Water Resources Conditions

Camp Creek is managed as a Class I brook and brown trout fishery. The 1990 fish survey found 62 brown trout ranging from 1 - 14.9 inches and 7 forage species. Camp Creek has not been stocked with trout since about 1975. The stream HBI (Hilsenhoff Biotic Index) was 4.35, indicating slight organic loading, and the Habitat Rating was "fair".

Water resource problems include streambank and channel erosion, flooding and sedimentation of riffles and pools. The stream has a shifting sand substrate in the lower portion and a gravel/sand substrate in the upper portion. Land use in the stream corridor includes forest, meadow, wetland and cultivated fields.

Bufton Hollow Creek is a high gradient 1.1 mile tributary of Camp Creek. Two large springs enter Bufton Hollow Creek a short distance above its mouth, which provide trout spawning habitat. The stream is managed as a Class I brook and brown trout fishery. A 1983 fish survey found good populations of yearling and adult wild brook and brown trout.

Water resource problems include sedimentation of pools and riffle areas and lack of suitable cover for adult trout. The stream was previously ditched and is generally wide and shallow. Most of the stream flows through open pasture.

Creek 22-14 (township of Forest, Richland Co.) is a very small 1.0 mile tributary of Camp Creek. The stream is classified as forage, but a 1983 fish survey found brook and brown trout and several forage species. The stream was previously ditched and the banks are heavily grazed.

Water Resource Objectives

The following water resource management objectives are recommended for the Camp Creek subwatershed:

1. Increase carryover of adult trout and trout reproduction in Camp Creek by improving overall habitat conditions.

2. Improve fish habitat conditions by reducing sediment and organic loading to subwatershed streams.

Pollutants from Nonpoint Sources

Eroding Uplands (sediment and nutrients)

Erosion and subsequent sedimentation from upland sources accounts for 31% (or 1,036 tons per year) of the total reaching the streams in the Camp Creek subwatershed. Excessive

erosion on certain crop fields and excessive grazing of woodlots are the most probable sources of sedimentation.

Eroding and Trampled Streambanks (sediment and direct habitat impairment)

Streambank erosion has a direct and very substantial negative impact on both water quality and trout habitat conditions. Roughly 27% (or 918 tons per year) of the sediment reaching the streams in Camp Creek results directly from eroding and trampled streambanks.

Eroding Gullies (sediment and nutrients)

Erosion from small gullies comprise 42% (or 1,438 tons per year) of the sediment reaching water courses in the Camp Creek subwatershed. Again, most of these gullies occur in small drainage areas, and are located near ridge crop fields or ridge pastures just prior to draining into the steep wooded hillsides.

Animal Lots (oxygen demand and nutrients)

Manure from animal lots and winter spread fields are the most probable source of oxygen demanding substances having an impact on water quality. Approximately 275 lbs. of phosphorus from 13 inventoried animal lots runs off into the streams in the Camp Creek subwatershed.

Winter Spread Manure (oxygen demand and nutrients)

Manure spread in winter on "critical" acres poses a significant threat to water quality in the Camp Creek subwatershed. Approximately 156 acres of cropland where manure is winter spread are considered to be "critical", or unsuitable. Those fields are over 6% slope and are subject to heavy runoff during spring rains and runoff from melting snow.

Chadwick Hollow Subwatershed (CH)

Subwatershed Description

The Chadwick Hollow subwatershed drains an area of 10.6 square miles. The subwatershed is located primarily in Vernon County, with only a small part of the northwest corner of Richland County included. The major water resource of concern is Chadwick Hollow Creek (otherwise known as Church Creek). There are several small unnamed intermittent streams in the subwatershed which drain directly into the Kickapoo River.

The subwatershed is entirely rural with land use divided as follows:

agricultural	42%
woodland	55%
other*	3%

* grassland, wetland, and quarries

Water Resources Conditions

Chadwick Hollow Creek is a 0.5 mile tributary of the Kickapoo River near Viola. The stream originates in Vernon County and enters Richland County near its mouth. Forage and minnow species dominate the fishery. Significant wetlands border the stream near its mouth.

Water Resource Objectives

The following water resource management objectives are recommended for the Chadwick Hollow subwatershed:

1. Maintain the existing forage fishery in Chadwick Hollow Creek.

Pollutants from Nonpoint Sources

Eroding Uplands (sediment and nutrients)

Upland erosion makes up 37% (or 712 tons per year) of the sediment reaching water courses in the Chadwick Hollow subwatershed. Grazed woodland and heavily grazed pasture are the most significant sources of sediment. There are only 938 acres of cropland as opposed to over 4,000 acres of pasture and grazed woodland.

Eroding and Trampled Streambanks (sediment and direct habitat impairment)

Because of the small size of the streams in the subwatershed, streambank erosion is very minor, accounting for only 14% (or 264 tons per year) of the total sediment reaching the streams.

Eroding Gullies (sediment and nutrients)

Gully erosion accounts for 49% (or 938 tons per year) of the sediment reaching the streams in Chadwick Hollow. Most of these gullies occur in upland pasture areas and in the grazed woodlots. Others occur in upland crop fields before they drain into the steep wooded

hillsides. The majority of the gullies occur in drainage areas of 5 acres or less, and a substantial amount of the eroded soil is deposited in the streams.

Animal Lots (oxygen demand and nutrients)

Manure from animal lots and winter spread fields are the most probable source of oxygen demanding substances having an impact on water quality. Nearly 103 lbs. of phosphorus from 5 animal lots inventoried runs off into the channels and small streams in the Chadwick Hollow subwatershed.

Winter Spread Manure (oxygen demand and nutrients)

Because of the small amount of cropland acreage in this subwatershed, winter spread manure on "critical" acres is less of a problem than in other subwatersheds. Currently, manure is being spread on approximately 13 acres of "critical" lands.

Cheyenne Valley Subwatershed (CY)

Subwatershed Description

The Cheyenne Valley Subwatershed drains an area of 11.2 square miles. There are two small tributaries (Barton Hollow and Newman Valley) entering Cheyenne Valley, but the main water resource of concern is Cheyenne Valley Creek itself. The stream is about 7 miles in length, and flows in an easterly direction before joining Billings Creek near the intersection of Highway 33 and County Trunk Highway F inside Wildcat Mountain State Park.

The subwatershed is rural with land use divided as follows:

agricultural	49%
woodlands	47%
other*	4%

* roads, wetlands, grassland, quarries, and scattered residences

Water Quality Conditions

Cheyenne Valley Creek is managed as a Class II brook and brown trout fishery and was stocked in 1990 with 400 brook trout fingerlings and 1200 brown trout fingerlings. The 1990 fish survey found 11 brook trout (5 - 9.4 inches), 23 brown trout (4.5 - 8.4 inches) and 8 species of minnow and other forage fish. Coarse and fine gravel are the predominant

substrate types, with some sand, rubble and silt present. The stream HBI (Hilsenhoff Biotic Index) was 4.88, indicating some organic pollution, and the Habitat Rating was "fair".

Water resource problems include flooding, streambank erosion and sedimentation of riffles and pools. Streambank erosion is medium to high and gravel riffle areas are highly embedded. Land use in the upper portion of the stream corridor is primarily pasture and cropland. Much of the downstream portion is wooded and located within the boundaries of Wildcat Mountain State Park.

Creek 22-6 (Barton Hollow, township of Forest, Vernon Co.) is a high gradient 1.0 mile tributary of Cheyenne Valley Creek. Minnows and other forage species comprise the fish community. Sand is the primary substrate type, with lesser amounts of gravel, silt and rubble.

Creek 15-14 (Newman Valley, township of Forest, Vernon Co.) is a high gradient 0.5 mile tributary of Cheyenne Valley Creek. Minnows and other forage species comprise the fish community. Sand is the dominant substrate with considerable gravel and some rubble.

Water Quality Objectives

The following water resource objectives are recommended for the Cheyenne Valley Creek Subwatershed:

1. Improve fish habitat to increase trout reproduction and increase carryover of adult trout in Cheyenne Valley Creek.

2. Improve water resource conditions by reducing sediment and organic loading to the subwatershed streams.

Pollutants from Nonpoint Sources

Eroding Uplands (sediment and nutrients)

Most of the sediment reaching Cheyenne Valley Creek from upland erosion is from eroding crop fields. Heavily grazed woodlots also contribute a substantial amount of sediment. Roughly 48% (or 1,829 tons per year) of the total sediment reaching the streams results from upland erosion in this subwatershed.

Eroding and Trampled Streambanks (sediment and direct habitat impairment)

Streambank erosion accounts for about 26% of the total sediment reaching Cheyenne Valley Creek. More than 200 eroded and trampled sites contributing 1,009 tons of sediment per year were identified and evaluated during the streambank inventory process. Sedimentation

has a direct effect on trout habitat in the stream. The bare eroding banks provide little or no cover for trout.

Eroding Gullies (sediment and nutrients)

Gully erosion accounts for the remaining 26% (or 991 tons per year) of the sediment reaching the stream. The majority of the gullies occur in small drainage areas of 5 acres or less, and are chiefly found near woodland and cropland boundaries on ridge fields.

Animal Lots (oxygen demand and nutrients)

Manure from animal lots and winter spread fields are the most probable source of oxygen demanding substances having an impact on water quality. Runoff manure from 23 animal lots delivers approximately 1355 lbs. of phosphorus to Cheyenne Valley Creek.

Winter Spread Manure (oxygen demand and nutrients)

Manure spread on "critical" acres are a probable source of oxygen demanding substances having an impact on water quality in Cheyenne Valley. The manure spread on fields over 6% slope in the winter tend to be susceptible to run-off during spring rains and snowmelt conditions. Approximately 303 acres of "critical" cropland is being used for winter spreading in the Cheyenne Valley subwatershed.

Elk Creek Subwatershed (EL)

Subwatershed Description

The Elk Creek subwatershed drains an area of 15.6 square miles. It lies primarily in Richland County, but enters the Kickapoo River in Vernon County about 2 miles south of the village of Viola. Major tributaries include Tenny Spring Creek and Hoke Creek. Elk Creek flows westerly along County Highway U. There are no villages or major residential areas in the subwatershed.

This subwatershed is rural with land use divided as follows:

agricultural	44%
woodland	42%
grassland	13%
other*	1%

* wetlands, quarries, and scattered residences

Water Resource Conditions

Elk Creek is managed as a Class II brook and brown trout fishery. The 1990 fish survey found 23 brown trout (3-13 inches in length), 2 rainbow trout (11 and 11.9 inches), and 10 minnow and other forage species. The stream headwaters area is in the Elk Creek Fishery Area and has abundant wild brook trout reproduction. The stream has not been stocked with trout since about 1975. Elk Creek's biotic index rating of 4.21 indicates that water quality is generally very good, but that there is possible slight organic pollution. A stream habitat rating of 91 indicates that habitat is generally good in Elk Creek.
Water resource problems in Elk Creek include flooding, streambank erosion, organic loading from barnyards, and cropland runoff. Lack of instream cover is a problem in the lower reach and beaver dams are a problem in the upper reach. Primary land use types are open pasture, cultivated fields and woodland.

Trout reproduction in Elk Creek could be improved by reducing sedimentation of gravel and rubble in the riffle areas. Adult trout carryover and survival could be improved by increasing available cover through streambank stabilization, installation of instream habitat structures and reducing sedimentation of pools.

Tenny Spring Creek is a high gradient 1.4 mile tributary of Elk Creek. The stream is managed as a Class I brown trout fishery. A 1987 fish survey found an abundance of wild brown trout ranging from 3 - 19.4 inches. Sand is the dominant substrate, with some gravel, rubble and silt.

Hoke Creek is a high gradient 0.7 mile tributary to Elk Creek. The stream is managed as a Class I brown and brook trout fishery. A 1978 fish survey found brown trout ranging from 6 - 12.9 inches, and brook trout ranging from 3 - 9.9 inches.

Water Resources Objectives

The following water resource management objectives are recommended for the Elk Creek Subwatershed:

1. Increase carryover of adult trout and trout reproduction in Elk Creek by improving overall habitat conditions.

2. Improve fish habitat conditions by reducing sediment and organic loading to subwatershed streams.

Pollutants from Nonpoint Sources

Eroding Uplands (sediment and nutrients)

Erosion from upland sources is responsible for 40% (or 1,258 tons of sediment per year) of the sediment reaching streams in the Elk Creek subwatershed. Much of this total is a result of eroding crop fields on steep ridge slopes.

Eroding and Trampled Streambanks (sediment and direct habitat impairment)

Trampled streambanks and eroding bends are responsible for 17% (or 530 tons per year) of the total sediment load being delivered directly into the streams in the Elk Creek subwatershed. Trout habitat is lost or impaired as a result.

Eroding Gullies (sediment and nutrients)

Over 43% (or 1,375 tons per year) of the sediment reaching water courses in Elk Creek is a result of gully erosion. Most of these gullies are small, and occur in 5 acre or smaller drainage areas. Because of the topography, narrow ridges and steep wooded hillsides, gullies are quite common.

Animal Lots (oxygen demand and nutrients)

Manure from animal lots and winter spread crop fields are the most probable source of oxygen demanding substances having an impact on water quality. Approximately 479 lbs. of phosphorous from 20 animal lots is delivered to the streams in the Elk Creek subwatershed.

Winter Spread Manure (oxygen demand and nutrients)

Comparatively, winter spread manure on "critical" acres is an insignificant problem in the Elk Creek subwatershed. Approximately 159 of the 2,929 cropland acres are currently considered to be "critical" acres where manure is being spread during the winter months.

Goose Creek Subwatershed (GO)

Subwatershed Description

The Goose Creek subwatershed drains 6.0 square miles, and includes both Goose Creek valley and Welker Hollow. Both Goose Creek and Welker Hollow Creek flow in a westerly direction until they flow into the Kickapoo River. The subwatershed lies entirely in Richland County. Goose Creek is currently classified as a marginal Class II trout fishery, while Welker Hollow Creek is primarily a forage stream.

The subwatershed is rural with land use divided as follows:

agricultural	46%
woodland	49%
other*	5%

* grassland, wetland, and scattered residences

Water Resource Conditions

Goose Creek is a 3.0 mile tributary of the Kickapoo River. Goose Creek is managed as a marginal Class II trout fishery. The 1990 fish survey found 1 brown trout (9 inches) and 5 forage species. The stream was stocked in Fall 1989 with fingerling brown trout. The dominant stream substrate types include rubble, gravel and silt. The stream HBI (Hilsenhoff Biotic Index) was 4.89, indicating some organic pollution, and the Habitat Rating was "fair".

Water resource problems include lack of instream habitat, streambank erosion, sedimentation of pools and riffles, and organic loading from animal waste. Land use in the stream corridor is primarily open pasture.

Welker Hollow Creek is a high gradient 1.8 mile tributary of the Kickapoo River. Minnows and other forage species dominate the fishery in Welker Hollow Creek. A 1973 fish survey found 6 minnow and forage species. The stream is typically overgrown with vegetation during late summer. Wetland meadow forms part of the stream corridor.

Water Resource Objectives

The following water resource management objectives are recommended for the Goose Creek subwatershed:

1. Improve fish habitat to increase carryover of adult trout in Goose Creek.

2. Improve fish habitat by reducing sediment and organic loading to the subwatershed streams.

Pollutants from Nonpoint Sources

Eroding Uplands (sediment and nutrients)

Erosion from upland sources accounts for 41% (or 402 tons per year) of the sediment reaching Goose Creek and Welker Hollow Creek. Steep eroding crop fields and other crop fields located close to water runs are primarily responsible for this sedimentation.

Eroding and Trampled Streambanks (sediment and direct habitat impairment)

Sedimentation as a result of trampled and eroded streambanks make up only 5% (or 52 tons per year) of the total sediment load being delivered to the streams.

Eroding Gullies (sediment and nutrients)

Sedimentation resulting from gully erosion comprises 54% (or 534 tons per year) of the total sediment load reaching streams in the Goose Creek subwatershed. Again, these gullies are typically small, and occur in 5 acre or smaller drainage areas. Normally they will occur on ridge top fields just prior to draining into steep wooded hillsides.

Animal Lots (oxygen demand and nutrients)

Manure from animal lots and winter spread crop fields are the most probable source of oxygen demanding substances having an impact on water quality. Seven animal lots were analyzed during the inventory process. It was determined that these five lots deliver 328 lbs. of phosphorus to the stream.

Winter Spread Manure (oxygen demand and nutrients)

Because of the relatively small number of livestock operations in the Goose Creek subwatershed, winter spread manure is less of a problem than in other subwatersheds. Currently, manure is being winter spread on approximately 106 "critical" cropland acres.

Hay Valley Subwatershed (HV)

Subwatershed Description

The Hay Valley subwatershed actually consists of five valleys, each with small streams being direct tributaries to the Kickapoo River. They are Hay Valley Creek, Indian Creek, White Hollow, Lamb Valley, and Walker Valley. Much of this subwatershed lies in the Army Corps of Engineers land and in Wildcat Mountain State Park.

This subwatershed is primarily rural with land use divided as follows:

agricultural	29%
woodland	59%
other*	12%

* grassland, wetlands, and residences

Water Resources Conditions

Indian Creek flows southerly 2.2 miles to the Kickapoo River near Rockton. Indian Creek has a forage fish community. The 1990 fish survey found 7 minnow and other forage species. Sand and gravel are the predominant substrate types. The stream had an HBI (Hilsenhoff Biotic Index) of 4.27, indicating slight organic pollution, and a "fair" Habitat Rating.