STREAM MANAGEMENT PLAN – Page 1

Stream name		Kittle Number	Total Length	Approved Date of Plan
West Fork Des Moines River		**I-037**	**116.53 miles**	**Dec. 22, 2011**
Region	Area Fisheries Office	Plan Managed Reach (river miles)	Length Plan Managed Reach	
4	**Windom (F418)**	**mile 0.00 to mile 116.53**	**107.42 miles (w/o Lake Shetek)**	
Major Watershed:		Counties		
West Fork Des Moines River – Head waters (51)		**Cottonwood (17), Jackson (32), Murray (51)**		

Similar Reach	Reach name	Stream Miles	Length miles	Rosgen Channel Type	Fisheries Ecological Classification [1]	Species of Management Interest
1	**Mouth-Windom**	**0.0 – 23.69**	**23.69**	**NA**	**II-B, C, D**	**walleye, northern pike, channel catfish**
2	**Windom-Heron Lake outlet**	**23.69 – 43.43**	**19.74**	**NA**	**II-B, C, D**	**walleye, northern pike, channel catfish**
3	**Heron Lake outlet-Lime Creek**	**43.43 – 71.09**	**27.66**	**NA**	**II-B, C, D**	**walleye, northern pike, channel catfish**
4	**Lime Creek-Lake Shetek**	**70.09 – 96.76**	**25.67**	**NA**	**II-B, C, D**	**walleye, northern pike, channel catfish**
-	**Lake Shetek (DOW 51004600)**	**96.76 – 105.86**	**9.11**	**-**		
5	**Lake Shetek-Yankton Lake outlet**	**105.86 – 116.53**	**10.67**	**NA**	**II-B, C, D**	**walleye, northern pike, channel catfish**

Long Range Goals

Goal 1: Reaches 1, 2, 3 – An accessible fishery for walleye, channel catfish, and northern pike and suitable aquatic habitat to support it.

Objectives (Desired Future Conditions) and Operational Plans:

1. Walleye, northern pike, and channel catfish populations as defined by minimum catch rates for adults; presence of naturally reproduced young; and adequate age structure (values based on historic fisheries survey catch rates associated with anecdotal reports of angling success):
    a. Walleye – adults 1.0/hr electrofishing; 1.0/trap net set; presence of age-0 fish; at least four age groups
    b. Northern pike – adults 1.0/hr electrofishing; 1.5/trap net set; presence of age-0 fish; at least four age groups
    c. Channel catfish – adults 1.0/trap net set; presence of age-0 fish; at least three age groups
        i. Conduct fish population assessments as time allows to ensure populations are being maintained as defined above.
        ii. If populations do not meet objectives, either conduct supplemental surveys of fish populations to determine factors influencing abundance or consider stocking to bolster abundance.
2. A free-flowing geomorphically-stable river channel with water quantity and quality sufficient to support populations of walleye, channel catfish, and northern pike.
    a. As soon as possible, conduct a full stream survey to identify stable and unstable stream reaches and potential factors influencing stability, including road crossings, mainstem dams (e.g., Talcot Lake dam, beaver dams), bank stability/erosion, and floodplain connectivity.

Approved by:

Area Supervisor	Date	Regional Manager	Date

STREAM MANAGEMENT PLAN – Page 2

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4	**Windom (418)**	**0.00 to 116.53**	**107.42 miles (w/o Lake Shetek)**	

Long Range Goals (continued)

b. Assess baseflow volume from each tributary to determine and prioritize tributaries for maintenance of low flows.
c. Support and advocate for implementation of action items identified in the Total Maximum Daily Load Plan in part by attending relevant meetings. Implementation of action items should enhance hydrology, water quality, connectivity, and geomorphology components through better land use practices in key areas.
d. Assist with monitoring responsibilities identified in the TMDL Plan for DNR staff (including fisheries) for macrophytes, phytoplankton, zooplankton, and fish communities.

3. A publicly-accessible river resource.
   a. Ensure existing public access sites, including boat and canoe launches, remain functional.
   b. Conduct a recreational use survey to determine if the needs of all recreational users are being met (e.g., are there enough access points, is their spacing adequate).

Goal 2: Reaches 4 and 5 – There is not enough information to formulate specific management goals at this time (see Future Potential Plans).

Survey and Assessment Schedule			
Next scheduled assessment(s)	Station (river mile)	Objective	Report due
None scheduled			

Stocking Schedule				
Next scheduled stocking	Species - size	Quantity	Reach	Specific location
None scheduled				

Future Potential Plans

1. Advocate for programs that seek to limit the effects of climate change, especially as it might influence precipitation patterns.
2. Develop and implement, or assist with implementation of, a monitoring program to detect improvements in hydrology, geomorphology, and water quality that could be the result of actions of conservation partners (e.g., via implementation of the TMDL Plan, climate change reduction measures, etc.)
3. Conduct a full stream survey, or at a minimum, a fish population assessment, in Reaches 1 and 2 (river upstream from Talcot Lake) to gather baseline information to identify management options. Such a survey should include an assessment of aquatic vegetation and the presence of invasive aquatic and terrestrial species.
4. Develop monitoring protocols to detect establishment and expansion of Asian carp into this watershed.
5. Implement a recreational use and creel survey to better define current practices and desired future conditions of river recreationists.

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Background Information

Priorities – Moderate recreational importance (angling, hunting, canoeing, kayaking); designated canoe route; sportfishing for walleye, northern pike, channel catfish, black crappie, and yellow perch; dam removal; potential invasion route for Asian carp. One tributary, Scheldorf Creek, is a designated trout stream with four tributaries of its own that are also protected as such.

Description of Stream System – The Des Moines River is a tributary of the Mississippi River, approximately 525 miles (845 km) long from its mouth to its farther headwaters in southern Minnesota. The largest river flowing across the state of Iowa, it flows across Iowa from northwest to southeast, forming part of the state boundary with Iowa and Missouri.

This management plan is for the West Fork of the Des Moines River in Minnesota, lying within the boundaries of DNR major watershed #51. It is a hardwater eutrophic river flowing through a partially wooded agricultural area. The river flows across soils consisting of loam, clay loam, and silty clay loam on flat to gently rolling uplands. Almost all of the watershed is in private ownership with predominate uses including row crop agriculture and livestock pasture. Also present in the watershed are various state, county and city parks, wildlife management areas and game refuges. The river's source begins in southwest Lyon County, but permanent flow is generally considered to be the outlet from Lake Shetek. Most flow originates from lake outlets and tributaries. As of 2012, the most downstream 53 miles of the mainstem is considered free flowing in Minnesota (i.e., from Talcot Lake Dam downstream).

Stream Mouth Location: T.102N, R.35W, S.24 (old Jackson dam site)

Stations used for fish surveys and assessments can be found in Table 1.

Past Surveys and Investigations –The first documented fisheries survey by a state fisheries crew was a brief survey conducted in 1953 on Kilen Creek in Kilen Woods State Park. This tributary to the West Fork Des Moines River was deemed to have no possibilities for fish or fishing due to inadequate flow. The first initial survey was conducted from 1977-1979 and included identification of three similar reaches and associated sampling reaches; inventories of tributaries, springs, dams and other barriers; measurements of physical habitat and water quality; and fish community assessments. Similar, but less intensive surveys were completed in 1985, 1987, and 1994. In 2012, a fish kill investigation and a broad-level watershed mapping evaluation were completed.

1) Moyle, J. B. 1953. Stream Survey Report, Kilen Park Creek, Jackson County.
2) Ingbritson, M. 1979. Initial Stream Survey Report 1977-1979, West Fork Des Moines River.
3) Ingbritson, M. 1986. River Fisheries Survey, Des Moines River: Talcot Lake dam to Iowa border.
4) Halverson, M. 1988. Stream Population Assessment, West Fork Des Moines River.
5) MNDNR. 1994. Fisheries Assessment and Water Analysis Report, West Fork Des Moines River.
6) Doorenbos, R. 2012. Des Moines River Fish Kill Investigation.
7) Hodgins, N. 2012. Initial survey, map preparations-West Fork Des Moines River.

Past Management – The West Fork of the Des Moines River has been infrequently sampled for fishes since the initial stream survey was completed in 1979 (Table 1). No formal management plan has been written for this river. Most management efforts have focused on infrequent population assessments for gamefishes; occasional stocking of channel catfish, black crappie, walleye, smallmouth bass and northern pike (Table 2); commercial fish removal (Table 3); promiscuous fishing opportunities due to poor water quality; documentation of sporadic fish kills; and most recently, dam removals. The river has provided good opportunities for anglers fishing for northern pike, walleye, channel catfish and crappie. It is believed that few anglers caught many smallmouth bass following an introductory stocking in 1979. No smallmouth bass have since been stocked. The river has supported large numbers of common carp, bigmouth buffalo, quillback carpsucker, and black bullhead. Portions of reaches 1, 2, and 3 were opened to promiscuous fishing at least seven times between 1952 and 1987, usually in conjunction with partial fish kills due to low dissolved oxygen levels.

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Assessment of Resource Condition (ARC)

Hydrology

General Description – The West Fork Des Moines River drains a 1,248 mi^2 watershed composed of primarily cultivated land. Occasional livestock pasture and urban land uses are also present. Major cities along the river include Windom (population 4,600 in 2010 census) and Jackson (3,300 in 2010). Several large glacial lakes and wetland complexes are present in the basin and provide some water storage. These include Heron Lake, Kinbrae lake complex, Lime Lake, and Lake Maria. Two others, Talcot Lake and Lake Shetek, are located on the mainstem river and have lake outlet structures to control lake levels primarily for wetland and waterfowl management. Drainage density is 0.10 mi/mi^2 which is relatively low. Low drainage density values are often the result of widely spaced streams associated with a watershed with good infiltration capacity. Most of the watershed is overlain by prairie soils of loams, clay loams, or silty clay loams, which likely have good infiltration capacity.

Based on the initial survey completed in 1979, most of the water in the river downstream from Talcot Lake, originates as surface runoff from about 20 tributaries and ditches. Seven of these tributaries have their origins in lakes (e.g., Boot Lake WMA, Warren Lake, String Lake). Only one tributary, Scheldorf Creek, has a spring-fed water source. Consequently, hydrology of the river is heavily influenced by precipitation, especially spring-summer rainfall, and subsequent overland flow.

Total annual precipitation has been increasing slowly from about 28 inches in 1960 to just over 30 inches in 2009. Stream channels in tributaries and on the mainstem may need to be able to accommodate this increase in streamflow. Historically, within each year, precipitation generally increased gradually from March (about 2 inches) to a peak in June at about 4.5 inches, before gradually declining through November. Precipitation from 2000-2009 showed slightly higher than historic rainfall in April and May and again in late summer-early fall (August-October), whereas midsummer precipitation amounts were generally less, especially in July. The primarily agricultural land use practices may speed overland water delivery to the mainstem river resulting in a flashier hydrologic regime. This may also increase the magnitude and duration of low flows, a cited concern in past stream surveys and assessments.

A United States Geological Survey stream gage (05476000) is located near the mouth of the river at Jackson, MN. Historic data indicates that the river's hydrology is typified by a spring flood in April, likely the result of melting snow and spring rains, followed by a gradual decline through August and September. River flows since 1960 have been higher than flows recorded from 1930-1959. In the last decade (2000-2009) the April flood has maintained its magnitude but has extended into May. Also, the flood recession has dipped lower than averaged flows in June, July, and August. This likely re-illustrates the relationship between precipitation and streamflow, because recent precipitation patterns have suggested a similar pattern of lower than average rainfall amounts in June and July in 2000-2009. Dams exist at the outlets of Talcot Lake and Lake Shetek, but their influence on hydrology is unknown. Two other mainstem dams existed at Windom and Jackson but were recently removed in 2012. Ditching, tiling, and channelization of tributaries likely also speed water delivery to the stream, but these issues have not been quantified in past stream surveys.

Watershed Scale Concerns – The two most important factors influencing hydrology of the West Fork of the Des Moines River likely occur at the watershed scale. They are precipitation events that contribute flow volume and land use practices that move this water to the stream. Precipitation influences all five elements of hydrology: the magnitude (how much water), timing (when that water comes), frequency (how often the water rises), duration (how long it lasts), and rate of change (how rapidly it rises and then falls). Land use practices also influence these five but have a greater influence on duration (how quickly the water gets to the stream, e.g., via drain tiles or ditches) and consequently how rapidly the water rises and falls (rate of change). Because precipitation and land use practices generally fall outside the management authority of DNR-Fisheries, proper management of hydrology for this river will depend on involvement of other agencies and conservation partners. However, DNR-Fisheries may have a role in identification of important land areas to target for conservation efforts by partners and to monitor fish and instream habitat benefits in response to changes in land use practices and climate.

Riparian Scale Concerns- Specific riparian scale concerns have not been identified. Presence of levees and more generally, the importance of floodplain access to mediate flood peaks is unknown. Further investigation may be warranted.

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Instream Scale Concerns – Dams and road crossings are likely the two greatest instream concerns for hydrology. Alterations to the hydrologic regime on this river due to the two remaining dams (Talcot Lake and Lake Shetek) are unknown. Historically, active beaver dams have also been identified on the mainstem but their hydrologic impacts were not quantified. In addition, there are many instream road crossings located at several locations (hundreds of locations) on the mainstem and tributaries. Whether these crossings influence the magnitude, timing, duration, frequency, and rate of change of high and low flow pulses is unknown. Additional data may need to be acquired to ensure these structures are not having an impact. To accomplish this, stream stage or discharge recording equipment could be established upstream and downstream from these structures to assess impacts. Alternatively, differences in geomorphology (i.e., channel dimension, pattern, and profile) could also be collected and used as a surrogate assessment. If dimension, pattern, and profile differ between upstream and downstream stations, this might also suggest concerns (however, such differences may be more related to geomorphology concerns such as improper sediment movement than to primarily hydrology concerns).

Management Recommendations for Hydrology

1) Successful direct management of precipitation seems unlikely other than through advocation of programs designed to reduce effects of climate change. Most such programs will be developed and implemented by others. DNR-Fisheries can contribute to such efforts mostly as an advocate and through monitoring efforts to demonstrate either continued alterations or perhaps re-establishment of preferred conditions.
2) More direct management of hydrology may be accomplished through better management of land use practices in the basin. Flows should be measured near the mouth of each tributary to determine which tributaries contribute the most surface water to the mainstem. Land use practices in the watersheds of the primary contributing tributaries should be targeted for enhancement by partners such as NRCS, SWCD, etc.
3) The influence of Talcot Lake Dam, Lake Shetek Dam, beaver dams, and road crossings on stream hydrology is unknown and should be investigated.

Connectivity

General Description – The three primary connectivity dimensions are longitudinal, lateral and vertical. Longitudinally, the mainstem West Fork Des Moines River has two man-made dams at the outlets of Talcot Lake and Lake Shetek, historical presence of beaver dams, and several road crossings. In addition, there are also hundreds of road crossings scattered throughout the watershed on many tributaries. With dam removals at Windom and Jackson, the most downstream 53 river miles are considered to be free flowing. There are also water quality barriers, in terms of river sections with low dissolved oxygen, which result in occasional barriers for fishes and other aquatic biota. Lateral and vertical (i.e., groundwater flow) connectivity has never been evaluated.

Watershed Scale Concerns –The extensive number and scope of road crossings in the basin may be considered a watershed-scale concern. However, the impact of such crossings on movement of water, sediment, or biota has not been determined. The importance of water movement to the stream from subsurface sources is unknown as well.

Riparian Scale Concerns – Lateral riparian connectivity concerns are unknown. Although not completely inventoried, it is believed that riparian zone levees are either uncommon or absent along the West Fork of the Des Moines River. Entrenched river channels may result in a decreased connection between a river and its floodplain as well, but no geomorphic surveys have been conducted to assess this on the West Fork.

Instream Scale Concerns – The existing mainstem dams (Talcot Lake, Lake Shetek), road crossings, and unknown beaver dams may be cause for concern as barriers to movement of fishes or other aquatic biota, or as impediments to proper movement of water and sediment. However, none of these factors have been examined for this river since at least the initial survey in 1979. Therefore, concern for these factors cannot be determined at this time. Low dissolved oxygen levels in some river sections continue to plague this river, as evidenced by a moderate fish kill in summer 2012. These episodic water quality barriers are intimately linked with hydrology as they are most common during low flows.

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Management Recommendations for Connectivity –

4) Almost nothing is known about connectivity concerns either along the mainstem river or its many tributaries. Thus, a full stream survey should be completed. The connectivity survey should specifically assess the potential interruptions to water, sediment, and aquatic biota movements through road crossings, over mainstem dams, and subsurface connections of groundwater flow.

5) To alleviate chronic instream water quality barriers, augmentation of low instream flows may need to be implemented. This will most likely be accomplished through better land use practices, especially in priority sub-watersheds of tributaries that contribute substantial flows (see management recommendation 2 above).

Geomorphology and Fish Habitat

General Description – Almost no geomorphic surveys have been completed on this river making a broad-level description difficult. Watershed measures indicate that the length of the basin is about 66 mi with an overall drop in elevation of 641 feet. Overall slope of the watershed (i.e., basin relief ratio = 0.0018) is steeper than the slope of the mainstem river channel (0.000314). The mainstem is a 6th order stream from its confluence with the Heron Lake outlet tributary downstream to Jackson (Reaches 1 and 2). It is a 5th order stream upstream to Lake Shetek (reaches 3 and 4). In 1979, channel width averaged about 60 feet in reaches 1 and 2. A watershed-scale longitudinal profile depicts several sections of little or no slope interspersed with rapid changes in stream slope. Some sections lacking slope can be explained by known lakes and impoundments such as Talcot Lake and Lake Shetek, whereas others cannot be similarly explained. Other areas with steep stream slopes could be nick points, improperly designed road crossings, historic stream obstructions, such as beaver dams, or some other feature. It is not currently possible to determine if the mainstem river channel is geomorphically stable or not, although most former prairie streams in southwestern Minnesota are believed to be unstable. The presence of a large number of road crossings may interrupt proper sediment and water transport.

Similarly, almost no assessment of fish habitat has been completed since the initial survey in 1979. That survey noted that fish cover included occasional log jams and overhanging vegetation. Boulders, instream vegetation and undercut banks were usually rated as scare or occasional cover types. Nevertheless, the entire river downstream from Talcot Lake was considered to provide suitable habitat for gamefishes in 1979.

Watershed Scale Concerns – The primary factors that influence stream geomorphology from watershed sources are amounts of water and sediment. Average annual precipitation has increased over the past 50 years, suggesting that water volume has increased. The West Fork Des Moines River would have had to (and may continue to) change in response to an increase in water volume. Land use practices may ameliorate or increase the effects of this increase in water volume. Similarly, excessive sediment may fill stream channels either from erosion as water rushes overland, or by instream bank erosion due to higher streamflows. The 1979 survey noted several instances of severe bank erosion which would have supported this notion 30 years ago. However, current conditions are unknown. Because most of the watershed is in agriculture, land use practices are likely important regulators of water and sediment delivery to the river.

Riparian Scale Concerns – Streambank erosion is present at some sites which will increase sediment delivery to the stream channel. Availability of adequate floodplains that allow dissipation of stream power during high flows has not been determined. Perhaps the greatest concern is a lack of geomorphic information.

Instream Scale Concerns – Lack of recent information on instream geomorphic conditions and fish habitat is the primary concern.

Management Recommendations for Geomorphology and Fish Habitat –

1) 6) Schedule a full stream survey to gather information on the current geomorphic state and instream habitat of each similar reach and priority tributaries.
2) As opportunities arise, continue working with conservation partners on implementation of better land use practices as a general approach to improving geomorphology.
3) Conduct a comprehensive inventory and evaluation of road crossings. Consider prioritizing this inventory, perhaps by identifying important tributaries (see recommendation 2 above).

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Water Quality

General Description – Water quality in the West Fork Des Moines River has been infrequently assessed by grab samples conducted by MNDNR-Fisheries since at least the 1970s. These samples have suggested a nutrient-rich river with occasional excessive algae blooms and periods of low dissolved oxygen. The initial survey in 1979 noted non-point source pollution problems of turbidity, nutrient enrichment from agricultural activities including livestock pasturing, and general agricultural runoff. Point-source pollution problems associated with discharge from the Windom treatment plant included suds and organic discharge. Nutrient enrichment often coupled with low flows in summer or winter has led to occasional fish kills. The Minnesota Pollution Control Agency (MPCA) listed reach 1 as impaired in 1994 for ammonia and low dissolved oxygen. Some point-source pollution may have been addressed by an upgrade to the Windom wastewater treatment plant in 1995 at a cost of 4.1 million. Most subsequent impairment listings by MPCA may represent a shift to non-point source pollution concerns. For example, subsequent impairment listings included Reach 1 turbidity in 1998, fecal coliform in 2004 and reaches 3 and 4 turbidity and fecal coliform in 2004.

A Total Maximum Daily Load (TMDL) study was completed and approved for the entire basin in December 2008 (MPCA 2008; Heron Lake Watershed District 2009). This project noted that various reaches and lakes in the basin were listed as impaired for bacteria, turbidity, and phosphorus. To meet water quality goals, bacteria levels would need to be reduced by 10-86 percent (depending on specific water body or stream reach); turbidity by 20-90 percent, and phosphorus by 79 percent. Primary sources of fecal coliform bacteria included livestock on overgrazed pasture, surface-applied manure, runoff from feedlots, and inadequate septic systems. Turbidity sources included streambank erosion, row cropping practices and algae. Phosphorus impairments were primarily located within the Heron lakes and were due to wastewater treatment facilities, cropland/pasture runoff, and streambank erosion. Specific projects to address these pollutant sources have been developed (see Heron Lake Watershed District 2009). The estimated cost for implementation of all identified projects was $63 million dollars. This equates to a cost of about $47,000/mi^2 or about $74/acre in the watershed.

Perhaps the most important water quality factor for fish management is continued episodic periods of low dissolved oxygen, with the last occurring in summer 2012 during low flows and an extremely warm summer.

Watershed Scale Concerns – As identified in the TMDL, the most important water quality pollutants include bacteria, turbidity, and phosphorus. A total of 123 specific action items were initially identified to address these pollutants, but a final subset of 38 were prioritized for implementation. Some examples include providing a $15.acre incentive for variable rate fertilizer application, replace open tile intakes with alternative tile intakes by providing 75% cost share, provide a $2,500 per acre incentive for restoring wetlands through the Wetland Reserve Program, and obtain a feedlot inventory by conducting Level III feedlot inspections. The agencies responsible for implementation of most actions items were conservation partners such as the seven county SWCD and NRCS offices, county environmental offices, and the Heron Lake Watershed District. Fisheries staff may have little direct involvement in these action items, but should at a minimum serve as an advocate to these conservation partners. As time allows, fisheries staff should continue to attend informational meetings associated with these processes. Also, fisheries staff should continue monitoring of selected riverine components in the West Fork Des Moines River to help document benefits of these programs to the fishery of this river. The TMDL implementation plan does list one specific action item for DNR. That item (Action F, under Objective 9-Effectiveness Monitoring), directs the DNR Shallow Lakes and Fisheries units to conduct thorough macrophyte, phytoplankton, zooplankton and fishery surveys. Fisheries staff should attempt to complete their part of this work.

Riparian Scale Concerns – The TMDL implementation plan offers several action items specific to riparian scale issues of bank erosion, control of runoff, overgrazing, and other non-point sources of impairment. Many suggest monetary incentives for establishment of buffer strips, perpetual easements, and other actions. Fisheries should aid these efforts in an advocacy role and perhaps through implementation of more surveys to help identify specific locations where these action items may be most effective.

Instream Scale Concerns –Continued low dissolved oxygen levels and associated fish kills remain the primary instream water quality concern. These problems appear to be related to combinations of flow volume, water temperature, and biological oxygen demand associated with nutrient enrichment. As such, low instream dissolved oxygen levels are the result of larger-scale concerns. Flow volume may be partially addressed by management recommendations for hydrology. Nutrient enrichment is likely due to non-point

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sources that can be best addressed by better land use practices in the watershed and riparian zones as directed by the TMDL Implementation Plan.

Management Recommendations for Water Quality –

1) Continue to support conservation measures in the watershed and associated monitoring efforts identified in the TMDL Implementation Plan.
2) Conduct a full stream survey that includes an inventory of riparian areas with heavy livestock use or row crop agriculture near the shoreline to identify areas of potential bank erosion and non-point sources of pollution.
3) Assist with specific monitoring efforts identified in the TMDL Plan for macrophytes, phytoplankton, zooplankton, and fisheries resources.

Biology

General Description – Biota in the West Fork Des Moines River have been infrequently assessed. A total of 23 fish species have been sampled by fisheries staff between 1979 and 1994 in reaches 1 and 2, and reach 3 downstream from Talcot Lake (Table 1). Those past assessments indicated sport fishery potential for northern pike, walleye, channel catfish, black crappie, and yellow perch. Natural reproduction was documented for all five species at least once (Table 4). Growth rates in 1987 were at least average for most sportfishes with walleye and northern pike reaching 16 to 17 inches by age 4. The largest walleye collected in 1987 was just longer than 28 inches. Fisheries assessments also noted populations of some commercial species including common carp, bigmouth buffalo, black bullhead, and quillback carpsucker. No state-listed species of special concern were collected in these assessments. More recent fish surveys have not been conducted since 1987 but walleye, channel catfish, redhorse spp., white sucker and quillback carpsucker were noted in a 2012 fish kill.

Fishes have not been sampled upstream of Talcot Lake in the West Fork Des Moines River (i.e., reaches 4 and 5), but fisheries assessments have been conducted in Lake Shetek. The last survey in that lake was in 2010 and found most of the same fishes present as in the river downstream from Talcot Lake.

Other biota have not been assessed since the initial survey in 1979. That survey noted the presence of 31 beaver dams (24 considered active dams) between Jackson and Talcot Lake, suggesting beaver were abundant at that time. Other vertebrates were not noted. Aquatic plants present in 1979 included algae, arrowhead, lesser duckweed, common cattail, softstem bulrush, sago pondweed, and Potamageton spp. Most aquatic plants were found along river margins in waters with little or no velocity. Macroinvertebrates were not assessed.

Watershed Scale Concerns – Based on information available, there doesn't appear to be any high priority watershed-scale concerns for the biology component, although a complete inventory of invasive species, especially invasive plants has not been completed.

Riparian Scale Concerns –Specific concerns for fishery management are not presently known because of a lack of recent information, especially of potential terrestrial invasive species such as reed canary grass.

Instream Scale Concerns – Based on anecdotal angling reports and observations during the 2012 fish kill, the river in reaches 1, 2, and 3 is believed to continue to support fishable populations for northern pike, channel catfish, and walleye. However, the current status of those populations is unknown due to a lack of information. Invasive Asian carp are known to be present in an adjacent watershed. Periodic hydrologic connections, such as in conjunction with high water events, may allow entry into the West Fork Des Moines River watershed. Presence and status of other invasive species is unknown.

Management Recommendations for Biology –

1) Complete a full stream survey that includes assessment of sport fish populations and the broader fish community in all five reaches, aquatic vegetation, and presence of invasive aquatic and riparian terrestrial species.
2) Consider development of monitoring protocols to detect expansion of Asian carp into this watershed.

STREAM MANAGEMENT PLAN – Page 9

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Social Aspects

General Description – Because most of the surrounding land use in the 1,300 mi^2 watershed is primarily agricultural, watershed land owners and conservation agencies likely have the strongest influence on aquatic habitat and fisheries resources in the West Fork Des Moines River. The development of the TMDL plan identified many of the important conservation partners in the watershed. Two committees were formulated during this process: an advisory committee and a technical committee. The advisory committee included representatives from the cities of Currie and Brewster, the Taylor Co-op, Pheasants Forever, Minnesota Soybean Growers, Martin County SWCD, Cottonwood County, and the Minnesota DNR-Windom. The technical committee included members from MPCA; Heron Lake Watershed District; county staff from Nobles, Jackson, Murray, Martin, and Lyon counties; SWCD staff from Pipestone, Nobles, Jackson, Murray, Cottonwood, Lyon, and Martin counties; cities of Jackson, Windom, Lakefield, Okabena, and Worthington; Swift Brands Inc.; U.S. Fish and Wildlife Service; MNDNR Marshall, Windom, Mankato, and Talcot Lake WMA staff members; BWSR; NRCS staff from Nobles, Jackson, Murray, Cottonwood, Martin, Pipestone, and Lyon counties; and the Silver Lake Watershed coordinator. Of course, all the anglers that fish the West Fork Des Moines River represent another key stakeholder group, but there is no formal organization representing them. River canoeists and kayakers represent another informal stakeholder group. The 1979 survey noted the presence of eight city, county, or state owned parks or lands that afford access to recreational users, including anglers. An additional 22 road crossings also afford public access to the river downstream from Talcot Lake. The 2012 Water Trail Guide notes five canoe access points and two boat landings on the river downstream from Talcot Lake.

Watershed Scale Concerns – Because land use in the basin has such an important influence on the aquatic habitat and fisheries resources, maintenance of effective cooperation and collaboration among all the land owners and associated conservation agencies remains a high priority for management of this river. The TMDL Implementation Plan identifies several of these partners and suggests action items to ensure effective cooperation and communication is maintained in this watershed. In particular, is the hiring of a Watershed Coordinator and associated technical staff will help facilitate collaboration among these varied stakeholder groups.

Riparian Scale Concerns – Same concerns as above in the Watershed-Scale section.

Instream Scale Concerns – Instream-scale concerns are unknown at present. No formal creel or human dimensions surveys have been initiated so there is no information on whether current recreational users are satisfied or dissatisfied with current management practices such as adequacy of existing angling regulations, river access, quality of the fishery, etc. Based on a lack of angler comments, it is assumed that no high priority concerns currently exist.

Management Recommendations for Social Aspects –

1) Continue to support implementation of action items identified in the TMDL Plan.
2) Consider implementing a recreational use and creel survey to better define desired future conditions and current practices of river recreationists.

References

Heron Lake Watershed District. 2009. West Fork Des Moines River and Heron Lake TMDL Implementation Plan. Available: http://www.hlwdonline.org/hlwd/images/pdf/Implementation_Plan.pdf (Accessed 3-1-13).

MPCA (Minnesota Pollution Control Agency). 2008. West Fork Des Moines River Watershed Total Maximum Daily Load Final Report: excess nutrients (North and South Heron Lakes), turbidity, and fecal coliform bacteria impairments. Minnesota Pollution Control Agency, St. Paul. Available: http://www.pca.state.mn.us/index.php/view-document.html?gid=8223 (Accessed 3-1-13).

Stream name		Kittle Number	Total Length	Date of Plan
West Fork Des Moines River		**I-037**	**116.53 miles**	**Dec. 22, 2011**
Region	Area Fisheries Office	Plan Managed Reach (river miles)	Length Plan Managed Reach	
4	**Windom (418)**	**0.00 to 116.53**	**107.42 miles (w/o Lake Shetek)**	

Table 1. Fish sampling stations used historically on the West Fork Des Moines River (I-037). River mile location is the distance from the old Jackson Dam site (i.e., old river "mouth").

River mile location	Old Station Number	Station Description	Years sampled	Station Location (T/R/Sec)
52.8	5	Talcot Lake WMA	1979, 1985, 1987	T-105/R-38/Sec-20
38.5	4	none	1979, 1987	T-105/R-37/Sec-15
23.5	3	Windom city park	1979, 1987	T-105/R-36/Sec-26, 35
15.7	2	none	1979, 1987, 1994	T-104/R-35/Sec-19
0.1	1	Jackson Dam impoundment	1979, 1987, 1994	T-102/R-35/Sec-23

Table 2. Fishes stocked in the West Fork Des Moines River downstream from Talcot Lake, Cottonwood and Jackson counties.

Year(s)	Species	Numbers
1970	Channel catfish fingerlings	6,920
1971	Channel catfish fingerlings	10,000
1978	Channel catfish fingerlings	24,301
1980-1982	Channel catfish	10,270
1976	Black crappie adults	2,475
1977	Black crappie adults	775
1978	Black crappie adults	1,960
1980-1982	Black crappie	8,474
1978	Walleye fingerlings	4,313
1979	Walleye fingerlings	5,886
1980-1985	Walleye	13.740
1979	Smallmouth bass fingerlings	11,500
1986	Northern pike	15,390

Table 3. Fishes removed from the West Fork Des Moines River downstream from Talcot Lake, Cottonwood and Jackson counties.

Year	Size	Pounds
1946-1984	Common carp	55,610
1946-1984	Buffalo spp.	15,177
1957-1971	Bullhead spp.	12,900

Table 4. Fish species sampled in fisheries surveys and assessments, West Fork Des Moines River, Talcot Lake and downstream, Cottonwood and Jackson counties.

Common Name	1979	1985	1987	1994
Channel catfish	X		X	X
Tadpole madtom	X			
Black bullhead	X	X	X	X
Yellow bullhead	X	X	X	
Black crappie		X	X	
White crappie			X	
Bluegill		X	X	
Pumpkinseed		X		

Stream name	Kittle Number	Total Length	Date of Plan
West Fork Des Moines River	**I-037**	**116.53 miles**	**Dec. 22, 2011**

Region	Area Fisheries Office	Plan Managed Reach (river miles)	Length Plan Managed Reach
4	**Windom (418)**	**0.00 to 116.53**	**107.42 miles (w/o Lake Shetek)**

Orangespotted sunfish			X	
Green sunfish			X	X
Northern pike	X	X	X	X
Walleye	X	X	X	X
Yellow perch	X	X		
Bigmouth buffalo	X	X	X	
Quillback carpsucker	X	X		X
River carpsucker			X	
Shorthead redhorse				X
White sucker	X		X	X
Common carp	X	X	X	X
Fathead minnow	X			
Bluntnose minnow	X			
Common shiner	X			
Spotfin shiner	X			
Young-of-year observed				
Channel catfish			X	
Black crappie	X		X	
Northern pike	X			
Walleye	X			
Yellow perch	X			

Stream name		Kittle Number	Total Length	Date of Plan
West Fork Des Moines River		**I-037**	**116.53 miles**	**Dec. 22, 2011**
Region	Area Fisheries Office	Plan Managed Reach (river miles)	Length Plan Managed Reach	
4	**Windom (418)**	**0.00 to 116.53**	**107.42 miles (w/o Lake Shetek)**	

Appendix 1. MNDNR Fisheries Ecological Classification of Minnesota Streams.

Class	Class Name	Cold/Warm	SubClass	SubClass Name
I	Trout	Cold	IA.	Wild Trout
			IB.	Coldwater Feeder
			IC.	Semi-wild Trout
			ID.	Marginal Trout
II	Warmwater Gamefish	Warm	IIA.	Smallmouth bass
			IIB.	Walleye
			IIC.	Northern pike
			IID.	Channel catfish
			IIE.	Cosmopolitan
			IIF.	Other (list)
III	Warmwater Feeder	Warm	-	-
IV	Rough Fish - Forage Fish	Warm	-	-
V	Intermittent	Warm	-	-

End of Plan