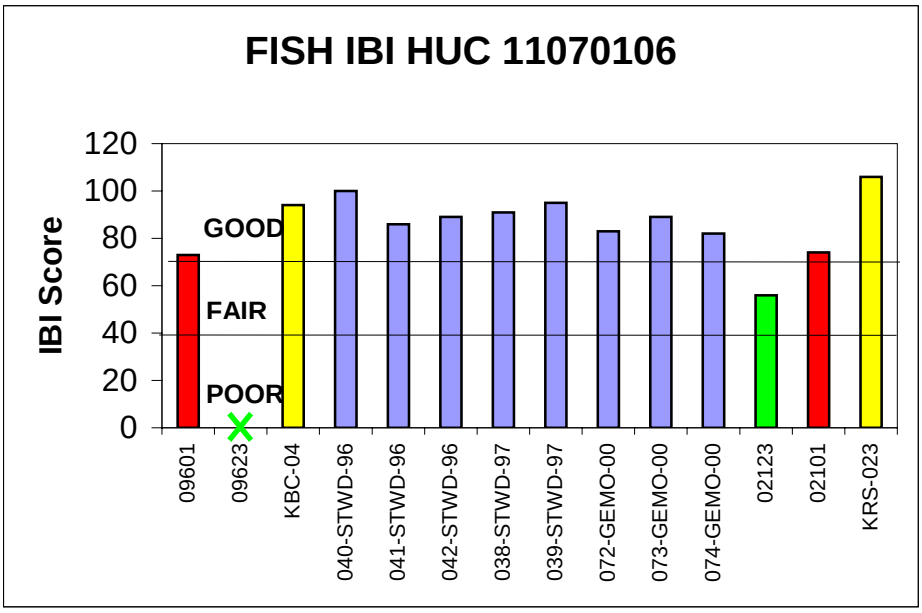
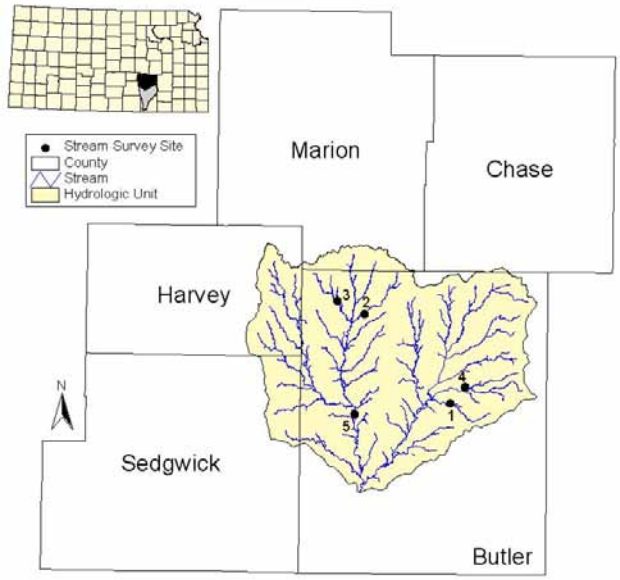


Figure 2. Graph of IBI values for HUC 11070106

Walnut River Basin
HUC 11030017

LOCATION



- This HUC consists of 5 sites (6 samples).
- Sites were surveyed between 1994-2000.

BIOLOGICAL HIGHLIGHTS

- 1 sample was moderately impacted by nutrient and oxygen demanding pollutants, 5 samples were highly impacted (see figure 1)
- The overall MBI value for this HUC was 5.81, indicating high impact from nutrient and oxygen demanding pollutants.
- 38 species of fish were surveyed (see fish species collected, page 2).
    - SINC – spotted sucker
- 17 species of mussels were surveyed (see mussel species collected, page 2)
    - SINC – creeper, deertoe, fatmucket, Wabash pigtoe

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Bird	BU	97	15	0.250	9.32	12
2	EB Whitewater	BU	97	17	0.317	8.23	14
3	Henry	BU	96	11	0.222	8.79	16
4	Bemis	BU	94	7	*	7.25	24
4			00	7	*	7.37	13
5	Whitewater	BU	00	18	0.458	4.52	17

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in fair condition based on the information available at this time.
- Efforts should be utilized to further study the SINC mussel and fish populations within this area.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

Image 1. Bird Creek, Butler Co.

Walnut River Basin
HUC 11030017

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	16	355	70	170	5.3	7.76	173	53	0.01	2.6	0.11
2	16	437	191	210	7.7	8.8	136	23	0.11	10	0.59
3	15	1272	23	601	3	7.84	309	9.6	NA	0.6	0.55
4	24	453	18	222	5.3	8.1	205	15	0.05	2	0.07
4	24	410	32	210	7.9	7.48	NA	NA	NA	NA	NA
5	26	1126	39	545	5.5	NA	225	96	0.07	2.7	0.22

TDS = total dissolved solids

Fish Species Collected

black bullhead
black crappie
blackstripe topminnow
bluegill
bluntnose minnow
brook silverside
bullhead minnow
central stoneroller
channel catfish
common carp
fathead minnow
flathead catfish
freckled madtom
freshwater drum
gizzard shad
golden redhorse
golden shiner
green sunfish
largemouth bass
logperch
longear sunfish
longnose gar
orangespotted sunfish
orangethroat darter
red shiner
redfin shiner
river carpsucker
rosyface shiner
sand shiner
shorthead redhorse
slenderhead darter
smallmouth buffalo
spotted sucker
suckermouth minnow
walleye
western mosquitofish
white bass
yellow bullhead

Mussel Species Collected

Asian clam
bleufer
creeper
deertoe
fatmucket
fingernail clam
fragile papershell
giant floater
mapleleaf
pimpleback
pistolgrip
plain pocketbook
pondhorn
pondmussel
threeridge
Wabash pigtoe
white heelsplitter

Walnut River Basin
HUC 11030017

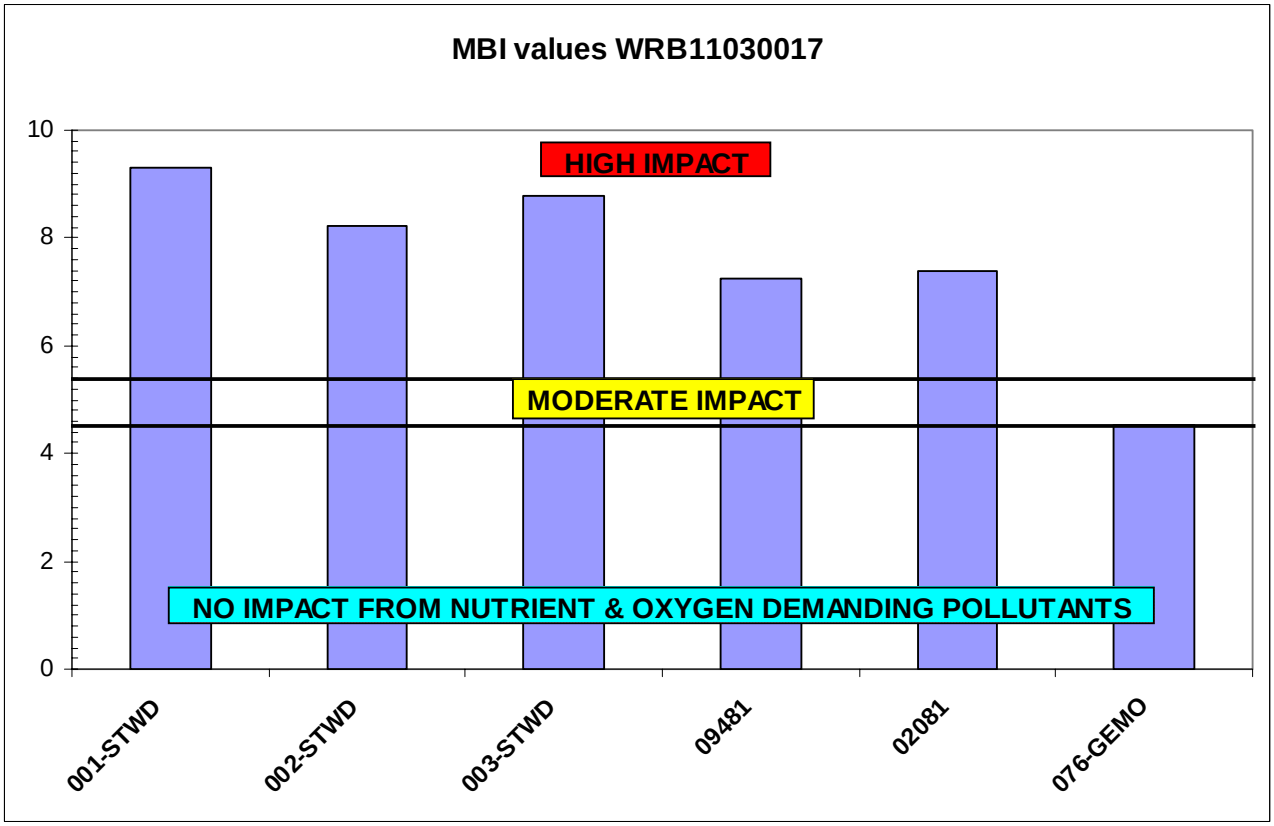


Figure 1. Graph of MBI values for HUC 11030017

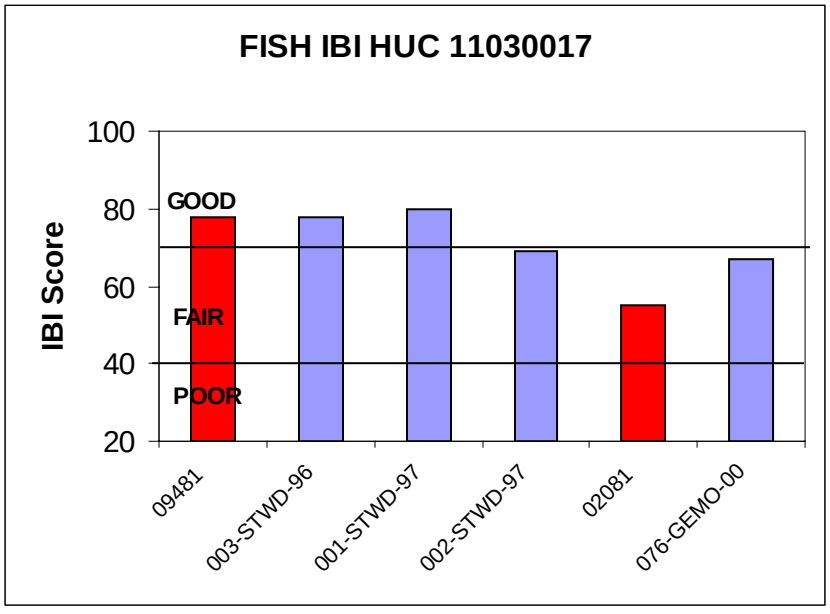
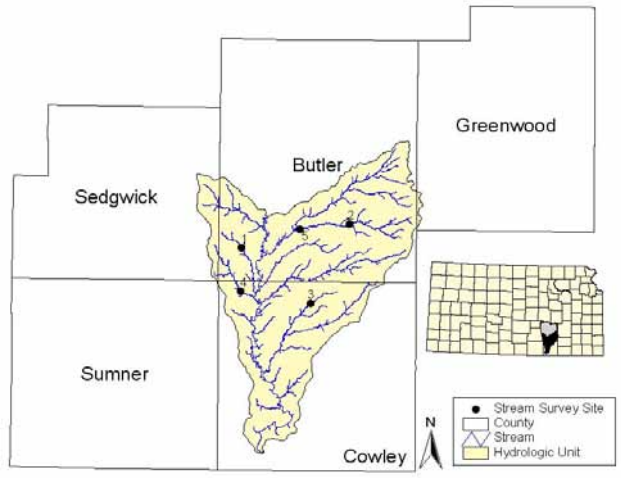


Figure 2. Graph of IBI values for HUC 11030017

Walnut River Basin
HUC 11030018

LOCATION



- This HUC consists of 5 sites (5 samples).
- Sites were surveyed between 1996-2003.

BIOLOGICAL HIGHLIGHTS

- 1 sample was not impacted by nutrient and oxygen demanding pollutants, 1 sample was moderately impacted, and 3 samples were highly impacted (see figure 1).
- The overall MBI value for this HUC was 7.55, indicating high impact from nutrient and oxygen demanding pollutants.
- 37 species of fish were surveyed within this area (see fish species collected, page 2)
- 12 species of freshwater mussel were surveyed (see mussel species collected, page 2)
    - SINC – creeper, Wabash pigtoe

Site #	Stream Name	Co	Yr	Insect Rich	EPT	MBI	Fish Rich
1	Eight Mile	BU	96	8	0.097	10.02	16
2	Hickory	BU	96	12	0.040	7.48	23
3	Dutch	CL	96	13	0.180	5.07	22
4	Polecat	CL	96	13	0.300	5.68	21
5	Hickory	BU	03	20	0.643	4.47	23

*Fewer than 100 individual insects collected
Highlighted rows represent different sampling events at the same location; Rich = richness

SUMMARY

- This HUC could be considered to be in good condition based on the information available at this time.
- Efforts should be utilized to further study the SINC mussel populations within this area.
- Additional surveys should be performed as the opportunities arise and conditions permit to further assess the biological integrity of this HUC and gain more data.
- A water quality table is presented on page 2

Walnut River Basin
HUC 11030018

Water Quality Table

Site#	H20 Temp C	Conductivity mS	Turbidity FTU	TDS mg/l	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Chlorides mg/l	Ammonia mg/l	Nitrates mg/l	Phosphorus mg/l
1	15	1889	25	928	2.2	7.8	259	7.3	NA	0	0.9
2	25	530	27	255	5.3	7.63	NA	5.5	0.03	1.1	0.12
3	21	236	342	112	8.6	7.74	NA	8	0.4	30.5	0.08
4	22	346	192	164	6.6	7.73	NA	2.3	0.21	15.4	0.14
5	24	615	26	299	3.2	7.7	5.6	0.1	0.06	0.3	0.01

TDS = total dissolved solids

Fish Species Collected

bigmouth buffalo
black bullhead
black crappie
blackstripe topminnow
bluegill
bluntnose minnow
brook silverside
bullhead minnow
central stoneroller
channel catfish
channel darter
common carp
fathead minnow
flathead catfish
freckled madtom
gizzard shad
golden redhorse
golden shiner
green sunfish
largemouth bass
logperch
longear sunfish
orangespotted sunfish
orangethroat darter
red shiner
redfin shiner
rosyface shiner
sand shiner
shorthead redhorse
slenderhead darter
slim minnow
spotted bass
stonecat
suckermouth minnow
western mosquitofish
white crappie
yellow bullhead

Mussel Species Collected

Asian clam
creeper
fragile papershell
giant floater
mapleleaf
pimpleback
pistolgrip
pondhorn
pondmussel
threeridge
Wabash pigtoe
white heelsplitter

Walnut River Basin
HUC 11030018

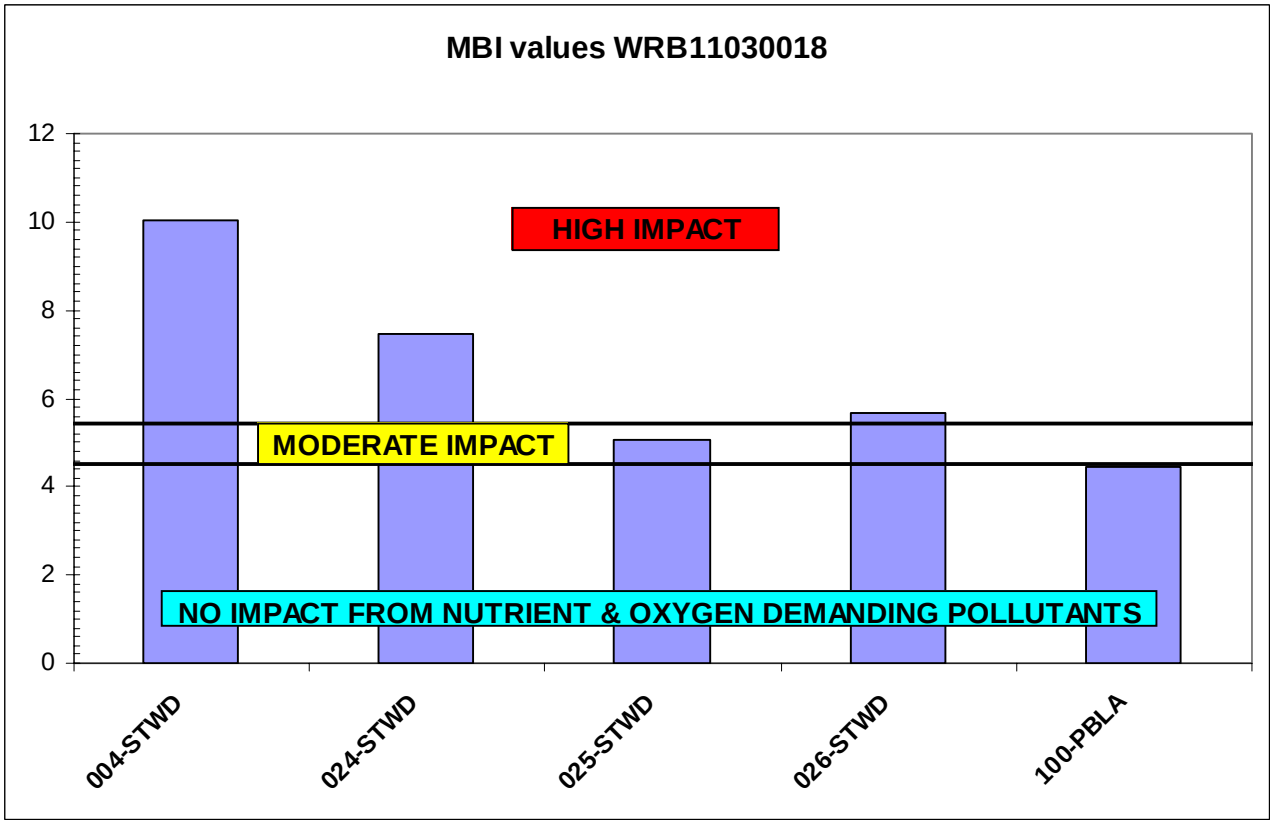


Figure 1. Graph of MBI values for HUC 11030018

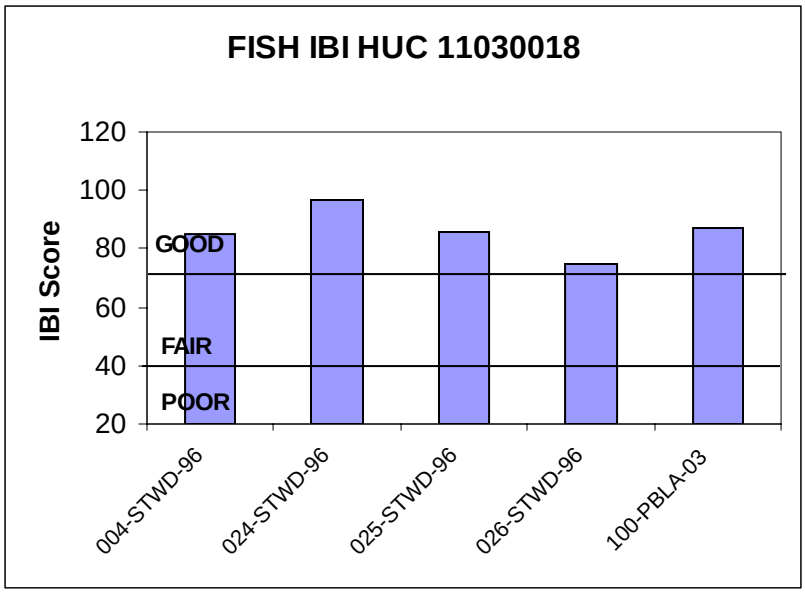


Figure 2. Graph of IBI values for HUC 11030018