OTTER AND MORREY CREEKS WATERSHED (LW11)

The streams in the Otter and Morrey Creek Watershed drain to the Wisconsin River in northwest Iowa County. The streams in this watershed have a high gradient. Many of the streams in the eastern portion of the watershed, such as Penn Hollow, Pengelly, Pompey Pillar, and Smokey Hollow, have low flow, which could be due in part to lack of groundwater recharge. Overall, most of the streams support trout, although nonpoint sources of water pollution are suspected to affect water quality, habitat and recreational use.

The overall population in the watershed is projected to be around 2,522. The Village of Avoca is the only municipality in the watershed. Avoca has seen a 28% growth rate since the 1990 census from 474 to 608 people. Overall, the majority of the watershed is broad-leaf deciduous forest and a significant number of acres are in woodland. Agriculture is the second most dominant land use in the watershed. There are large wetland complexes along the Wisconsin River particularly near Avoca, which are very important for wildlife. Away from the Wisconsin River floodplain there are few wetlands and most of them are wet meadows which are grazed or cultivated adjacent streams.

Table 1: Land Cover in the Watershed

Land Cover	*Percent of Watershed*
Forest (Total)	48.8%
Broad-Leaf Deciduous	*48.3%*
Coniferous	*0.5%*
Agriculture	29.3%
Grassland	16.0%
Wetland (Total)	4.1%
Forested	*2.4%*
Emergent/Wet Meadow	*1.7%*
Lowland Shrub	*0.5%*
Open Water	1.0%
Barren	0.3%
Development	0.1%

Watershed At A Glance

Drainage Area (m^2): 199.0

Total Stream Miles: 173.0

Trout Stream Miles: 66.2

Sport Fishery Miles: 28.5

Lakes: Avoca Lake, Blackhawk Lake

Exceptional/Outstanding Resource Waters: Harker, Lee and Martin Creeks

Municipalities: Avoca

Major Public Lands: Avoca Unit of the LWSR, Blackhawk Lake State Recreation Area

Concerns and Issues:
- Nonpoint source pollution
- Lack of adequate in-stream habitat
- Flood control structures
- Atrazine

Initiatives and Projects:
- Citizen stream monitoring on Flint, Harker and Lee Creeks
- Wild trout reintroduction
- Shallow Lakes Initiative

Flooding in the watershed was perceived as a problem and as a result numerous flood control structures were constructed on streams in the watershed. These structures have since had a negative impact on aquatic habitat. Atrazine is also a concern in the watershed and the portion of the watershed on the Wisconsin River floodplain is in an atrazine prohibition area.

Elevated levels of atrazine, a herbicide used on corn, have been found in some tested private water wells. Soils are permeable, which allows atrazine to reach groundwater in some locations. See Appendix B.

There are currently two industrial facilities in the watershed that discharge to groundwater. The Village of Avoca lies on the sandy Wisconsin River outwash plain. A new treatment plant went into operation in November 1996 that discharges to Morrey Creek.

The Otter and Morrey Creeks Watershed has a variety of good quality habitats and rare plant communities that are listed on the state's Natural Heritage Inventory, (NHI), kept by the Bureau of Endangered Resources. These communities include:

- Dry cliff
- Dry prairie
- Dry-mesic prairie
- Moist cliff
- Oak opening
- Pine barrens
- Pine relict
- Sand barrens
- Sand prairie
- Southern dry forest
- Southern dry-mesic forest
- Southern mesic forest
- Alder thicket
- Emergent aquatic
- Ephemeral pond
- Floodplain forest
- Oxbow Lake
- Shrub-carr
- Southern sedge meadow
- Hard springs and spring runs
- Wet-mesic prairie

In addition to these special communities, the watershed is also home for a variety of rare plant and animal species including; 2 species of beetle, 2 species of birds, 3 species of butterflies, 2 species of dragonflies, 13 species of fish, 2 species of frogs, 12 species of mussels, 17 species of plant species, 1 species of snake, 1 species of turtle and 2 mammal species. These plants and animals are also listed on the state's Natural Heritage Inventory, (NHI).

The 3,736-acre Avoca Unit of the Lower Wisconsin Riverway is in this watershed. Visitors to the Avoca Unit can birdwatch, fish on the river channel, use the boat launch or enjoy prairie aesthetics. Also in the watershed is the Blackhawk Lake Recreation Area. The 2,036-acre area is state-owned land and offers fishing, birdwatching, hiking, boating and swimming.

STREAMS AND RIVERS IN THE WATERSHED

Baker Creek
Limited information exists for this creek.

Cave Hollow Creek
Cave Hollow Creek is a spring fed stream with a limestone bedrock bottom. The stream is shallow with lots of riffles, but few pools. It is currently listed as a Class II trout fishery, but has very limited in-stream habitat. Stream health is affected by nonpoint source pollution from heavy streambank pasturing and cropland erosion which have contributed to heavily silted in conditions. Road culverts limit fish migration in the stream.

Dickinson Creek
Dickinson Creek is a spring fed tributary to Otter Creek with some pools and riffles. It is a Class II trout stream and supports some natural reproduction of brook trout. Dickinson Creek has experienced problems with nonpoint source pollution from bank erosion.

Flint Creek
Flint Creek is a spring fed tributary to Otter Creek. It is a Class II trout stream. The stream has limited flow. Streambank pasturing, cropland erosion and development pressures affect the stream and it has been ranked as a high priority for nonpoint source pollution abatement. There is a dry dam constructed on Flint Creek for flood control. There is no public access available to Flint Creek. A road culvert limits fish migration on a tributary to Flint Creek. There is a group of citizen monitors on this creek. To see the data that these monitors have collected, please visit their website at http://members.tripod.com/nohrchapter/monitor_home.htm.

Fritsch Creek
Limited information exists for this creek.

Harker Creek
Harker Creek is a tributary to Otter Creek below Blackhawk Lake and has a steeper gradient than Otter Creek. It is a Class II and Class I trout stream with some natural reproduction of brook trout and has been designated as exceptional resource water (ERW). In fact, Harker Creek is thought to be one of the better trout streams in Iowa County. A rare aquatic species has been found in the creek.

Surveys conducted in 2000 found water quality from fair to excellent. Fish that are indicators of cold water and other species that are intolerant to water pollution were found and were dominant at all sites. The presence of these species shows a marked improvement from fishery survey results from the 1970's. The 2000 survey results suggest that the land use is shifting from intensive agriculture to a more natural landscape. Overall, stream reaches are well buffered with wetlands and support abundant wildlife. There is good aquatic vegetation and a good supply of aquatic macroinvertebrates in the stream. Dissolved oxygen levels and temperature readings were good and temperatures did not exceed 65.5 degrees Fahrenheit.

Despite the good water quality, there are also problems on the stream. A flood control dam was constructed on the stream and can negatively impact water quality and temperature in cold water streams. In addition, there is some evidence of grazing along the stream, with banks exposed and eroding. As a result of nonpoint source problems, the stream has been ranked as a high priority for nonpoint source pollution reduction. Overall, the transition from agricultural to natural vegetation presents an opportunity to improve and maintain the water quality and fishery in the stream through brush removal and habitat restoration. The state has a small number of easements along a section of Harker Creek.

Citizen stream monitors are have been actively monitoring Harker Creek since July 2000. The volunteers monitor the creek's turbidity, temperature and dissolved oxygen. To see the data that these monitors have collected, please visit their website at http://members.tripod.com/nohrchapter/monitor_home.htm.

Lee Creek
Lee Creek is a major tributary to Harker Creek and contributes 20 percent of Harker Creek's total flow. Lee Creek is listed as a Class I trout stream and an exceptional resource water (ERW).

Fish that are indicators of cold water and other species intolerant to water pollution were found and were dominant at all sites. The presence of these species shows a marked improvement from fishery survey results from the 1970's. The 2000 survey results suggest that the land use is shifting from intensive agriculture to a more natural landscape. Overall, stream reaches are well buffered with wetlands and support abundant wildlife. There is good aquatic vegetation and a good supply of aquatic macroinvertebrates. Dissolved oxygen levels and temperature readings were good and temperatures did not exceed 70 degrees Fahrenheit. The stream does have limited winter and spring habitat for trout. Overall, data collected in 2000 indicates that Lee Creek supports a naturally reproducing population of brook and brown trout.

Citizen stream monitors are have been actively monitoring Lee Creek since July 2000. The volunteers monitor the creek's turbidity, temperature and dissolved oxygen. To see the data that these monitors have collected, please visit their website at http://members.tripod.com/nohrchapter/monitor_home.htm.

Lowery Creek
Lowery Creek is a tributary to the Wisconsin River west of Tower Hill State Park. The creek supports a warm water sport fishery for its lower 1.5 miles and is considered a Class II trout stream for much of the rest of its length. The creek has problems with streambank pasturing and hydrologic modification.

Marsh Creek
See Avoca Lake.

Martin Creek
Limited information available for this stream.

Morrey Creek
Morrey Creek is a warm water seepage stream. It has a Class II brown trout sport fishery in the upper 4 miles. A rare aquatic species has been found in the creek. The stream has been affected by a floodwater retarding structure built to decrease the severity of flooding and bank erosion. The creek receives discharge from the wastewater treatment plant. A stream classification survey was conducted in 1993. At the time of the survey, the stream was shaded by woody vegetation with a low density of stabilizing grasses on the banks. Streambanks were frequently eroded. Overall, the stream had good habitat and water quality for warm water fish.

Narveson Creek
Narveson Creek, a tributary to Otter Creek, is a spring fed Class II trout fishery. The stream has been impacted by the construction of a flood control structure. The stream is also affected by nonpoint source pollution from surrounding agricultural landuse.

Norway Hollow Creek
Norway Hollow Creek is a spring fed tributary of Otter Creek. The lower 1.5 miles is a Class II brown trout fishery. The stream is impacted by nonpoint source pollution from agricultural landuse and streambank erosion.

Otter Creek
Otter Creek is a tributary to the Wisconsin River. The creek has been impounded to form Blackhawk Lake. Otter Creek is a Class II trout stream for eight miles of its length above Dickinson Creek, (Blackhawk Lake not included). The lower 15 miles are considered a warm water sport fishery. There are some nice smaller wetland pockets adjacent to and near Otter Creek. The state manages several easements along Otter Creek. A rare aquatic species has been found in the creek.

Overall, the stream has been ranked as a high priority for nonpoint source pollution reduction. Significant nonpoint sources of water pollution in the stream's lower reaches include heavy grazing, eroding banks, and barnyards near the creek. In the middle reach of the stream, there are problems with cattle trampling banks which causes erosion and stream sedimentation. The stream has been listed on the "impaired water" list as a result of this severe nonpoint source pollution.

Other impairments on the creek are the result of the impoundment in the creek's headwaters. Blackhawk Lake's bottom discharge structure does not effectively reduce water temperatures downstream. Surveys conducted in 1999 and 2000 found a significant increase in water temperatures below the dam and a moderate drop in dissolved oxygen levels, some of which were below water quality standards. In addition, fisheries surveys found few cold water species above the dam and only a warm water forage fish community below the dam, with no intolerant species and few cold water species present. The macroinvertebrate community was very good above the lake and fair below the lake. The lake also experiences algae blooms as a result of nutrient loading in the lake.

Paul Creek
Paul Creek is a small spring fed tributary to Rush Creek. The creek has the steepest gradient of any named stream in the county and flows through a homestead that is over 100 years old. The creek's drainage area is heavily wooded. The creek has limited flow and is thought to support a Class II trout stream.

Penn Hollow Creek
Penn Hollow Creek is a tributary to Otter Creek. The creek is classified as a Class II trout stream. Overall, the creek's flow is limited. There is limited information available on this stream.

Pompey Pillar Creek
Pompey Pillar Creek is a tributary to Otter Creek. The stream is classified as a Class II trout fishery for 3 miles of its length and Class I (above CTH I) for another mile. The stream has some natural reproduction of brook trout. Surveys conducted in 1995 and 1997 found that water quality, temperature and the macroinvertebrate community in the headwaters area of the creek is of good quality. The creek, however, is heavily pastured in some spots and although water quality is good, in-stream trout habitat is limited. In addition, Pompey Pillar is threatened by nonpoint source pollution from cropland erosion and from a detention dam that affects in-stream habitat. The stream has been ranked as a high priority for nonpoint source pollution abatement. In addition, it is recommended that in-stream habitat work be conducted on the stream to increase trout habitat and to help reduce the threat to the creek from nonpoint sources of pollution. The state manages a small easement along Pompey Pillar Creek. In addition, the state owns a small parcel of land in the headwaters of the creek.

Rush Creek
Rush Creek is a tributary to the Wisconsin River. About five miles of its length are classified as a Class II trout stream and the stream supports some natural reproduction of brook trout. Bank erosion, cropland erosion, cattle access to the stream and barnyard runoff are all suspected sources of sedimentation and turbidity in the creek. Due to Rush Creek's problem with nonpoint source pollution, it is listed on the "impaired waters" list.

Smokey Hollow Creek
Smokey Hollow Creek is a spring fed tributary to Pompey Pillar Creek. It is a Class II trout stream with limited flow. The creek has problems with bank erosion. A sediment detention dam was constructed on the stream to help reduce soil erosion and sedimentation in the creek.

Snead Creek
Snead Creek is a tributary to Rush Creek. The creek supports a cold water forage fish population. A rare aquatic species has been found in the creek. Intensive cattle grazing along the stream has exposed streambanks, resulting in severe erosion. The water is turbid and the stream has been widened by this activity. In-stream habitat has also probably been affected by the agricultural practices along the stream. The stream has been ponded and these ponds make the stream's fishery unmanageable.

Spring Valley Creek
Spring Valley Creek is a spring fed tributary of Otter Creek. The creek is subject to flooding and bank erosion. The creek supports a Class II trout fishery and experiences problems with nonpoint pollution and as a result of hydrologic modification.

Wisconsin River
This watershed is adjacent to a portion of the Wisconsin River. For more information on the Wisconsin River, see page 90.

LAKES IN THE WATERSHED

Avoca Lake
Avoca Lake is an enlargement of Marsh Creek that drains to the Wisconsin River by Avoca. The lake has a surface acreage of 48 and a maximum depth of 10 feet. A rare aquatic species has been found in Marsh Creek. Much of the land near the lake is state owned and managed and makes up the Avoca Unit of the Lower Wisconsin State Riverway. Avoca Lake is a part of a "Shallow Lakes Initiative" that began in 1998 to document the resource values and problems in shallow water areas of the Wisconsin River. Unlike the other study lakes, Jones Slough in the Blue River Watershed (LW09) and Long Lake in the Bear Creek Watershed (LW14), Avoca Lake does not receive impounded water and has the best water quality. In addition, the lake is able to support a threatened species.

Blackhawk Lake
Blackhawk Lake is 220 acres and has a maximum depth of 40 feet. The lake was constructed by impounding the headwaters of Otter Creek as a part of a flood control project. The lake's fishery consists of walleye, large and smallmouth bass and panfish. Blackhawk Lake is one of four small impoundments monitored by the Department of Natural Resources in 1999 and 2000 to determine the effect they have on cold water streams.

Impoundments, such as Blackhawk Lake, warm the water and decrease water quality below the impoundment. They also negatively affect the macroinvertebrate community, increase the growth of periphyton and decrease the fish habitat. In addition, these impoundments typically have organically rich bottom sediments and often have problems with algal blooms. Blackhawk Lake experiences a period of dissolved oxygen depletion near the bottom as a result of these nutrients. (See Otter Creek)

RECOMMENDATIONS (LW11)

- Stream assessment monitoring should be conducted on the named streams in the watershed to determine nonpoint source priority rankings.
- Stream classification monitoring should be conducted on **Fritsch Creek** and **Paul Creek**.
- The study to determine the impact of small impoundments on cold water resources should be continued. These studies should evaluate options to modify the impoundment to improve water temperature and quality should be continued. In particular, the Blackhawk Lake impoundment on **Otter Creek** should be examined.
- Land acquisition and fish management easements along the Otter Creek system should be pursued to enable access for habitat improvement work.
- Groundwater recharge areas in the Otter and Morrey Creek Watershed should be protected to increase groundwater infiltration.
- Methods to control the predation of trout by heron and otter along the Otter Creek system should be examined.

- Fish migration problems that result from impassable bridges and other factors on the Otter Creek system should be addressed.
- A no-kill fishery for brook trout in the west half of section 27, T7N, R2E on **Dickinson Creek** should be instated.
- Baseline monitoring should be conducted on **Otter Creek**.
- Condition monitoring on **Blackhawk Lake** should be conducted.
- In-stream habitat and stream remeandering projects should be implemented on **Pompey Pillar Creek**.
- Brush removal and in-stream habitat improvements should be conducted on **Harker Creek**.
- In-stream habitat work on **Lee Creek** should be conducted to improve winter and spring trout habitat.
- Projects to reduce nonpoint source pollution, such as the Targeted Runoff Management program (TRM), should be pursued for **Harker Creek** and **Lee Creek**.
- The flood control structures that exist on creeks in the watershed should be removed.
- Nonpoint source problems on **Cave Hollow Creek** should be assessed.
- In-stream habitat work and an improvement of the over-winter cover on the existing WDNR land is needed on **Cave Hollow Creek**.
- An effort should be made to improve water quality and temperature below Blackhawk Lake. An evaluation of establishing a bottom discharge at **Blackhawk Lake** is needed. A withdrawal from the top of the hypolimnion to reduce organic loading while reducing water temperatures should be considered.
- **Harker Creek, Marsh Creek, Morrey Creek, Otter Creek, and Snead Creek** should be surveyed to determine if rare aquatic elements previously found in the streams are still present.
- **Avoca Lake** should continue to be monitored as a part of the "Shallow Lakes Initiative."
- Public access on **Flint Creek** and **Pompey Pillar Creek** should be increased.
- The Village of Avoca should continue to provide attention to plant operation to insure compliance with permit limits.

WATERSHED MAP

Streams in the Otter and Morrey Creeks Watershed (LW11) — Iowa County — Area: 199 sq miles

Stream Name	WBIC	Length (miles)	Existing Use	Potential Use	Supporting Potential Use	Codified Use and Trout Stream Classification	Proposed Codified Use	303(d) Status	Rare Aquatic Species	Use Impairment		NPS Rank	Monitored/ Evaluated/ Unassessed	Data Level	Trend	Ref.*
										Source	Impact					
Baker Creek	1239800	1.9	COLD II	same	Part	COLD II	same	N	N	NPS , HM	HAB	NR	U		U	4, 20
Cave Hollow Creek	1239700	2	COLD II	same	Part	COLD II	same	N	N	NPS,PSB, HM,CL,A CC	HAB,MIG	M	M (1996, 1998)	B2,H1	U	4, 20
Dickinson Creek	1238200	4	COLD II	same	Part	COLD II	same	N	N	NPS	HAB	M	E (1963, 1994)	H1	U	4, 20
Flint Creek	1238300	0-8	COLD II	same	Part	COLD II	same	N	N	NPS , PSB, CL, DEV	HAB, FLOW	H	U		U	4, 14, 20
		8-10	U	U	U	DEF	same	N								
Fritsch Creek	1239900	1	COLD II	same	Part	DEF	same	N	N	CL	HAB	NR	U		U	14
Harker Creek	1238400	0-1	COLD II	same	Part	COLD II	same	N	Y	NPS		H	M (2000)	B4, H3	U	4, 7, 9, 14, 17, 20
		1-4.1	COLD I	same	Full	COLD II/ERW	COLD I	N								
Lee Creek	1238500	3.9	COLD I	same	Full	COLD II/ERW	COLD I	N	N	NPS	HAB	M	M (2000)	B4, H3	U	7, 9, 14, 15, 17, 18
Lowery Creek	1241400	0-1.2	WWSF	same	Part	DEF	same	N	N	HM,PSB	HAB,FLO W	M	E (1979, 1996)	B2, H1	U	14, 20
		1.2-4.7	COLD II	same	Part	COLD II	same	N								
		4.7-8	U	U	U	DEF	same	N								
Marsh Creek	1219900	10	WWSF	U	U	DEF	same	N	Y	HM	HAB, TEMP, FLOW	H	U		U	
Martin Creek	1238600	1	COLD I	same	Full	COLD I/ERW	same	N	N			NR	M (2000)	B4, H3	U	4, 20
Morrey Creek	1220000	0-2	WWSF	same	Part	DEF	same	N	Y	HM	HAB	M	E (1993)	P1, H2, B4	U	14, 18, 20
		2-6	COLD II	same	Full	COLD II	same	N								
		6-8	U	U	U	DEF	same	N								
Narveson Creek	1239100	1.8	COLD II	same	Part	COLD II	same	N	N	NPS ,HM	HAB	M	E		U	4, 20
Norway Hollow Creek (T7N R2E S9)	1237800	0-1.5	COLD II	same	Part	COLD II	same	N	N			NR	U		U	4, 14, 20
		1.5-4	COLD	same	Part	DEF	same	N								

Stream Name	WBIC	Length (miles)	Existing Use	Potential Use	Supporting Potential Use	Codified Use and Trout Stream Classification	Proposed Codified Use	303(d) Status	Rare Aquatic Species	Use Impairment		NPS Rank	Monitored/ Evaluated/ Unassessed	Data Level	Trend	Ref.*
										Source	Impact					
Otter Creek	1237100	0-15.3	WWSF	same	Part	DEF	same	Y	Y	NPS, HM, CL	HAB, FLOW, TEMP	H	M (1999, 2000)	P2, B4, H3	U	4, 14, 18, 20
		15.3-23.3	COLD II	same	Part	COLD II	same	Y								
		23.3-25	U	U	U	DEF	same	N								
Paul Creek	1240900	2	COLD II	same	Part	DEF	same	N	N			NR	U		U	14
Pengelly Creek	1239000	2	COLD II	same	Part	COLD II	same	N	N			NR	E (1963)		U	20
Penn Hollow Creek	1237300	0-2.5	COLD II	same	Part	COLD II	same	N	N	NPS	HAB,FLOW	NR	E		U	4, 14, 20
		2.5-4	COLD	same	Part	DEF	same	N								
Pompey Pillar Cr.	1237900	0-3	COLD II	same	Part	COLD II	same	N	N	HM, NPS, CL	HAB	H	M (1997, 1995)	B2,H1	U	4, 20
		3-4	COLD I	same	Part	COLD II	COLD I /ERW	N								
		4-7	U	U	U	DEF	same	N								
Rush Creek	1240100	0-5	COLD II	same	Part	COLD II	same	Y	N	HM		M	E		U	4, 20
		5-10	U	U	U	DEF	same	N								
Smoky Hollow Cr.	1238000	0-3.5	COLD II	same	Part	COLD II	same	N	N	NPS	HAB	NR	E (1968)		U	4, 20
		3.5-5	U	U	U	DEF	same	N								
Spring Valley	1237600	2.5	COLD II	same	Part	COLD II	same	N	N	HM,NPS	HAB	NR	E		U	4, 20
Snead Creek	1240000	10	COLD	same	Part	DEF	same	N	Y	HM	FLOW,TEMP	M	E		U	4, 20
Unnamed streams		45.8				DEF										

Total Stream Miles	173
COLD	14
COLD I	9
COLD III	57.2
WWSF	28.5
U	49.9

The numbers in this column refer to the References found in the corresponding Watershed Narrative.
See Appendix J: "How to Read the Stream Tables," in Chapter 7 of the State of the Lower Wisconsin River Basin Report.

Lakes in the Otter and Morrey Creeks Watershed (LW11) **Iowa County**

Lake Name	WBIC	County	Surface Area (Acres)	Max Depth	Lake Type	Winterkill	Access	SH	Hg	MAC	LMO	TSI	Lake Plan or Prot	P Sens	Comments
Avoca Lake	1220200	Iowa	48	10	DG	N	BR		R	EWM				2	
Blackhawk Lake	1239400	Iowa	220	40			BR	C	M					1	

See Appendix K: "How to Read the Lake Tables," in Chapter 7 of the Lower Wisconsin State of the Basin Report.

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