HABITAT CONDITIONS

Channel Alterations

There have been no significant channel alterations anywhere throughout the Eleven Point Watershed. Small channelization projects have probably occurred on private property and also from road and bridge construction. These activities are currently not considered to be a major threat to the river system. However, there are currently (1998) 8 permitted gravel removal operations within the watershed (Figure Wq01) (USACOE 1998). The negative impacts of gravel mining have been shown to include channel deepening, sedimentation of downstream habitats, accelerated bank erosion, the formation of a wider and shallower channel, the lowering of the floodplain water table, and channel shift (Roell 1999).

National Scenic River

Congress passed legislation which established the National Wild and Scenic Rivers System in 1968. Forty four miles of the Eleven Point River, which was free of impoundments with its shoreline and watershed still largely undeveloped, qualified as a National Scenic River (USFS 1995). Thus the portion of the Eleven Point River between Thomasville and Highway 142 Bridge became one of the 8 initial units of the National Wild and Scenic River Systems.

Approximately half of the lands within the Eleven Point National Scenic River Area are privately owned (USFS 1995). The remainder of the area is owned and managed by the United States Forest Service. To assure the continued natural appearance of this area, private lands along the river are protected by scenic easements, acquired from landowners within the National Scenic River Area.

Natural Features

In the late 1980s and early 1990s the Missouri Department of Conservation inventoried counties within the Eleven Point River Watershed for unique natural features (Nigh 1988; Ryan and Smith 1991). The inventories recognized seven categories of natural features: examples of undisturbed natural communities, habitat of rare or endangered species, habitat of relict species, outstanding geological formations, areas for nature studies, other unique features, and special aquatic areas having good water quality, flora and fauna. These studies identified 134 potential natural features in the Eleven Point River Watershed. Of the 134 sites, 35 had exceptional or highly significant natural features. The Eleven Point River was recognized as an outstanding natural feature. Blue Spring was recognized as the most exceptional spring site in the state and the surrounding area was identified as containing an outstanding aquatic community. The corridor of the Eleven Point River near Greer contained an exceptional example of a mesic dolomite forest. Unique and outstanding dolomite bluffs, glades, and dry music chert forests are common throughout the watershed. Other types of exceptional or highly significant features found in the watershed include: pond swamp and marsh, dry chert forest, mesic dolomite forest, pond marsh/shrub swamp, effluent cave, deep phreatic spring, marsh (fen), fen, dry-mesic bottomland forest, flatwoods, pond shrub swamp, pin oak flatwoods/pond marsh and forested acid seep (Nigh 1988; Ryan and Smith 1991).

Improvement Projects

Currently there are no Missouri Department of Conservation stream habitat improvement projects in the Eleven Point Watershed.

Stream Habitat Assessment

Stream and riparian habitat quality were evaluated at 16 sites throughout the Eleven Point Watershed in 1992 and 1995 by Missouri Department of Conservation and United States Forest Service personnel (Figure Hc01). Habitat quality was assessed using the Missouri Department of Conservation Stream Habitat Assessment Device (SHAD II). SHAD survey sites were selected independently of historic fish collection sites. SHAD surveys helped identify common problems throughout the watershed and provided a standardized description of habitat condition at specific locations. For purposes of evaluation, the SHADS were grouped according to their location in the watershed. Any particular SHAD was assigned to one of three major drainage sections: the Upper Eleven Point Section (above Spring Creek), Middle Eleven Point Section (between Spring Creek and Fredrick Creek), or the Lower Eleven Point Section (below Fredrick Creek). This grouping proved to be appropriate for evaluating general physical habitat characteristics since many of the habitat conditions at the sites within each drainage section were similar. However, because of the small number of SHAD sites and the subjective, general nature of the SHADs and this grouping, this evaluation can not be considered a thorough and accurate representation of the entire Eleven Point Watershed.

The upper Eleven Point Drainage Section consisted of eight survey locations. Seven surveys were conducted on the Eleven Point River and one on the Middle Fork. Streams in the upper section rated lowest in habitat quality. Timbered stream corridor width at all but one site, had at least a portion of one of the stream banks with less than 100 feet of timbered corridor. Stream banks ranged from stable to severely eroded. Silt and organic debris composed 15% to 45% of the stream substrate on all of the streams in the upper section except the Middle Fork, where substrate was composed primarily of cobble and gravel. Additional habitat concerns included a lack of instream cover and a significant amount of algal growth, indicating a high nutrient influx.

Habitat conditions in the Middle Drainage Section of the Eleven Point were the best (This portion of the watershed is almost entirely within United States Forest Service boundaries). Timbered stream corridor width was >100 feet and bank erosion is minimal at all three survey locations. In-stream cover was sparse, primarily consisting of boulders. Substrate was primarily composed of cobble and gravel.

Four SHAD surveys were completed in the Lower Eleven Point Drainage Section. Habitat quality in this portion of the watershed was impacted by farming operations. Most of the stream corridor contained <100 feet of timber. Instream cover was very sparse, consisting primarily of small patches of water willow (< 2% of wetted area). Silt and organic debris were prevalent. Algal growth was significant at all sites, indicating a high nutrient influx. Cattle had direct access to the stream at three of the four survey sites; Piney Creek (River Mile 3); Fredrick Creek (River Mile 9); Eleven Point River (River Mile 2-3).

Selected SHAD data was entered into a geographic information system (GIS) database based on a numerical system which enabled more efficient analysis of data. Sites were evaluated based on the following SHAD categories: "stream bank erosion", stream bank erosion protection", "percent timbered stream corridor", and "narrowest width of timbered corridor".

Numerical values associated with different levels of condition for each category were then assigned to left and right streambanks and corridors of each riffle and pool evaluated with 1 being extremely poor and 5 being excellent. These values were then averaged to give an overall grade for the site (Figure Hc01). The lowest grade within the Eleven Point Watershed was a 3 (fair). Three sites received this

rating; all of which are located in the Upper Eleven Point Drainage Section. Three sites were rated as 5 (excellent) one of which was a dry site located on the Upper Eleven Point River. It was felt that data from this site was still pertinent to determining erosion and scour susceptibility of this site during a flood event. The remaining 10 sites were rated as 4 (good).

An aerial survey of the Eleven Point Watershed was made during February, 1995. The survey flight covered the entire length of the Eleven Point River within Missouri and many of the major tributaries. A video tape of the reconnaissance flight was used to identify areas of significant channel and bank disturbance(Tables Hc01, Hc02, and Figure Hc01) .

Perhaps one of the more difficult attributes of a watershed to attempt to quantify is stream habitat. This is due to the fact that there are several dynamic characteristics which make up stream habitat. To evaluate all of these characteristics individually and accurately for an entire watershed is a monumental task. Thus, the next best thing is to evaluate a characteristic that has the most impact on all aspects of stream habitat. This is, arguably, riparian corridor land cover/land use. Riparian corridor land cover effects many aspects of stream habitat. These include, but are not limited to water temperature, turbidity, nutrient loading, sand/gravel deposition, in-stream cover, flow, channel width, and channel stability. These in turn have effects on still other characteristics of stream habitat such as food availability, dissolved oxygen, cover, spawning areas, etc.

Evaluation of riparian corridor land cover/land use within the Eleven Point Watershed was accomplished using Missouri Resource Assessment Partnership Phase 1 Land Cover Data. A buffer zone 3 pixels (90 meters) wide was created which corresponded to a 1:100,000 hydrography coverage for the watershed. This was split into segments no longer than 0.25 miles long (Caldwell, personal communication). Percent land use for each segment was then calculated. Land cover/land use categories included forest, woodland, grassland, cropland, urban, and water. Percentages of these categories were then calculated for riparian corridors within each of the 20 fourteen digit hydrologic units, the three main drainage sections within the watershed, as well as the whole watershed.

Results for the entire watershed indicate that corridor land use consists of more forest/woodland (65.0%) than grassland/cropland (33.7%). Combined percentages for the remaining categories are less than 4% of the total riparian corridor land cover/land use in the watershed. Of the three major drainage sections within the watershed, the Middle Eleven Point Section has the highest combined percentage of forest/woodland corridor land cover/land use at 77.8%. It also has the lowest combined percentage of grassland/cropland corridor land use at 20.5%. This is due in large part to the fact that much of this section is part of the Mark Twain National Forest. Table Hc03 gives riparian corridor land cover/land use percentages for all fourteen digit hydrologic units within the watershed as well as percentages for the three major drainage sections of the watershed and the total watershed. Figure Hc02 presents a graphic representation of riparian corridor land cover/land use for all fourteen digit hydrologic units within the watershed.

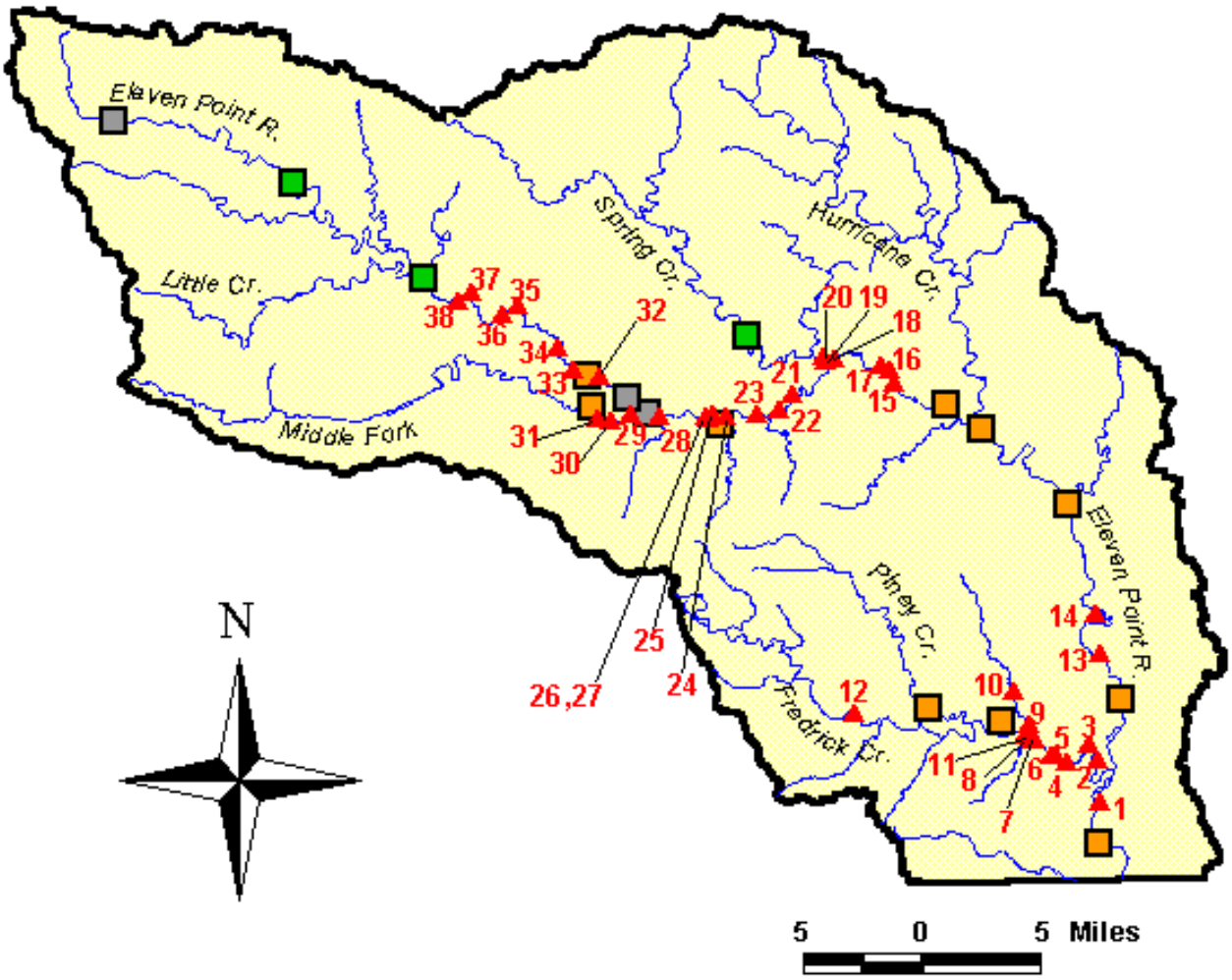
Approximately 21 miles of stream within the Eleven Point Watershed are designated for cold-water sport fishery (MDNR 1994). Twenty miles of the Eleven Point River are designated for cold-water sport fishery from the mouth of Greer Spring Branch to approximately Highway 160 at Riverton. The remaining 1 mile is Greer Spring Branch (Figure Hc03).

As part of an effort to further quantify cold water resources throughout the Eleven Point Watershed, long-term temperature recorders were deployed in July and retrieved in September of 1995. In addition to

the eight temperature recorders deployed throughout the Eleven Point River, a single unit was deployed on Greer Spring Branch and two were deployed on Hurricane Creek (Figure Hc03). Figure Hc04 shows the maximum 3 hour consecutive water temperatures from the Eleven Point River and Greer Spring Branch during the months of July, August, and September of 1995. Greer Spring Branch reached a maximum temperature of 64.4 degrees Fahrenheit (deg. F.). The confluence of Greer Spring Branch just below river mile 34, strongly influences the temperature of the Eleven Point River, as witnessed by the 10 deg. F. drop in temperature from river mile 34 to river mile 28. Temperature recorders were deployed at river miles 1 and 4 on Hurricane Creek. A maximum temperature of 74 deg. F. was reached at both locations on Hurricane Creek.

Figure Hc01.

Eleven Point Watershed
Habitat



Legend

▲ Aerial Inventory Site (Tables Hc2 and Hc3)

S.H.A.D. Site (1995)*

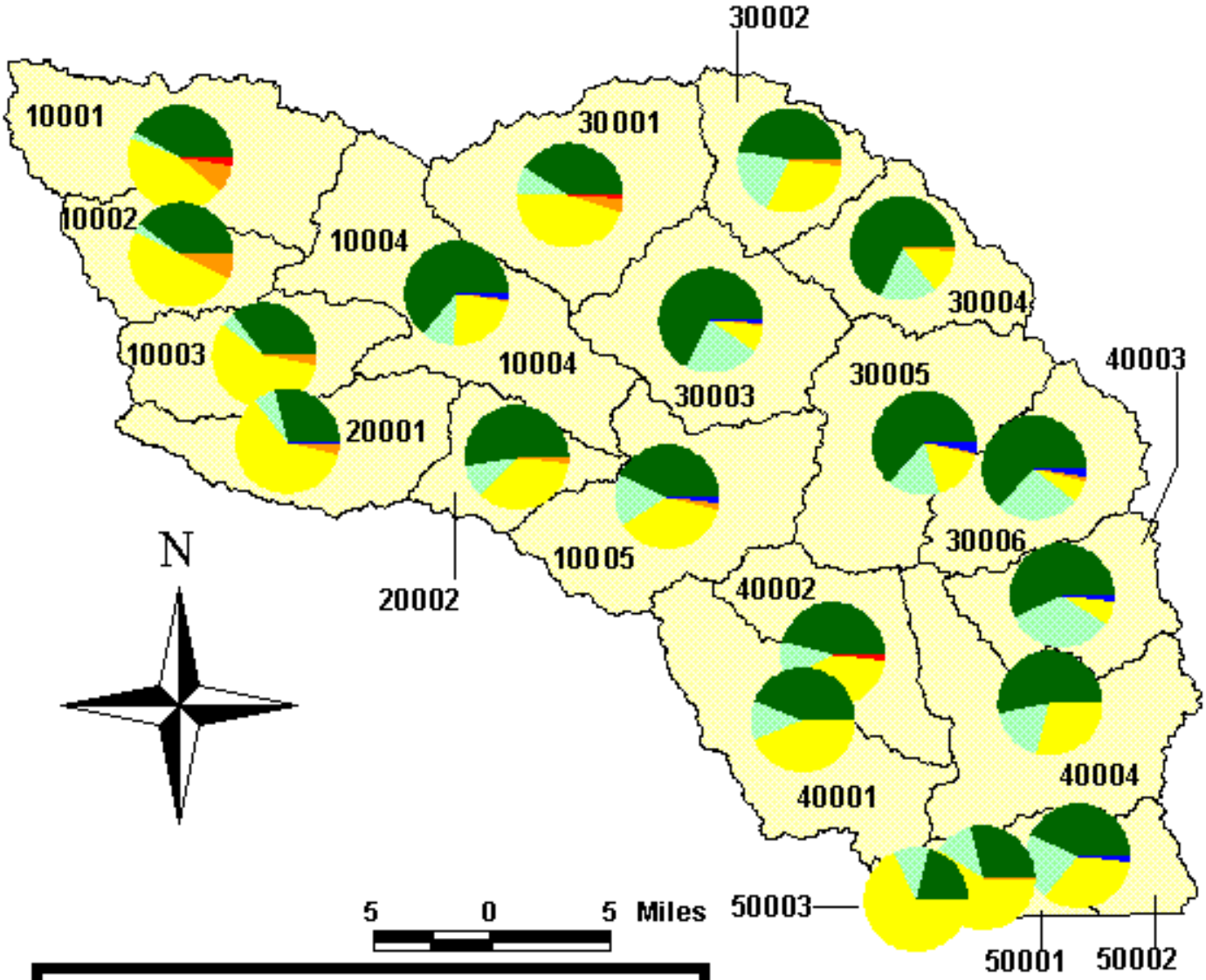
- Fair
- Good
- Excellent

*Stream Habitat Assessment Device (S.H.A.D.) ratings based only on the following catagories: "streambank erosion", "streambank erosion protection","percent of timbered stream corridor >or= 100ft", and "narrowest width of timbered corridor".

Figure Hc02.

Eleven Point Watershed

Riparian Corridor Land Cover /Land Use



Legend

Percent Land Cover/Land Use*

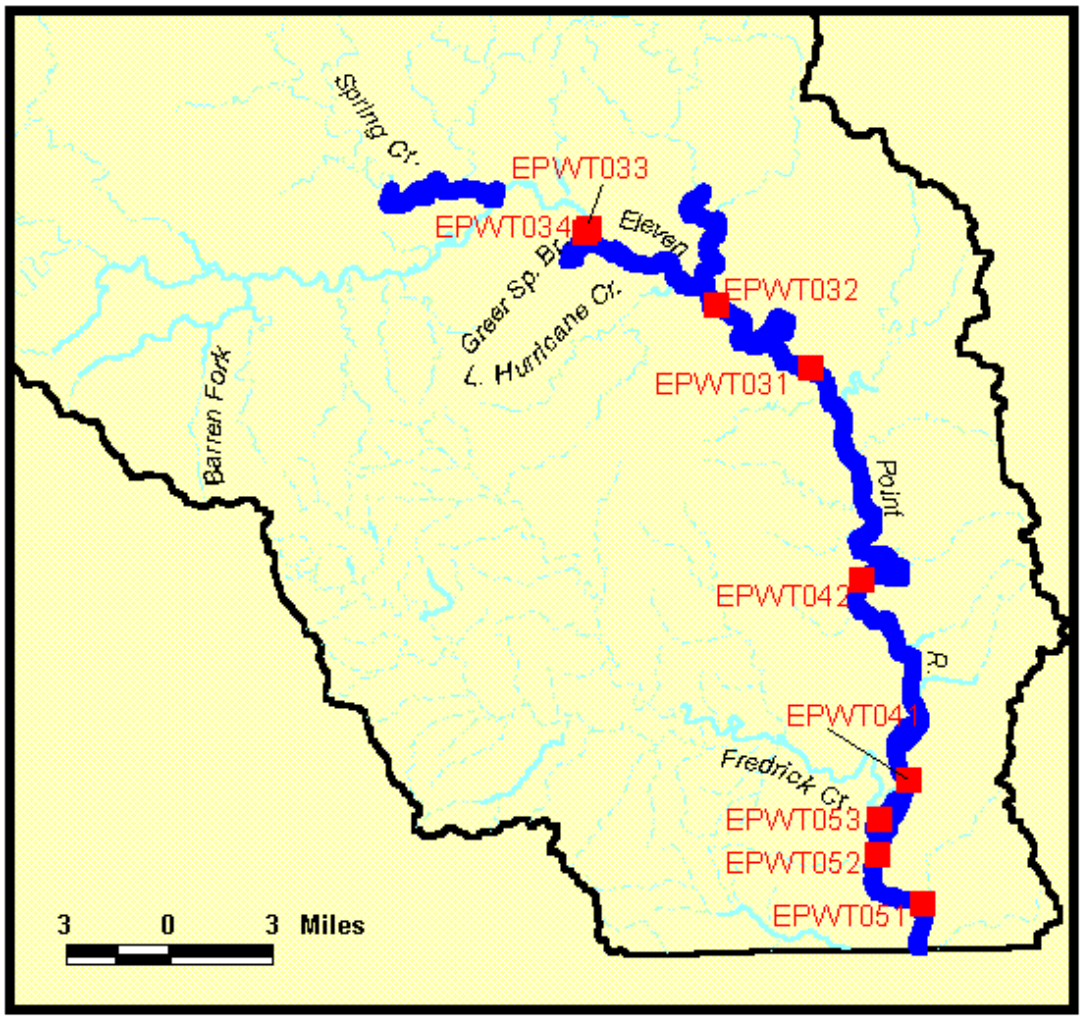
- Forest
- Cropland
- Woodland
- Urban
- Grassland
- Water

*Based on Missouri Resource Assessment Partnership (MoRAP) Phase 1 Land Cover Map December, 1997

MDC 5/1999

Figure Hc03.

Eleven Point Watershed
Cold Water



Legend

Temperature Monitoring Site

Cold Water Stream*

* "Streams designated for cold-water sport fishery" in the Missouri Dept. of Natural Resources Clean Water Commission regulations 1996 (10 CSR 20.7, Table C)

N

MDC 5/1999

Figure Hc04. Maximum three hour consecutive temperatures for selected sites on the Eleven Point River as well as one site on Greer Spring Branch..

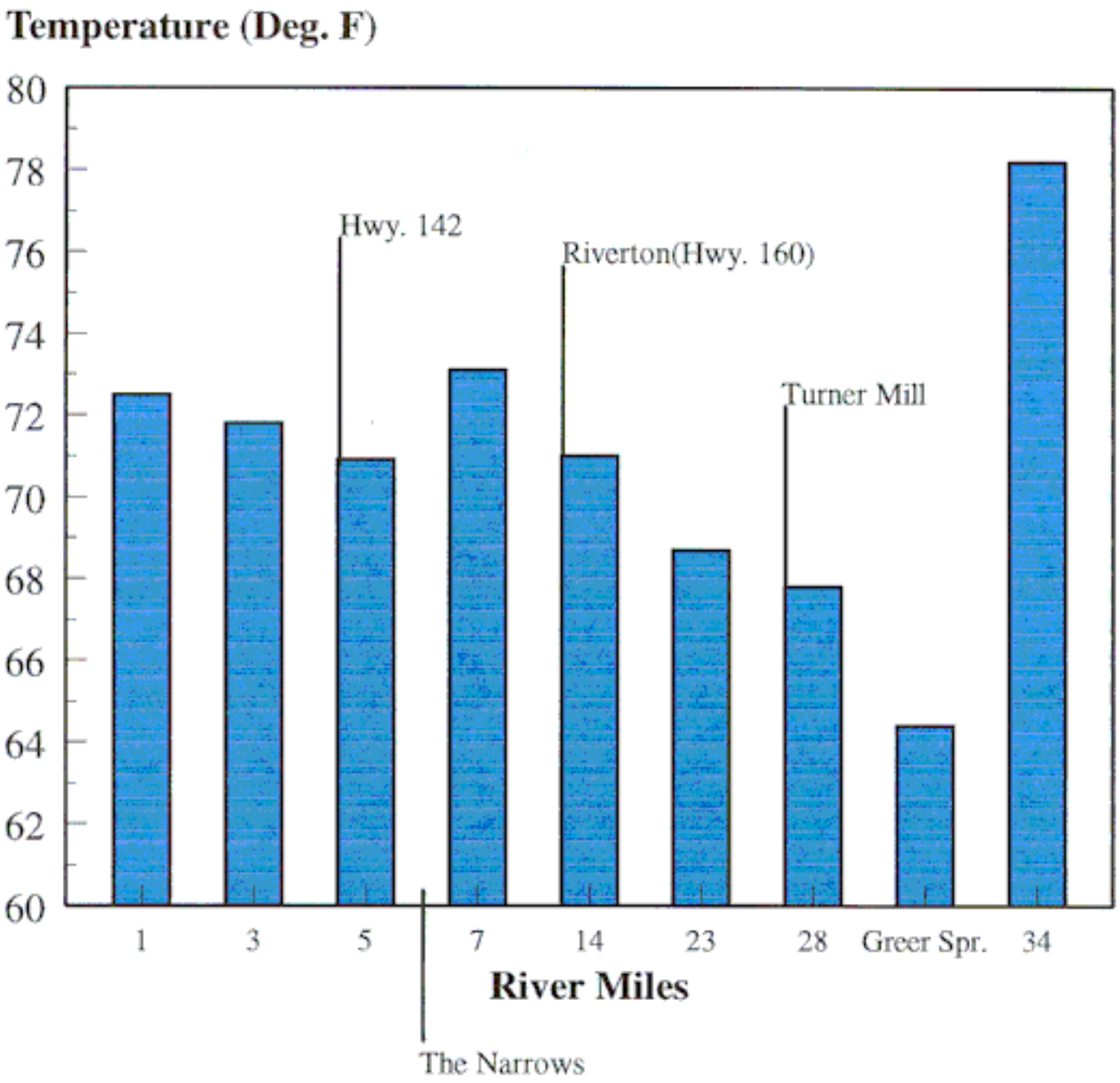


Table Hc01. Qualitative observations of stream channel condition and use of selected sites within the Eleven Point Watershed based on aerial video (1995).

Site*	Stream Name	Left Bank Condition/Land Use	Right Bank Condition/Land Use
1	Eleven Point River	Erosion/Pasture	Stable/Timber
2	Fredrick Creek	Erosion/Pasture	Deposition/Pasture
3	Fredrick Creek	Erosion/Timber	Deposition/Timber
4	Fredrick Creek	Erosion/Pasture	Stable/Timber
5	Fredrick Creek	Erosion	Deposition
6	Fredrick Creek	Erosion	Deposition/Pasture
7	Fredrick Creek	Headcutting	Headcutting
8	Fredrick Creek	Erosion	Deposition/Pasture
9	Dry Creek	Erosion/Pasture	Stable /Pasture
10	Dry Creek	Erosion/Pasture	Stable /Pasture
11	Fredrick Creek	Stable/Timber	Erosion/Pasture
12	Fredrick Creek	Erosion	Cattle in Stream/Pasture
13	Eleven Point River	Erosion	Deposition/Pasture

14	Eleven Point River	Erosion/Timber	Stable/Timber
15	Eleven Point River	Erosion	Deposition/Timber
16	Eleven Point River	Stable/Timber	Erosion/Timber
17	Eleven Point River	Stable/Timber	Erosion/Timber
18	Eleven Point River	Stable/Timber	Erosion/Sparse Timber
19	Spring Creek	Erosion/Timber	Erosion/Timber
20	Spring Creek	Timber	Grassland
21	Eleven Point River	Erosion	Deposition
22	Eleven Point River	Erosion/Pasture	Deposition/Timber
23	Eleven Point River	Stable/Timber	Erosion/Pasture

Site*	Stream Name	Left Bank Condition/Land Use	Right Bank Condition/Land Use
24	Eleven Point River	Open Grassland	Open Grassland
25	Eleven Point River	Stable /Pasture	Erosion/Pasture
26	Eleven Point River	Erosion/Pasture	Stable/Timber

27	**Eleven Point River**	**Erosion**	**Deposition/Pasture**
28	**Eleven Point River**	**Erosion/Pasture**	**Timber**
29	**Middle Fork**	**Erosion**	**Channel Widening/Gravel Mining**
30	**Middle Fork**	**Erosion**	**Channel Widening/Gravel Mining**
31	**Middle Fork**	**Erosion**	**Channel Widening/Gravel Mining**
32	**Eleven Point River**	**Erosion**	**Stream Widening/Gravel Mining**

Table Hc02. Qualitatve observations of timbered stream corridor at selected points within the Eleven Point Watershed based on aerial video (1995).

Site*	Left Timbered Corridor Width			Right Timbered Corridor Width		
	%>100ft	%50-100ft	%<10ft	%>100ft	%50-100ft	%<10ft
1	0	0	100	100	0	0
2	50	0	50	0	0	100
3	0	30	70	0	0	100
4	0	40	60	100	0	0
5	0	0	100	0	0	100
6	0	0	100	0	0	100
7	50	0	50	0	0	100
8	0	0	100	0	0	100
9	0	0	100	0	0	100
10	0	0	100	0	0	100
11	100	0	0	0	0	100
12	0	0	100	0	0	100
13	50	0	50	50	0	50
14	100	0	0	100	0	0
15	100	0	0	100	0	0
16	100	0	0	100	0	0
17	100	0	0	100	0	0
18	100	0	0	100	0	0
19	0	0	100	0	100	0

20	0	50	50	0	0	100
21	0	0	100	0	0	100
22	0	0	100	50	0	50

	%>100ft	%50-100ft	%<10ft	%>100ft	%50-100ft	%<10ft
23	100	0	0	0	0	100
24	0	0	100	0	0	100
25	0	0	100	0	0	100
26	0	0	100	100	0	0
27	0	0	100	0	0	100
28	0	50	50	0	30	70
29	0	0	100	0	0	100
30	0	0	100	0	0	100
31	0	0	100	0	0	100
32	0	0	100	0	0	100
33	0	0	100	100	0	0
34	0	0	100	0	0	100
35	50	0	50	50	0	50
36	0	0	100	0	0	100
37	0	0	100	0	0	100
38	0	0	100	0	100	0

*** Site number corresponds to Table Hc01 and Figure Hc01.**

Table Hc03. Percent riparian corridor land use for 14 digit hydrologic units within the Spring River Tributaries Watershed (Figure Hc02). Data is based on MoRAP Phase 1 Land Cover (1997).

Subwatershed	FOR	WDL	GRS	CRP	URB	WAT
10001	41.7	2.4	44.6	7.7	3.2	0.2
10002	40.3	3.2	49.5	6.7	0	0.2
10003	35.2	5.1	56.7	2.5	0	0.5
10004	64.1	9.5	23.4	1.4	<0.1	1.5
10005	43.3	16.0	37.3	1.5	0	1.9
20001	29.2	7.1	60.4	3.0	0	0.2
20002	53.1	10.4	34.5	1.6	0	0.4
Upper Eleven Point	45.1	8.1	41.8	3.4	0.6	0.9
30001	41.0	7.8	45.8	3.5	1.8	0.1
30002	46.9	20.6	30.5	1.9	0	0.5
30003	66.9	23.4	8.3	0.5	0	0.8
30004	68.2	17.9	12.6	0.6	0	0.7
30005	63.4	16.6	16.2	1.2	0	2.6
30006	63.4	25.8	6.9	0.5	0	3.3
Middle Eleven Point	59.2	18.6	19.2	1.3	0.3	1.4
40001	43.7	12.1	43.8	0.3	0	<0.1
40002	46.0	11.5	40.3	0.2	2.0	<0.1
40003	56.9	34.3	7.4	<0.1	0	1.3
40004	52.6	17.5	28.9	0.2	0	0.7
50001	28.9	12.2	57.8	1.0	0	<0.1

50002	**42.7**	**20.6**	**33.9**	**0.2**	**0**	**2.5**
50003	**21.0**	**10.6**	**68.4**	**0**	**0**	**0**
Lower Eleven Point	**47.3**	**17.5**	**34.0**	**0.3**	**0.3**	**0.6**
Eleven Point Watershed	**50.5**	**14.5**	**31.9**	**1.8**	**0.4**	**1.0**

FOR =Forest, WDL=Woodland, GRS=Grassland, CRP=Cropland, URB=Urban, WAT=Water