OPPORTUNITIES FOR STREAM FISHERY CONSERVATION IN THE CHARITON RIVER WATERSHED

The following perspectives on problems and opportunities for watershed management will guide MDC management priorities and activities for the foreseeable future. We realize we are only one of many partners whose joint efforts will be needed to protect and restore stream ecosystem integrity in the Chariton River watershed.

MANAGING MDC RIPARIAN OWNERSHIPS

Stream Access Acquisition

MDC has purchased small tracts of land along streams in order to provide public access for recreation and to establish an ownership stake which may strengthen our position in resisting system-wide threats to riparian habitat integrity. Several opportunities exist to improve the stream access network within the Chariton River basin.

Particularly high quality riparian habitat exists near the confluence of the East Fork and Middle Fork of the Little Chariton River in southeastern Chariton County. Acquisition would conserve this rare habitat, and development would enable a 12-mile float of the Little Chariton from the confluence downstream to Lewis Mill Access.

Mussel Fork Creek in its unaltered lower reaches has excellent instream and riparian habitat, but access is limited to walk-in fishing at Mussel Fork Conservation Area. It would be desirable to have small craft access at river mile 30 and walk-in access near river mile 12.

Shoal Creek in eastern Putnam County contains several reaches of exceptional instream and riparian habitat, but there is no public access. It would be desirable to acquire an ownership stake on this stream and provide limited walk-in fishing access somewhere between river mile 13 and U.S. Highway 136.

Recreational potential is limited on the channelized portion of the Chariton River, but there is a gap in small craft access between Dodd Access (river mile 43) and Price Bridge Access (river mile 7). If canoeing and other small craft navigation becomes more popular on such water, intermediate points of access would be desirable.

Stream Access Development

Because of fiscal constraints, planned developments have not been completed on all existing stream access areas. Developments should be completed so citizens can experience the recreational opportunities that will build their individual commitment to helping preserve and restore streams in this watershed. As a matter of strategic priority, MDC should complete planned developments on the following areas (year of acquisition in parentheses) before acquiring additional areas:

Access Area Name	Stream	Development Need
Truitt (1972)	Chariton	Concrete boat ramp
Elmer Cook Memorial (1995)	Chariton	Concrete boat ramp
Keytesville (1993)	Chariton	Entrance road, 10-car parking area, concrete boat ramp
Price Bridge (1988)	Chariton	Entrance road, 10-car parking area, concrete boat ramp

Site-Specific Stream Habitat Restoration

Although stream ecosystem health is almost entirely dependent upon processes occurring upstream and downstream of any given ownership, Department of Conservation riparian areas should serve as models of good stream stewardship. In the Chariton River watershed, forested corridor deficiencies have been corrected at Rebel's Cove and Mussel Fork conservation areas. MDC has a unique opportunity to restore approximately one mile of original channel adjacent to a channelized reach of Mussel Fork Creek on the Mussel Fork Conservation Area, pending cooperation by a neighboring landowner and funding for equipment work and rock.

Public Use Information

Public use of Chariton River watershed streams is very low, largely because instream habitat has been so adversely affected by channelization and sedimentation. Still, there are remnant reaches that are scenic, support diverse aquatic communities, and have fair fishing.

MDC could increase public use and appreciation of Chariton River watershed streams by developing a brochure describing stream recreational opportunities. Such a brochure would include colored pictures, simple stream maps with mileages, access sites, and camping areas clearly marked, descriptions of other local attractions, and fishing opportunities/regulations. Statewide news releases and an article in the *Conservationist* magazine might also help to inform potential users of the opportunities awaiting them in the Chariton River watershed.

CONSERVATION OF AQUATIC COMMUNITIES

Statewide, the Department of Conservation is developing a long-term Resource Assessment and Monitoring program (RAM). The objective is to establish standardized sampling methods for several stream ecosystem attributes, especially biotic communities, that will allow scientists to

provide an accurate, legally defensible portrayal of conditions and trends. Sampling will occur at random and fixed sites to allow statewide or individual watershed assessments. Information gathered from this effort may be used to prioritize watersheds for conservation.

Long-Term Fish Community Monitoring

Long-term monitoring to assess stream fish community trends has not been conducted in the Chariton River watershed. Extensive sampling within the RAM framework is not likely to occur for several years. Baseline fish data are absent for the Little Chariton River basin. In order to monitor trends in fish community composition and population levels, the Department of Conservation should conduct an initial fish community survey of the Little Chariton River basin, and perform follow-up surveys on approximate ten-year intervals of the Chariton River basin at a subset of sites randomly selected from among those surveyed during 1987-1994 (Table 8).

Fishery Management and Research Needs

Stream fish communities in the Chariton River watershed seem to be imbalanced. Surveys and angler reports reveal the existence of relatively few fish-eating predators (flathead catfish or walleye) but large numbers of insect-eating bottom feeders (channel catfish, river carpsuckers, common carp, and a variety of native minnow species). Non-game fishes are represented mostly by species tolerant of the shallow depths and shifting substrates caused by excessive watershed erosion and subsequent stream channel sedimentation. Shifting substrates dramatically reduce biological productivity, so in channelized streams the large populations of insect-eating fish are almost entirely dependent upon terrestrial inputs or whatever invertebrate production occurs on in-channel woody debris. There are not enough predatory fish to control the abundant insect-eating fish. Degraded habitat may be the main factor limiting predator abundance and thereby preventing ecosystem balance.

We know very little about the migration patterns and minimum habitat requirements of the key predator--flathead catfish. Also, we do not know if the relative scarcity of flathead catfish is due to overharvest under liberal regulations, illegal harvest, habitat deficiencies, or some combination of factors. We need basic research, starting with studies of flathead catfish movement and exploitation rate, in order to begin developing a broad range of strategies for effectively managing sport fishes in streams (e.g., regulation, stocking, and information/education in addition to habitat protection/restoration).

Monitoring Contaminants in Fish

Fish contaminant monitoring has been conducted every three years within the Chariton River watershed at Long Branch and Thomas Hill lakes (Little Chariton watershed) and at Prairie Hill on the Chariton River mainstem. Such monitoring should continue. Additionally, the Department of Conservation should work with the Department of Health to monitor mercury levels in flathead catfish – the only significantly harvested piscivore in basin streams.

Long-Term Mussel Community Monitoring

Most basin streams have an excessive bedload of shifting sand that is not conducive to the existence of a healthy mussel fauna. The only qualitative mussel survey conducted in the basin to date was on Mussel Fork Conservation Area in 1994. The Department of Conservation should assess mussel species diversity and abundance in streams on major conservation areas in the watershed, such as Rebel's Cove and Union Ridge.

SUPPORTING OTHER AGENCIES AND ORGANIZATIONS

The Missouri Department of Conservation works with many other governmental agencies and private conservation organizations in the process of managing stream resources. The following formal or traditional interactions are among the most significant in frequency and scope, and they should be continued:

Missouri Department of Natural Resources (DNR)

MDC assists DNR by periodically nominating pristine or otherwise valuable stream reaches for "Outstanding State Resource Water" status; recommending water quality standard classifications for stream reaches of special concern; and assisting in water pollution investigations whenever an event results in the loss of aquatic life. In such cases, MDC's role is to document the number of dead fish and other aquatic organisms and report to DNR the estimated value of animals lost according to formulas established by the American Fisheries Society. MDC should continue coordination with DNR in order to ensure efficient use of state government resources in the conservation of streams in the Chariton River watershed. In particular, MDC should sample stream fish communities in conjunction with DNR invertebrate monitoring at specific sites in sub-basin streams that may be impacted by the corporate hog producer, PSF-Contigroup.

Missouri Department of Health (DOH)

MDC assists DOH by periodically collecting fish from select streams and preparing tissue samples for analysis of pesticide and heavy metal contaminants. We cooperate with DOH in advising anglers about fish consumption. MDC should continue collecting tissue samples triennially from carp and bass in Little Chariton River reservoirs – Long Branch and Thomas Hill lakes – and from carp and flathead catfish in the Chariton River mainstem at Prairie Hill.

U.S. Army Corps of Engineers (COE)

MDC joins several other agencies in commenting to COE and DNR about activities in streams that require permit under Sections 404 and 401, respectively, of the federal Clean Water Act. COE requires a Section 404 permit for operators who propose to deposit or stockpile material in stream channels; and DNR requires a Section 401 permit for any activity that could significantly degrade water quality. MDC biologists help to disseminate information about stream-friendly sand and gravel removal practices to county commissions, contractors, and landowners.

MDC personnel are often the first agency representatives contacted by neighbors when individuals or public entities engage in what appear to be unpermitted and destructive practices in and along streams. Several incidents of Section 404 violation occur annually in the Chariton River watershed, prompting MDC biologists to assess impacts and recommend potentially acceptable terms of mitigation or restoration. However, only the COE or EPA (Environmental Protection Agency) can impose such requirements. MDC biologists should remain vigilant advocates for the interests of all riparian residents, upstream and downstream, who may be adversely affected by the activities of those few who knowingly violate Sections 404 or 401 of the Clean Water Act.

MDC recognizes that regulations are necessary to protect streams and their watersheds. Previous hopes that voluntary efforts alone would afford reasonable protection were unrealistic. Watershed management must be approached in a balanced, market-based manner that falls somewhere in the continuum between regulatory protection and voluntary conservation efforts.

Conservation Federation of Missouri (CFM)

MDC facilitates and promotes Stream Team, a program initiated by CFM that seeks to enlist volunteers in the stream conservation effort. As of October 2001, there were 28 Stream Teams registered in or bordering the Chariton River watershed. Of that total, 24 had not adopted a particular stream, but wanted to show their support in a variety of ways (8 from Kirksville, 6 from Macon, 4 from Moberly, and 6 from other rural communities).

Stream Teams who have adopted particular reaches of stream in the Chariton River watershed include the Truman State University Division of Science (Team #1780 - Chariton River and Big Creek); the Kirksville Alternative School (Team #1373 - Big Creek, Sugar Creek, and Hazel Creek); the Kirksville Tiger Cubs (Team #1588 - Sugar Creek); and Rick Gann of Callao (Team #1516 - Middle Fork Little Chariton River).

The most active Stream Team in the Chariton River watershed is the Family Farms Group (Team #714) based in Unionville. They have adopted various sections of Shoal Creek, Blackbird Creek, and Sandy Creek. Besides conducting extensive water quality monitoring in streams in the PSF-ContiGroup sub-basins, they have done riparian corridor tree plantings, stream bank stabilization, and litter pick-ups.

Greater citizen interest and volunteer effort will be needed for any significant stream improvements to occur within the Chariton River watershed.

ASSISTING CITIZEN-LED WATERSHED CONSERVATION EFFORTS

We are convinced that the watershed conservation approach will work only if there is widespread recognition that social, economic, and environmental values associated with streams are compatible. If that can be achieved, success will depend upon local initiatives to form diverse partnerships of committed groups and individuals under the leadership of landowners and other local interests.

Watershed restoration is essential to restoring the primary processes that create and maintain fish habitat in healthy stream ecosystems. The most critical and affordable first step in watershed restoration is *passive* restoration--the cessation of human activities that are causing degradation or preventing recovery (e.g., channelization, riparian corridor clearing, indiscriminate sand dredging, and streamside livestock grazing). *Active* restoration (e.g., tree revetments and riparian corridor tree plantings) should be considered only if recovery fails to occur over a reasonable period of time while using *passive* techniques (e.g., livestock exclusion and natural

regeneration of woody plants). Because restoring degraded stream ecosystems is more costly and risky than simply protecting fully functional sites, we suggest that protecting and preserving intact riparian ecosystems be the highest priority of watershed-scale restoration efforts.

Protecting Healthy Riparian Corridors -- Stream Stewardship

A program aimed at conserving healthy forested stream corridors by placing them into permanent easements using Stream Stewardship Agreements (SSA) was piloted in Marion County between 1992 and 1995. That effort resulted in the permanent conservation of 88 acres of 100- to 200-foot-wide forested corridor on four ownerships along 2.4 miles of the South Fabius River. The infrastructure now exists for MDC to facilitate the permanent conservation of healthy stream corridors, but measurable impact will require funding from a variety of sources. Enrollment of streamside lands in continuous CRP (Conservation Reserve Program) will not substitute for enrollment in SSA or other permanent easement programs because healthy forested corridors cannot be enrolled in CRP, and land enrolled in CRP buffers may be converted back to crop production at the end of short-term contract periods (10 to 15 years). However, CRP may provide a viable first step for landowners on the long path toward converting eroding floodplain cropfields or pastures into functional riparian corridors.

Passively Restoring Mildly Degraded Riparian Corridors -- Livestock Exclusion

The activity of livestock can degrade physical aspects of water quality by causing streambank erosion, resulting in turbidity and stream channel sedimentation. Chemical aspects of water quality can be degraded by livestock waste products. In some situations, streambank healing, corridor reforestation, and improved water quality can be achieved simply by excluding livestock from stream corridors. For fencing to be attractive to landowners, an alternative source of livestock water must be available (e.g., upland ponds, or shallow floodplain wells tapped by nose pumps or solar-powered pumps). Some landowners may have potential alternative water sources on their property, but may not have the money or the technical support to adopt new technology. Cost-share money for fencing and alternative watering may be available through a variety of federal and state programs. Department of Conservation biologists are available to assist landowners in selecting a practical alternative to instream watering of livestock.

Actively Restoring Moderately to Severely Degraded Corridors

A 75% cost-share program for stream restoration practices (e.g., tree revetments and riparian corridor tree plantings) was piloted by MDC in Sullivan County between 1990 and 1993. The program had no participants, despite the fact that 41% of county landowners were aware of

monetary incentives. The program lacked many elements critical to the adoption of innovation in agricultural communities, including relative economic advantage and value compatibility. The problems and their solutions were often complex, and MDC assistance had stipulations (ten-year forested corridors 50 to 100 feet wide) which many landowners were unwilling to accept. The lesson learned? Most rural northeastern Missouri landowners may not be prepared to make the personal sacrifices in time, money, and values needed to restore moderately to severely degraded stream habitats on their property. Available funds might be better spent first on protecting healthy riparian corridors and passively restoring those which are only mildly degraded.

Educating Future Watershed Stewards

Educating our youth about the complexities of watershed processes and problems will be critically important in advancing the science and art of watershed conservation. Today's youth are more technologically oriented and therefore more likely than their predecessors to embrace complex information systems. And because of changes in classroom teaching strategy, they are more likely to work effectively in problem-solving teams once they become adults.

MDC has found that students in and around the 6th grade are particularly receptive to messages about stream conservation because they can understand most concepts and evaluate new ideas with relatively little social or cultural bias. Classroom teachers may find helpful lesson-planning materials in Missouri's *Stream Team Curriculum*, a watershed-based curriculum developed by teachers, for teachers, that will help students to meet environmental education goals in the Missouri Performance Standards.

Junior high and high school students in vocational agricultural programs may also be prime candidates for watershed conservation education because they are more likely than others to become landowners and other important members of rural communities. Involving these students in hand-on stream conservation activities may contribute to the creation of a new generation of landowners committed to stream ecosystem integrity.

CITIZEN PRIMER TO LEADERSHIP IN WATERSHED CONSERVATION

This section is included as a starting point for citizens who wish to lead or contribute significantly to watershed-based stream conservation efforts. The proliferation of information about watershed planning can be intimidating to individuals or groups who have decided that they have a problem they wish to fix. To facilitate that process, we recommend that potential leaders and contributors to watershed conservation efforts first familiarize themselves with a summary of lessons learned over the past decade about what works and what does not. The list

in Table 9 combines the *Top 10 Watershed Lessons Learned* published by the United States Environmental Protection Agency (1997) with the ten principles for effectively coordinating watershed-based programs listed by Turner (1997). These documents are highly recommended reading.

Citizens determined to develop and implement watershed conservation plans can also obtain critically important information about organizing and funding such projects by visiting the Internet websites listed in Table 10. These sites contain convenient links to many other sites that, in the aggregate, provide enough information about the watershed conservation process to help any individual or group get started in an informed and effective manner.

Table 9. Ten useful watershed conservation principles.*

1)	For the watershed conservation approach to work, there must be widespread recognition that social, economic, and environmental values are compatible.
2)	Successful watershed conservation requires the formation and support of diverse partnerships under the authority of landowners and other local interests.
3)	Leadership is critical in the watershed approach to conservation.
4)	A good coordinator is key to successful watershed conservation projects.
5)	The best plans have clear visions, goals, and action items.
6)	Good tools (planning guides, technical assistance, and funding sources) are available to help watershed groups achieve their goals.
7)	It is important to start small and demonstrate success before working on larger scales, celebrating even minor success as it occurs.
8)	Plans are most likely to succeed if implemented on a manageable scale.
9)	Public awareness, education and involvement are keys to building and maintaining support for watershed conservation efforts.
10)	Measuring and communicating progress is essential to the success of watershed conservation efforts.

* – For EPA Publication 840-F-97-001, call the National Center for Environmental Publications and Information at 1-800-490-9198.

Table 10. Internet websites containing important information for Missouri watershed planners.

Conservation Technology Information Center

http://www.ctic.purdue.edu/

CTIC is a non-profit, public-private partnership equipping agriculture with realistic, affordable, and integrated solutions to environmental concerns.

EPA Watersheds and Wetlands

http://www.epa.gov/OWOW/

This site, created and maintained by the federal Environmental Protection Agency, is a good starting point for information about watersheds and water quality.

Funding Sources for Watershed Conservation

http://www.epa.gov/OWOW/watershed/wacademy/fund.html#forword

This site contains a comprehensive listing of private and public sources of watershed project funding, with links to many individual sites and references to many useful publications.

Know Your Watershed

http://www.ctic.purdue.edu/KYW/KYW.html

This initiative works to encourage the formation of local, voluntary partnerships among all watershed stakeholders for the purpose of developing and implementing watershed plans based upon shared visions of the future.

Missouri Stream Team

http://www.rollanet.org/~streams/

This site provides specific information on activities, programs, and funding sources for volunteers who have adopted Missouri streams or otherwise committed themselves to conserving stream resources in Missouri.

Missouri Watershed Information Network

http://outreach.missouri.edu/mowin/

This site serves as a clearinghouse for information about Missouri watersheds.

River Network

http://www.rivernetwork.org/wag.htm

This organization supports development of local watershed partnerships through its Watershed Assistance Grants program. They seek to fund projects in diverse geographies that have demonstration value on a national scale.