MANAGEMENT CHALLENGES AND OPPORTUNITIES

The management goals, objectives, and strategies for the Big Piney Watershed were developed using information collected from the Big Piney Watershed Inventory and Assessment (WIA) and direction provided by the Ozark Regional Management Guidelines (1998), Missouri Department of Conservation (MDC) Strategic Plan, and the Fisheries Division Five Year Strategic Plan. Objectives and strategies were written for instream and riparian habitat, water quality, aquatic biota, recreational use, and hydrography. All goals are of equal importance, with objectives listed in prioritized order whenever possible. This plan includes only those activities and results that can reasonably be expected to be achieved or influenced during the next 25 years. Completion of these objectives will depend upon their status in overall regional and division priorities and the availability of human resources and funds.

GOAL I: PROTECT AND IMPROVE RIPARIAN AND AQUATIC HABITATS IN THE BIG PINEY WATERSHED.

Status: Many streams in various portions of the watershed lack sufficient riparian corridors. Streams within the Upper Big Piney Hydrologic Unit have the least percentage of forested riparian corridors. In addition, gravel mining has been very prevalent in the Upper Big Piney as well as, to a lesser extent, in the Middle Big Piney and Spring Creek Hydrologic Units.

Objective 1.1: With the assistance of willing landowners, over a 25-year period, increase by 25% the proportion of streams with a sufficient forested corridor as defined in NRCS (2000).

Strategy: Referencing the priority ranking for eleven digit units of the Big Piney Watershed presented in Figure Mc01 (developed through evaluations of riparian forest cover absence, losing streams, unit size, and presence of sensitive species), direct appropriate riparian corridor improvement efforts towards the following ranked drainage units: High = Upper Big Piney; Medium = Middle Big Piney; Low = Lower Big Piney and Spring Creek.

1. Using satellite imagery, aerial photography, aerial stream survey documentation, and/or field investigations, document the conditions of riparian corridors and stream banks once every 10 years. Future projects such as the Missouri Resource Assessment Partnership Land Cover Classification should be encouraged in order to ensure that adequate data is available to allow efficient analysis of riparian corridor conditions over time.

2. Ensure all MDC Areas represent examples of proper riparian corridor stewardship by following established best management practices for riparian restoration/protection.

3. In cooperation with regional Private Land Services Division personnel, provide appropriate agencies such as Natural Resources Conservation Service (NRCS)

and Soil and Water Conservation Districts (SWCDs) as well as willing agricultural-oriented businesses such as farm centers, agricultural chemical dealers, etc. with free brochures dealing with riparian corridor issues in order to facilitate increased awareness and dissemination of this information to landowners.

4. Facilitate a riparian corridor workshop in the Upper Big Piney Drainage Unit.

5. Facilitate riparian corridor restoration/protection by willing landowners in accordance with applicable guidelines through the use of available funding and/or technical assistance.

Objective 1.2: Limit the negative impacts of sand and gravel removal within the watershed.

Strategy: Education of sand and gravel operators regarding limiting the potential negative impacts associated with sand and gravel removal, dynamic documentation of permitted sand and gravel removal sites, assisting with continued research regarding gravel removal, and encouragement of the efficient enforcement of violations associated with sand and gravel removal will be important in limiting the potential negative impacts of gravel removal.

1. Work with MDC Resource Science Division, Outreach and Education Division, and appropriate agencies such as MDNR in the development of an educational video illustrating proper and improper sand and gravel removal methods, proper site selection, and the consequences of improper sand and gravel removal operations.

2. Work with gravel removal operators, willing landowners, and regulating agencies to create a geographic information system (GIS) database of appropriate potential sand and gravel removal sites (to be updated as needed).

3. Continue to assist appropriate state and federal agencies in the enforcement of existing water quality laws in regards to sand and gravel removal.

4. Assist with additional research efforts regarding the effects of instream sand and gravel removal in order to develop measures that adequately protect aquatic resources.

5. Work with stakeholder groups such as landowners and governmental and non-governmental organizations to ensure appropriate gravel mining regulations exist to prevent damage to stream resources as well as property within the watershed due to improper gravel removal.

GOAL II: PROTECT SURFACE AND GROUND WATER QUALITY IN THE BIG PINEY WATERSHED.

Status: Currently (2004), all waters within the Big Piney Watershed are included in a statewide fish consumption advisory for largemouth bass due to elevated levels of mercury. While a limited analysis of water quality data does not appear to indicate any additional specific wide spread water quality problems within the Big Piney Watershed, some site specific concerns are noted. Within the watershed there is a 0.2 mile segment of Brushy Creek included in the 1998 303d list due to impairment by non-filterable residues from the Houston Sewage Treatment Plant. In addition, periodically elevated fecal coliform levels have been observed at Shanghai Spring, the Big Piney River near Big Piney, and the Big Piney River at Devils Elbow. It has been noted that Shanghai Spring and Pumping Station Spring "exhibit probable effects of septic contamination" (Imes et al. 1996). Potential contaminant sites have been inventoried on the Fort Leonard Wood Military Reservation and measures have been, or are being, taken to address these concerns. In addition, extensive water quality data continues to be collected in the FLW area as part of monitoring programs and studies the FLW is funding or otherwise associated with. Other items which always have the potential to cause water quality problems in this watershed, as in any other, include large numbers of livestock in riparian areas for extended periods of time, private septic system failure, increased nutrients from municipal sewage treatment facilities, improper sand and gravel removal and poor land use practices such as indiscriminate land clearing. These can result in periodic high fecal coliform levels, nutrient loading, and/or increased sediment and gravel deposition.

Objective 1.1: Ensure that watershed streams meet or exceed state standards for water quality.

Strategy: Due to the connection between the surface water and ground water systems in the watershed, protection of surface waters, both permanent and intermittent, can greatly contribute to the enhancement of ground water quality. MDC lands should be managed to provide good examples of water quality protection and form the basis for MDC efforts to promote water quality protection on both public and private land. Education of the citizenry and land owners on water quality issues and land stewardship is the best hope for improving water quality. Protecting riparian corridors will help to reduce and filter surface runoff as well as provide stream bank and channel stability. Ensuring that additional water quality monitoring (including bio-monitoring), particularly in those areas that have exhibited some water quality concerns in the recent past, is conducted in order to better delineate the degree of and solution to those problems will also be important. Encouragement of appropriate agencies to enforce existing water quality laws will also be required to obtain satisfactory water quality.

1. In cooperation with field personnel from all divisions, ensure management activities on public land, as well as MDC sponsored projects on private land, follow best management practices that protect water quality.

2. Encourage the establishment of a long-term monitoring project by the MDC Science Division in order to determine the impacts of MDC land management activities on water quality.

3. Through media contacts, personal contacts, literature development, and speaking engagements to groups such as area Stream Teams and land owners, inform the public of water quality issues and problems (e.g. karst topography, excessive siltation, animal waste runoff, gravel dredging, septic system failure etc.) and best management practices to address these problems.

4. In cooperation with regional private lands services personnel, encourage limiting livestock access in riparian areas and through education and/or incentive programs for private landowners.

5. Ensure that sites of water quality concern continue to be monitored and assist in developing solutions to any current problems which may still exist.

6. Encourage and assist, as needed, with additional dye tracing studies within the watershed in order to further determine intrawatershed and interwatershed ground water movement as well as recharge area of selected springs within the watershed with an emphasis on publicly owned spring outlets and, specifically, spring outlets on lands managed by the MDC.

7. Encourage and assist with enforcement of existing water quality laws by reviewing 404 permits, cooperating with other state and federal agencies to investigate pollution and fish kill reports, collecting water quality related data, and recommending measures to protect aquatic communities.

8. Encourage the incorporation of water quality data such as fish kills and water pollution investigation and MDNR designated uses into GIS by appropriate MDC and MDNR staff in order to facilitate effective data updating and analysis.

9. Encourage better stormwater management in urban and other developing areas.

GOAL III: MAINTAIN THE ABUNDANCE, DIVERSITY, AND DISTRIBUTION OF AQUATIC BIOTA AT OR ABOVE CURRENT LEVELS WHILE IMPROVING THE QUALITY OF THE GAME FISHERY IN THE BIG PINEY WATERSHED.

Status: Since 1930, an assemblage of 73 fish species, 32 mussel species and subspecies, 6 species of snails, 3 crayfish species, and 191 taxa of benthic macro-invertebrates (not including mussels and crayfish) have been identified throughout the Big Piney Watershed. A total of 41 species and subspecies of conservation concern are known to occur in the watershed. This list includes 4 fish species, 5 species of mussels, 2 species of amphibians, 1 species of crayfish, and 2 species of insects. The most common game fish species within the watershed include smallmouth bass, rock bass, and largemouth bass. In addition, two significant rainbow trout fisheries occur within the watershed, with a large amount of habitat enhancement work being done within the trout fishery of Spring Creek. Sucker species provide an alternative consumptive recreational opportunity within the watershed. Invasive exotic aquatic species within the watershed include the Asian clam and the common carp.

Objective 1.1: Maintain the diversity, abundance, and distribution of native non-sport fish, and aquatic invertebrate communities at or above current levels.

Strategy: High priority should be placed on protecting species of conservation concern and unique aquatic community assemblages. Focusing enhancement and protective efforts on a few species can be effective in helping other species that share the same habitat. Detecting changes in aquatic community species composition can be accomplished by conducting routine surveys of fish and invertebrate communities. In cases where significant changes in diversity, abundance, and/or distribution are noted, efforts to determine factors influencing the changes should be developed through cooperation with MDC Resource Science Division as well as other appropriate agencies and institutions. Cooperation between state and federal natural resource agencies, private land owners, and, in some instances, citizen groups will be necessary to adequately address challenges to aquatic community health.

1. Assist with recovery efforts for species of conservation concern within the watershed.

2. Survey fish communities in the watershed every 10 years at historical sampling sites using standardized sampling techniques. Initial emphasis should be placed on historic sites known in the past to harbor "species of conservation concern". Establish additional sampling sites as necessary with high priority given to MDC areas. Incorporate data into GIS in order to facilitate documentation of changes in species diversity, abundance, and/or distribution.

3. Using GIS, document locations and identify unique fish assemblages associated with natural features and special habitats such as spring branches for inclusion in the Natural Heritage Database.

4. Develop a prioritized list of stream reaches on MDC areas needing instream habitat restoration using the following criteria: presence of listed species, extent of forested stream corridor, size of stream, land use, soils, presence of permanent water, presence of sport fish, natural features and critical habitat.

5. As appropriate, recommend research projects in cooperation with MDC Resource Science staff to investigate reasons for significant changes in faunal abundance and distribution. Recommend management changes if needed.

6. Coordinate with MDC Resource Science staff and other groups (i.e. Fort Leonard Wood environmental staff, University of Missouri, etc.) to develop a routine mussel survey schedule for the watershed and ensure that data collected is made available in a comprehensive database.

7. Coordinate with MDC Resource Science staff and other groups (i.e. Fort Leonard Wood environmental staff, MDNR, University of Missouri, etc.) to conduct a survey of benthic invertebrates on all fifth order and larger streams and ensure that data collected is made available in a comprehensive database.

Objective 1.2: Maintain or improve populations of sport fish while maintaining a stable and diverse fish community.

Strategy: Proper management of game fish populations will depend on obtaining adequate surveys to determine the status of the fishery and angler attitudes as well as implementing habitat improvement projects, regulation changes, and fish stocking where needed.

1. Coordinate with appropriate MDC Staff (i.e. RCT and DCT Team members) to determine future management strategies for the Rock Bass and Black Bass fisheries of the Big Piney River based on the most recent scientific data available.

2. Assist in maintaining existing stream habitat enhancement structures within the watershed.

3. With approval from appropriate agencies (i.e. Fort Leonard Wood Natural Resources Staff, United States Army Corps of Engineers, USFS, etc.), implement additional instream habitat improvement projects in stream segments of heavy angler pressure which otherwise lack sufficient stream habitat with priority given to public areas.

4. Assist in maintaining a quality trout fishery in the Stone Mill Spring Branch Trout Management Area and the Spring Creek WTMA.

5. Within the Big Piney Watershed, continue to assist with future MDC efforts to comprehensively determine the extent of cold water resources in the state.

Objective 1.3: Prevent detrimental impacts on native fauna of the Big Piney Watershed from invasive exotic aquatic species.

Strategy: Preventing the introduction of invasive exotic species into the state is the easiest way to prevent detrimental impacts to native fauna. Public education regarding the prevention of invasive exotic species introduction is the key to preventing the potentially ecologically and economically damaging effects of such introductions. Once a detrimental invasive exotic species becomes established, research will be needed to seek ways to contain or eliminate them.

1. Educate the public on the potentially damaging effects of 'bait bucket' introductions to lake and stream communities as well as through the development and use of flyers posted at accesses, newspaper articles, and the Internet.

2. Continue MDC Fisheries division participation in the Missouri Aquaculture Advisory Council (MAAC) and other organizations and advocate controlling the introduction of invasive exotic fauna into state waters.

3. Monitor for invasive exotic species (e.g. zebra mussel, Asian clams, etc.) and their potentially harmful effects. This can be performed during fish community surveys.

4. If/when invasive exotic species are found, participate in statewide efforts to eliminate before unacceptable levels are reached.

GOAL IV: INCREASE PUBLIC AWARENESS AND PROMOTE WISE USE OF AQUATIC RESOURCES IN THE BIG PINEY WATERSHED.

Status: Much of the recreational use within the watershed is associated with the Big Piney River as well as the trout fisheries located on Spring Creek and Stone Mill Spring Branch. A statewide angler survey conducted in the 1980s estimated that total days spent angling on the Big Piney and its tributaries averaged 29,780 annually between the years 1983 and 1988. Some angler survey data has also been gathered for Stone Mill Spring Branch by Fort Leonard Wood Natural Resource Managers. In addition to angling, other stream oriented recreational activities within the watershed include canoeing and tubing to name a few.

Objective 4.1: Ensure that up to date aquatic oriented recreational data is available to properly manage aquatic resources and their use.

Strategy: In addition to creel surveys conducted by MDC, encourage and assist appropriate agencies such as the USFS as well as Fort Leonard Wood natural resource managers, in the continued monitoring of aquatic oriented recreational activities within the watershed on a regular basis in order to provide data to be used for determining long term trends and problems which may need to be addressed through adjustments in management.

1. In cooperation with MDC Resource Science, develop a routine angler survey program for the Big Piney Watershed to be conducted every 10 years.

2. Encourage surveys of non-consumptive river use by the United States Forest Service.

3. Encourage continued periodic surveys of aquatic resource use on Fort Leonard Wood Military Reservation by FLW natural resource managers.

Objective 4.2: Increase awareness of stream recreational opportunities and appreciation of stream ecology and advocacy to a level that will encourage a widespread and diversified public interest in the Big Piney Watershed.

Strategy: Careful publicity which focuses on species of conservation concern, unique aquatic-oriented communities, as well as abundant recreationally valuable fish populations can promote a continued appreciation of these different types of natural resource elements. Providing opportunities for the public to learn about stream ecology will, hopefully, create stream advocates.

1. Continue to assist in providing the MDC annual fishing prospectus as well as the "Missouri Trout Fishing" and "Ozark Smallmouth Bass Fishing" maps for public release in order to describe the specific fisheries and angling opportunities of selected waters.

2. Provide updated versions of the “Popular Public Fishing Streams in the Ozark Region” and “Popular Public Fishing Lakes in the Ozark Region” brochures in electronic form (via the MDC public Internet website) and paper form.

3. In cooperation with MDC Outreach and Education Division, provide the local and statewide media with timely "How to", "When to" articles and interviews that focus attention on places as well as both consumptive (i.e. gigging, float/wade fishing) and non-consumptive activities (i.e. snorkeling, floating, underwater photography)

4. Publicize the acquisition, development and opening of new public access and/or stream frontage sites.

5. In cooperation with regional field personnel from all divisions, emphasize stream ecology and good stream stewardship (utilizing brochures, aquaria, and stream tables where applicable) during presentations to school groups, youth organizations, and private landowner contacts.

6. Conduct outdoor youth events, such as Ecology Days at stream sites with field activities that demonstrate stream ecology and good stream stewardship.

7. Facilitate the development and activity of Stream Teams and other groups interested in adopting or otherwise promoting good stewardship and enjoyment of watershed streams.

8. Make public presentations in cooperation with regional field personnel from all divisions that focus on best management practices for private landowners.

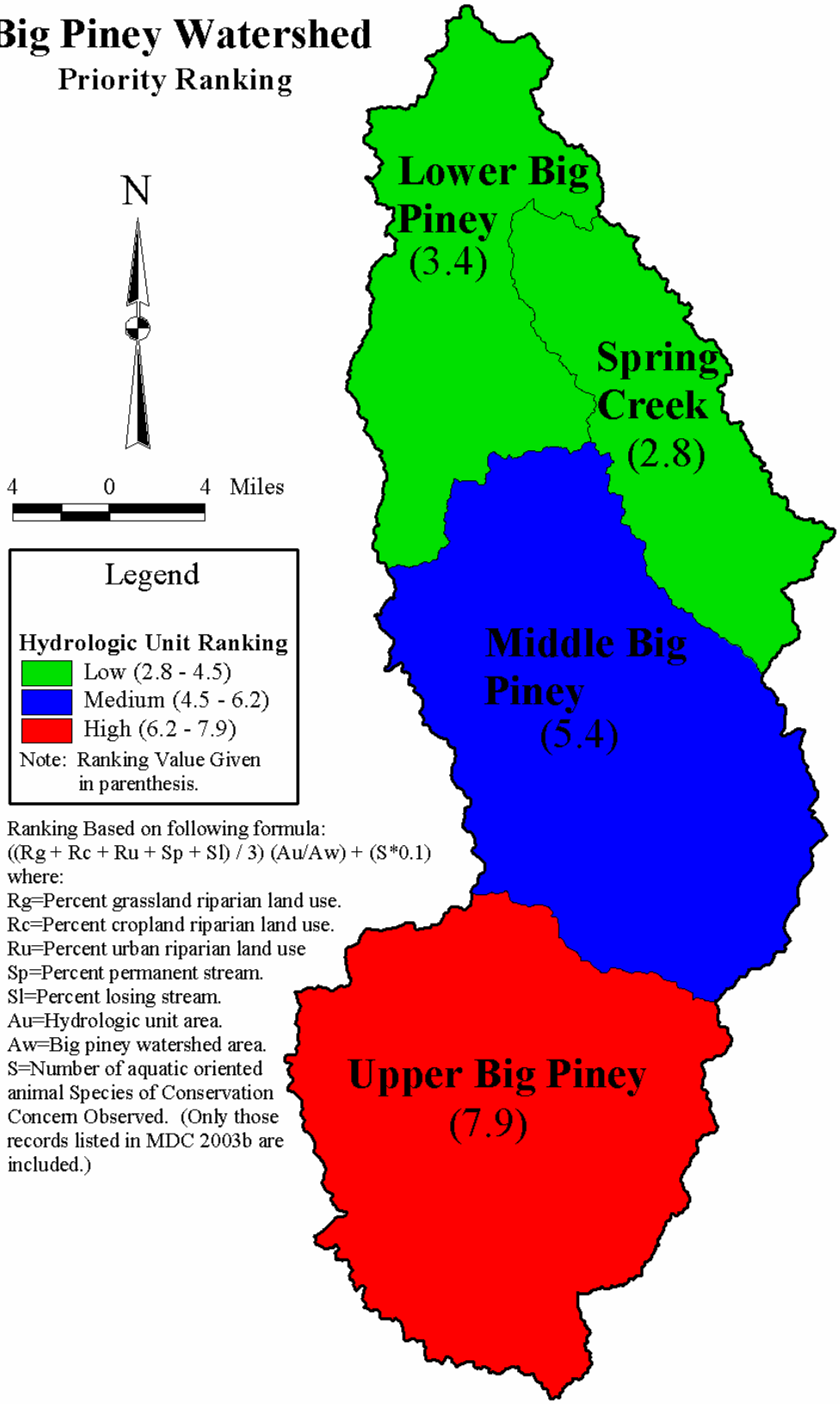
9. Provide promotional, educational, and technical stream materials to groups, fairs and other special events.

10. In cooperation with regional field personnel from all divisions, develop brochure which describes the watershed and promotes best management practices within the watershed.

Figure Mc01..

Big Piney Watershed

Priority Ranking



Ranking Based on following formula:
((Rg + Rc + Ru + Sp + Sl) / 3) (Au/Aw) + (S*0.1)
where:
Rg=Percent grassland riparian land use.
Rc=Percent cropland riparian land use.
Ru=Percent urban riparian land use
Sp=Percent permanent stream.
Sl=Percent losing stream.
Au=Hydrologic unit area.
Aw=Big piney watershed area.
S=Number of aquatic oriented animal Species of Conservation Concern Observed. (Only those records listed in MDC 2003b are included.)