

CHAPTER 6: ELEMENT D. - TECHNICAL & FINANCIAL ASSISTANCE

The chart below describes the planned order of implementation of management measures, the time requirements for implementing the plan, as well as identifying technical and financial resources for short term goals. There are limitations of trying identifying long-term funds sources into the far future. Funding sources will be continually sought.

GOALS	Management Objectives	Timeline	Tech Resources	Financial Resources
A1 CAPTURE THE FIRST 1.14 INCH OF STORMWATER RUNOFF				
a. Define Green Infrastructure Management Methods	1). Green infrastructure systems are defined as strategies to manage stormwater runoff at the local level through the use of natural systems, or engineered systems that mimic natural systems, to treat polluted runoff.		East West Gateway, Missouri Botanical Garden, MSD	
	2) Raingardens, bioswales, and bioretention; soil amendments & mulching; stormwater harvesting; lawn alternatives, i.e. replacing lawn grass with deep rooted plants; urban tree protection, tree planting, and urban forest management strategies; Rock weirs & filter socks; porous pavement, greenroofs.		Missouri Botanical Garden, MSD	
b. Engage residential, municipal and commercial audiences in stormwater management.	1) <i>Engage residential property owners in managing stormwater.</i> a) Provide financial incentives for voluntary participation in stormwater management through a rainscaping cost-share program.	Ongoing	Missouri Botanical Garden, MSD	319 funds, MSD, private landowners, private donors
	b) Provide technical support for best management practices through online resources, social media, workshops and webinars.	Ongoing	MSD, River des Peres Watershed Coalition (RdPWC), MBG	319 funds, MSD, private donors, GRG
	c) Support annual citizen engagement projects in the watershed.	Ongoing	RdPWC, Open Space Council, Earthday 365	Missouri Dept. of Conservation, 319 funds, GRG
	d) Involve citizens in local parks maintenance, including tree inventory, tree maintenance, and/or tree planting efforts with emphasis on native trees.	Ongoing	Forest Releaf, Open Space Council	Municipalities, MDC, 319 funds, GRG
	e) Encourage downspout disconnections where appropriate. Provide incentives to reroute increased overland flow to rainscaping features.	10 years	MSD	MSD

GOALS	Management Objectives	Timeline	Tech Resources	Financial Resources
b. Engage residential, municipal and commercial audiences in stormwater management. (cont)	2) Support municipalities to implement stormwater management measures. <ul style="list-style-type: none"> a. Support the development of and implementation of stormwater master plans in each municipality. 	5 to 10 years	Consulting firms, MSD	MSD, Muni’s
	<ul style="list-style-type: none"> B. Support the development of municipal planning and zoning efforts that may include a combination of incentives, ordinances removal of barriers and/or case study implementation. 	5 to 10 years	WG, Frontenac, Brentwood, Clayton, Creve Coeur	Transportation Alternatives Program (TAP), muni’s
	<ul style="list-style-type: none"> c. Identify and share model ordinances that impact water quality and stormwater quantity, including local and model urban forest management programs. 	5 to 10 years	EWG, Forest Releaf	TAP, Muni’s
	<ul style="list-style-type: none"> d. Support communities in addressing land disturbance of less than one acre to reduce erosion, and/or contain stormwater. 	5 to 10 years	Consulting firms	TAP, Muni’s
	<ul style="list-style-type: none"> e. Assist municipalities in managing parks and existing public lands for stormwater management. 	1 to 10 years	St. Louis County	GRG, TAP, Muni’s
	3) Develop strategies to assist commercial entities to engage as responsible watershed stakeholders. <ul style="list-style-type: none"> a. Target landscaping companies and horticultural industry to receive education on rain gardens and bio-retention systems. Develop a long term rain garden maintenance strategy that includes training for landscapers, education for installers, and provide technical assistance. 	1 to 5 years	MSD& co-permittees, MBG	MDC
	<ul style="list-style-type: none"> b. Encourage retail to stock/sell LID products; rain barrels & attachments, rain garden kits/instructions, rain garden plants, soil amendments, etc. 	1 to 10 years	HBA, MSD, Munis, MBG	MDC
	<ul style="list-style-type: none"> c. Identify invasive plants as undesirable and discourage nurseries from stocking; encourage nursery stocking of native plants. 	1 to 5 years	LREC, MBG, RdPWC	MDC
<ul style="list-style-type: none"> d. Encourage use of pervious pavement & bioretention in parking lots. 	10-20 years	MSD, Municipal Committee, MBG	MDC, 319 funds	

GOALS	Management Objectives	Timeline	Tech Resources	Financial Resources
A2 REDUCE IDENTIFIED POLLUTANTS AND OTHER IMPAIRMENTS				
a. Reach EPA Standard for Chloride Levels in Deer Creek by 2050..	1) Implement training/certification programs	10-15 yrs	St. Louis University (SLU), MBG, Consultants, Muni's	319 funds
	2) Enact legislation and ordinances	10-15 yrs	SLU, MBG, Consultants, Muni's	319 funds
	3) De-ice with reduced amounts of rock salt	1-10 yrs	SLU, MBG, Consultants, Muni's	319 funds
	4) Upgrade winter maintenance equipment	5-10 yrs	SLU, MBG, Consultants, Muni's	319 funds
	5) Use brine/pre-wetting/anti-icing strategies	5-10 yrs	SLU, MBG, Consultants, Muni's	319 funds
	6) Test alternative de-icers	10-15 yrs	SLU, MBG, Consultants, Muni's	319 funds
	7) Develop municipal salt management plans	15-20 yrs	SLU, MBG, Consultants, Muni's	319 funds
	8) Change road design	15-20 yrs	St. Louis County, Mo Dept of Transportation	319 funds, MoDOT
	9) Change salt storage practices	5-10 yrs	SLU, MBG, Consultants, Muni's	319 funds
	10) Educate private citizens	1-5 yrs	SLU, MBG, Consultants, Muni's	319 funds
	11) Set up revolving loan program	15-20 yrs		
b. Remove 5000 lbs of	1) Identify and prioritize parcels in the watershed needing yard waste and organic debris removal as recommended by watershed municipalities.	5-10 yrs	MSD Phase II	MSD, muni's, 319 funds

waste.				
	2) Support annual volunteer trash clean-ups in the watershed. (Local as well as larger)	1-5 yrs	Open Space Council, Stream Teams	MSD, GRG, MDC
GOALS	Management Objectives	Timeline	Tech Resources	Financial Resources
b. Remove trash, yard waste, and organic debris (cont.)	3) Pilot test the use of aquatic collectors	10-15 yrs	Muni's, Open Space, RiverKeepers, GRG, RdPWC, Stream Teams	GRG, MDC, 319 funds
	4) Reduce the volume of leaf litter entering streams in the watershed. Target property owners along creeks.	10-15 yrs	Municipalities	Local businesses
c. Reduce pet waste through education.	1) Distribute brochures on pet waste management.	Ongoing	MSD, Stream Teams, Boy Scouts, Girls Scouts	MSD
	3) Promote horse manure recycling.	5-10 yrs	MSD	MSD
d. Illicit discharge detection and elimination	1) Develop and maintain a map of the area streams, storm sewers and storm sewer outfalls.	Ongoing	MSD Phase II NPDES	MSD
	2) Survey the creeks for illicit connections to storm sewers, illegal dumping, and failing septic systems.	Ongoing	MSD/EPA	MSD
	3) implement a program to detect & eliminate illicit discharges.	Ongoing	MSD/EPA	MSD
e. Eliminate SSO's & address CSO's.	1) Plan for eliminating SSO's and addressing CSO's currently underway as part of the consent decree.	10-15 years	MSD/EPA	MSD
B1 MAINTAIN AND IMPROVE THE NATURAL STREAM PHYSICAL STABILITY AND REDUCE STREAM WIDENING AND BANK EROSION.				
b. Assess, implement, and maintain private on site	1) Assess technical and cost feasibility of regional detention systems.	10 to 15 years	MSD, muni's, engineering firms	MSD/munis
	2) Reassess protocols for regional detention maintenance and implement best management strategies.	15 to 20 years	MSD, muni's, engineering firms	MSD/munis
	2) Reassess protocols for regional detention maintenance and implement best	15 to 20	MSD, muni's,	MSD/munis

basins.	management strategies.	years	engineering firms	
GOALS	Management Objectives	Timeline	Tech Resources	Financial Resources
b. Capture first 2.5 inches of stormwater runoff to improve channel function & stability	1) Design and install rainscaping features that capture 2.5 inches of rainfall	5-10 yrs	Local engineering firms, City of Frontenac	319, Parks fund, muni
	2) Conduct seminars on the mechanics of stream dynamics related to flow. For planners, public works staff, developers.	5-10 yrs	East West Gateway COG	
	3) Explore opportunities to restore pool-riffle-pool sequences in the creek and tributaries.	10 - 15 yrs	Local engineering firms, local universities	
	4) Maintain instream flow and explore other opportunities to restore habitat and species diversity	10 - 15 yrs	Local engineering firms, local universities	319 funds

B2 PROVIDE ADEQUATE STREAM BUFFER ZONES (OR STREAM RIPARIAN CORRIDOR) to reduce erosion & sedimentation and to enable stream to carry large volumes of water associated with heavy rains without damage to property.

GOALS	Management Objectives	Timeline	Tech Resources	Financial Resources
a. Support greenway/trail development along riparian corridors.	1) Trail construction along parts of Deer Creek and its tributaries will provide additional public access to the creek, serve to heighten awareness and interest in the creek and its condition, and highlight water quality management strategies to the general public.	1 to 5 years	GRG	GRG
b. Promote invasive species removal and native plant establishment.	1) Assess invasive species types and extents along the riparian corridor.	Ongoing	Missouri Botanical Garden, local universities RdPWC, Open Space Council, Muni's	MSD, MDC, 319 funds, local foundations, GRG
	2) Provide invasive species and native plant education	Ongoing		
	3) Implement ongoing invasive species removal projects. Engage citizens in removal efforts	Ongoing		
	4. Partner with local nurseries to promote native plants.			
c. Identify willing	1) Identify and prioritize parcels for purchase in the riparian corridor and set aside development rights in perpetuity as recommended by watershed municipalities.	1 to 5 years	City of Brentwood, other muni's	

landowners located in the floodplain for voluntary purchase/sale and permanent removal from development.	2) Facilitate the purchase and set-aside of development rights of these properties as prioritized.	1 to 5 years	City of Brentwood, other muni's	Munis, GRG, USACE, FEMA
	3) Use FEMA buy out opportunities to buy back floodplains.	1 to 5 years	University City, GRHA, Brentwood, other muni's	
	4) Educate FEMA Administrators at municipalities on floodplain development/redevelopment restrictions (as a tool for opening floodplains).	ongoing	GRHA	
	5) Solicit FEMA and others for additional floodplain buyout funding.	1- 5 years	Muni's, GRHA	
	6) Explore opportunities to pass municipal ordinances that restrict or eliminate building in the floodplain.	5 to 10 years	GRHA, muni's	
d. Support appropriate wetland restoration.	1) Establish a wetland arboretum at the corner of Marshall and Brentwood.	1 to 5 years	Brentwood, MBG	Fish and Wildlife, GRG, 319 funds
	2) Identify and implement other suitable wetland enhancements.	5 -10 yrs	FEMA, GRHA, Muni's	FEMA, Fish and Wildlife
B3 PROTECT GROUNDWATER SUPPLIES IN SENSITIVE HIGH KARST AREAS				
GOALS	Management Objectives	Timeline	Tech Resources	Financial Resources
a. Prevent sinkhole contamination.	1) Assess if any sinkholes are currently employed for stormwater drainage.	5 to 10 years	Ladue, other muni's	319 funds
	2) Redirect stormwater to prevent it from directly draining in sinkholes	5 to 10 years		
b. Prevent groundwater contamination.	1) Assess the effectiveness of the incorporation of forbays/underdrains in bioretention systems to prevent groundwater contamination in high karst areas.	1 to 5 years	Local engineering firms, universities	Research grants
C1 EXPAND AND IMPROVE WATERSHED MODELING EFFORTS.				
	a. Model the existing conditions of the watershed as a basis to compare and evaluate proposed improvements or proposed policies.	1 to 5 years	MoDNR, Engineering Firms, MBG	319 funds, EPA research grants
	b. Take into account the high cost of modeling a large watershed			
	c. Use the Simple Model and iTree analysis tools to project and assess effectiveness of pollutant reduction from management measures implemented.	1 to 5 years		
C2 CONTINUE AND REFINE WATERSHED MONITORING EFFORTS.				

	a. Monitor the effectiveness of at least three demonstration BMP's over a 5 year period to inform future efforts. Recalibrate models based upon empirical data.	1 to 5 years	MSD, MBG, WU,SLU	319 funding, research grants
	b. Monitor effectiveness of bioretention systems – underdrains vs. no underdrains.	1 to 5 years	MBG	
	c. Track and make available information on size, scope, location and effectiveness of area BMP's.	1 to 5 years	MSD, EWG	
	d. Assess aquatic and riparian ecotone species diversity.	1 to 10 years	Local universities, Nature Conservancy	
	e. Continue ongoing water quality monitoring efforts in Deer Creek.	1 to 5 years	LREC, MDC, MSD, USGS	
C2 CONTINUE ONGOING WATERSHED PLANNING				
	a. Utilize the Planting Prioritization Plan to guide the prioritization of watershed projects. (See "Identifying Critical Areas" section of this chapter.)	ongoing	MBG	MoDNR, MDC
	b. Convene annual Technical Advisory Group, Community Leaders Task Force, and Steering Committee meetings to achieve regular stakeholder inputs.	ongoing	MBG	MoDNR
	c. Update watershed plan as needed.	5-10 yrs	MBG	MoDNR

6.2 TECHNICAL & FINANCIAL ASSISTANCE BY ORGANIZATION

AMERICAN SOCIETY OF CIVIL ENGINEERS

The American Society of Civil Engineers-St. Louis Chapter Water and Environment Sub-Committee will provide technical support for watershed planning and implementation by sponsoring and facilitating Deer Creek Watershed Technical Committee meetings.

GREAT RIVERS GREENWAY DISTRICT

The Great Rivers Greenway District has implemented many projects across the region, often in partnership with municipal, governmental, and public agencies, as well as private and nonprofit organizations. The blueprint for The Great Rivers Greenway District is to develop a region-wide system of greenways, parks, and trails that will encircle the region. Called, The River Ring, the 600-mile web of more than 45 greenways will span two states and an area of 1,216 square miles with 1.6 million residents. In addition to creating a vibrant, more connected region with thriving green spaces and flourishing natural habitats, new opportunities will result in strong economic development.

The Great River Greenway District will fund the implementation of a green infrastructure demonstration project in the City of Maplewood in conjunction with the Deer Creek Watershed planning effort.

METROPOLITAN ST. LOUIS SEWER DISTRICT

Metropolitan St. Louis Sewer District provides creek monitoring data, planning leadership, and engineering technical expertise and is implementing and assisting with the monitoring of three demonstration BMP's. In addition, MSD provides leadership on implementation of NPDES strategies in the watershed

To improve water quality in the Deer Creek Watershed, MSD is committing up to \$200,000 in staff time and implementation costs to install three bioretention systems in the Deer Creek Watershed that will be monitored by Washington University for system effectiveness. Pending board approval, MSD will contribute a second \$200,000 to the lead sponsor of the Deer Creek Watershed Alliance for the purpose of improving water quality in the Deer Creek Watershed, to be used as the sponsor deems appropriate.

MISSOURI BOTANICAL GARDEN

Missouri Botanical Garden manages, staffs, and houses the 319 funded Deer Creek Watershed Alliance and all of its activities. In addition, as part of the Missouri Botanical Garden program, the Litzsinger Road Ecology Center has conducted a sustainable schools summer workshop for teachers with follow-up field work at the school and at Litzsinger, and support for on-site native planting projects where schools demonstrate interest. Shaw Nature Reserve staff offers rain garden workshops, brochure and web-based rain garden information, and limited technical advice for rain garden installation. A list of recommended native plants for bioretention systems is posted on the Shaw Nature Reserve website. The Horticulture Division has installed a rain garden near the Kemper Center, and has a horticulture answer service who can answer rain garden related questions

for the general public. Missouri Botanical Garden also commits resources to direct, facilitate, and provide fiscal services for the implementation of 319 funded projects.

MISSOURI DEPARTMENT OF CONSERVATION

The Missouri Stream Team Program, a partnership of the Missouri Department of Conservation, coordinates volunteer stream team efforts in the region. The Missouri Department of Conservation's Grow Native program has extensive online resources related to rain garden plants, design, and resources. The Missouri Department of Conservation is interested in providing technical assistance and has agreed to provide replacement plants for demonstration projects. The Missouri Department of Conservation also provides several grant opportunities as well.

MISSOURI DEPARTMENT OF NATURAL RESOURCES & U.S. EPA REGION 7

Funds are available for watershed planning and implementation by US EPA Region 7 through the Department of Natural Resources under Section 319 of the Clean Water Act. In addition, Missouri Department of Natural Resources staff provides technical expertise to assist in watershed planning and implementation efforts.

AREA MUNICIPALITIES

The Cities of Clayton, Frontenac, and Rock Hill will provide outreach, education and administrative services related to downspout disconnection green infrastructure enhancements for homeowners in their respective cities. Other municipalities in the watershed will be invited to offer this same level of support as well.

OPEN SPACE COUNCIL

The Open Space Council organizes trash clean up projects, invasive species removal projects, and purchase of undeveloped flood plain or riparian corridor properties for conservation.

RIVER DES PERES WATERSHED COALITION

The River Des Peres Watershed Coalition engages in cleanups, invasive species removal projects, and planting projects in Deer Creek. The River Des Peres Watershed Coalition tracks and documents rain garden and rain barrel locations in the watershed. In addition, the River Des Peres Watershed Coalition specializes in researching and marketing rain barrels and animal waste composting systems.

SOIL AND WATER CONSERVATION DISTRICT

The St. Louis County Soil and Water Conservation District is initiating a "Show Me Rain Gardens" project. The project consists primarily of a website as a resource for rain garden information, a list of recommended rain garden plants, and tracking and documentation of rain garden locations in the watershed.

U.S. ARMY CORPS OF ENGINEERS

Planning assistance from the Corps of Engineers is available to the states on a cost share basis (50-50). Floodplain management would be a candidate for this assistance.

6.3 FINANCIAL ASSISTANCE FOR DEER CREEK WATERSHED -ADDITIONAL RESOURCES

FEDERAL FUNDING OPPORTUNITIES

The EPA.gov sites is a resource for potential grant opportunities:
http://www.epa.gov/ogd/grants/funding_opportunities.htm.

In addition, Boise State University is the site of the Environmental Finance Center (EFC) for USEPA Region 10. Nine universities in the United States have been designated EFCs by the Environmental Protection Agency to help states and regulated entities manage environmental mandates required by federal law. The EFCs are located at the University of Maryland, New Mexico Institute of Mining and Technology, Syracuse University, Cleveland State University, California State University at Hayward, University of Louisville, University of Southern Maine, & University of North Carolina at Chapel Hill. The EFC website is www.epa.gov/efinpage/ and contains information on the EFC Network and each of its regional centers.

The EFC strives to keep abreast of the latest environmental finance information and tools. This web site is updated monthly to provide this information to practitioners in this field.

Boise State University opened the Region 7 Satellite Office in October of 2007. The Region 7 Satellite EFC provides communities in Iowa, Kansas, Missouri and Nebraska with many of the services, tools and technical assistance that have been provided by the EFC in Region 10. Help on the "how to pay" issues of environmental protection is now available locally for the Midwest.

EFC provides and maintains a Directory of Watershed Resources which provides sources of potential funding for projects. The following list reflects information in this database. Additional websites that offer watershed funding search options include EPA Watershed Academy Catalog of Federal Funding for Watershed Protection and U.S. Environmental Protection Agency Watershed Funding.

6.4 EFC 'S DIRECTORY OF WATERSHED RESOURCES

Missouri Sources- 37 programs found

- Alternative Loan Program
- Grow Native! Program
- Missouri Wildlife Habitat Incentives Program (WHIP)
- Missouri's Aquaculture Program
- North Central Region(NCR)-SARE Professional Development Program Grant
- North Central Region(NCR)-SARE Research and Education Grant Program
- Conservation Contractor Training
- Master Wildlife Program
- Missouri Agroforestry Program
- Missouri Stream Team Program
- Missouri Watershed Management Assistance (MoWMA)

Deer Creek Watershed Management Plan
Chapter 6: Element d. – Technical & Financial Assistance

Missouri's Forest Keepers Network
Outdoor Classroom Grant, Missouri
United Sportsmen's League Wildlife Conservation Grant, Missouri
Community Development Block Grant (CDBG) Other Public Needs, Missouri
Community Development Block Grant Program (CDBG) Water and Wastewater, Missouri
Delta Regional Authority
Industrial Infrastructure Grant
Energy Revolving Fund
Land and Water Conservation Fund (LWCF) - Missouri
Living Lands and Waters-Educational Workshops
Missouri Brownfields Revolving Loan Fund
Missouri Energy Efficiency and Renewable Energy Set-Aside Program
Recreational Trails Program (RTP) - Missouri
Section 319 Nonpoint Source (NPS)- Minigrant Program
Section 319 Nonpoint Source Implementation Grant Program -Missouri
Watershed Management Development Grant
Adopt-A-Highway Program, Missouri
Request An Expert Program
Scenic Byways Program
Transportation Enhancement Program, Missouri
Tools for Floodplain Management
Abandoned Well Plugging Program
Plant Diagnostic Clinic
University of Missouri Center for Agroforestry
Missouri Alternatives Center
Region 7 Pollution Prevention Regional Information Center