

Table MS-4.1 Main Stem - Dam Removal *DRAFT*

041100020305 and 20203 (part)

Problem Statement MS 1: Non-attainment due to dams

The 1999 Cuyahoga River TSD indicated that QHEI scores in the dam pools of the Middle Cuyahoga River ranged from 46.5 to 56 due to hydromodification and embedded substrate, and thus were in non-attainment of WWH standards. Three of the dam pools, totalling 4.7 miles, remain.

Goals				Amount to complete, time frame
<i>Objectives</i>		Lead/ cooperating Organizations	Resources needed/cost	(contingent on funding, resources, landowner willingness)
Actions				
Goal MS 1a Restore 4.7 miles of the Cuyahoga River to WWH habitat standards by restoring free-flowing conditions.				
<i>MS 1a-1 Remove two low-head dams in Cuyahoga Falls, thereby restoring QHEI along 3 miles of river to WWH standards</i>				2 dams removed by 2014
1 Hire contractor		city of Cuyahoga Falls	Contractor. Funding from NEORSD	
2 Hold informational meetings				
3 Publish brochure or web page article				
4 Monitor for changes				
<i>MS 1a-2 Remove Ohio Edison Dam, restoring QHEI along 1.7 miles of river to WWH attainment</i>				
			Ohio EPA/property owner lead	remove dam by 2019
1 Sediment disposal study and plan		Ohio EPA		
2 Historical investigation?				
3 Permitting				
4 Remove and dispose of sediment				
5 Hire contractor for dam removal				
6 Coordinate with downstream communities and MetroParks, Serving Summit County				
7 Publicity				
8 Remove dam				
9 Monitor for changes				

Note: Select practices will be monitored for effectiveness

Problem Statement MS 2: Bacteria from CSOs or other sources.

OEPA samples and Akron modeling indicate that the Cuyahoga River within and downstream of the CSO area may not comply with recreational water criteria 5 of the 6 months of the recreational season due in part to CSO discharges. Each of the 4 CSOs in the Middle Cuyahoga typically discharges 3-49 times per year, total volume of 64.8 million gallons. OEPA monitoring also indicated single e. coli measurements of 2,600 at RM 48.38, upstream of the CSOs during higher flow.

Goals		Amount to complete, time frame (contingent on funding, resources, landowner willingness)	
<i>Objectives</i>	<i>Lead/ cooperating Organizations</i>	<i>Resources needed/cost</i>	
Actions			
Goal MS 2a Reduce number of combined sewer overflows by 105/year at 4 sites in the Gorge area by 2028.			
MS 2a-1 Implement Long-term control plan construction of 4 containment tanks			4 sites by 2028
1 Design studies for tanks	City of Akron		
2 Construct four containment facilities by 2028	City of Akron		
MS 2a-2 Conduct 5 wet-weather monitoring samples at 6 sites to document fecal coliform from other (non-point) sources.			
1 Work with partners to establish protocol			
2 Conduct wet-weather sampling for fecal coliform and TSS		sampling and analysis costs	
3 Document occurrences, work with university students and USGS			
Goal MS 2b Reduce volume of water entering the storm drains in the affected area.			
MS 2b-1 Retrofit existing impervious areas to infiltrate/treat runoff from 10,000 square feet within CSO drainage area e.g., bioinfiltration, permeable pavement)			
MS 2b-2 Conduct outreach concerning reduction of storm water volume			

Note: Select practices will be monitored for effectiveness

Table MS-4.3 Main Stem Sediment

041100020305 and -20203 (part)

Problem Statement MS 3: Sediment

Siltation has been identified as a cause of non-attainment in the Middle Cuyahoga River. Excess sediment is of concern downstream in the shipping channel and in Lake Erie, because of the nutrients that enter the water with the sediment. The STEP-L model indicates that the watershed contributes 1,342 tons of sediment from runoff and 995 tons per year from approximately 2 miles of eroding streambanks due to excess storm water and inadequate flood storage. Included in this total, approximately 3,500 linear feet of Kelsey Creek in Kennedy and Water Works Parks and Brookledge Golf Course is incised with eroding banks up to 6 feet tall. Walnut Creek in Adell Durbin Park is incised from one foot to several feet, depending on the slope. Small headwater tributaries in Munroe Falls and elsewhere are incised by one to five feet. Mapping indicates alteration of at least 451 acres of wetland (after soils mapping), loss of riparian features (floodplain access, riparian zone) of nearly 15.5 miles of streams, and alteration of 60-96% of riparian corridor within 75 feet. These figures do not reflect altered pre-existing wetlands or culverted streams in the older urban areas. The loss of beneficial watershed features reduces the flood-storage capacity and vertical stability of watershed tributaries. Potential loss of riparian vegetation with further development could result in increased loading and reduced storage in the future.

Goal			Amount to complete, time frame (contingent on funding, resources, landowner willingness)
Objective	Actions	Lead/ cooperating organizations	Resources needed/cost
Goal MS 3a Reduce streambank erosion, thereby reducing sedimentation by 490 tons per year.			
MS 3a-1 Stabilize 4,000 lf of Kelsey Creek banks and restore vertical stability/channel morphology thereby reducing sediment erosion by 245 tons per year.			
	1 Assemble advisory team		
	2 Assess stream segment characteristics and opportunities	City of Cuyahoga Falls	outside consultant
	3 Develop restoration strategies based on assessment		restoration team
	4 submit grant proposal(s)	city of CF/wc	
	5 Outreach with neighborhoods/Schnee school		
	6 Restoration work - vertical stability, banks, floodplain		\$100-250/linear foot plus plantings
	7 Encourage volunteer assistance with riparian plantings etc.	City of CF, consultant	plants, planting plan
	8 Install signage - riparian buffer, etc.		
	9 Coordinate with neighboring communities to reduce stormwater impact, develop stewardship		
MS 3a-2 Develop master plan for Kelsey Creek			
MS 3a-3 Stabilize 4,000 lf of other eroding tributary banks, improve morphology, and restore vertical stability, thereby reducing sediment loading by 245 tons/year.			
Target areas: eroding streams Cuy Falls, MF, Stow, Silver Springs, Tallmadge, Kent, etc.			
	1 Identify target areas for stabilization using mapping		
	2 Work with communities, partners to determine priorities		
	3 submit grant proposal(s)		

Note: Select practices will be monitored for effectiveness

Table MS-4.3 Main Stem Sediment
041100020305 and -20203 (part)

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Goal				Amount to complete, time frame (contingent on funding, resources, landowner willingness)
Objective	Actions	Lead/ cooperating organizations	Resources needed/cost	
	4 Develop restoration strategies based on assessment			
5-9	Submit grant proposal, design/build, coordination, signage - see 4-8 in MS 3a-1			
Goal MS 3b Restore riparian features to reduce existing sediment loading by 24.5 tons/year.				
MS 3b-1. Plant 25 ac of deep-rooted riparian vegetation, preferably native vegetation, reducing loading of sediment by 11 tons/yr.				
Target areas: former dam pool sediments, riparian banks lacking deep-rooted vegetation				
	1 Submit grant applications e.g., OEEF	WC/SWCDs/partners		
	2 Targeted outreach to public, institutional, and other owners of large properties	WC**/SWCDs/ Communities	Lists of golf courses, lake associations, homeowners' associations; maps of large parcels; printed outreach materials.	Target 1 group every 3 years (3 by 2022); improvements to best management practices or riparian management at one site every 4 years(2 sites by 2020); 2 outreach contacts per year
	3 Outreach to golf course owners encouraging Audubon-certification		labor, printing	
	4 Assist with plantings	SWCDs, master gardeners	native plants/trees and shrubs \$250 (\$500-1,000 per acre);	
	5 Construct and install signage	communities, partners, volunteers (scouts?)	\$300-500/sign	
	6 Follow-up outreach (individualized guide to riparian zone) and publicize		funding for handouts/brochures	
MS 3b-2 Restore 10 ac of wetland, reducing loading of sediment by 10 tons/year.				
	1 Map target areas to investigate for wetland, floodplain, riparian, habitat, or stream corridor restoration/protection/ enhancement	WC, partners	available mapping - compile and build on previous efforts	1 map by 2014, revisit and update if necessary every 3 years
	2 Hold meetings with landowners to determine interest	WC, partners		
	3 Identify wetland restoration site for clearinghouse	WC, Communities, other partners	meetings with landowners; readily available mapping, outside assistance from consultant, possible assistance from Kent State University wetland ecology class	5 concept plans by 2020; 1 every 2 years afterward.
	4 Submit grant application			
	5 Restore/protect/enhance wetlands	Partners	\$5,000-\$100,000 per acre, design/build consultant, sites -protection by ease- ments would be at the low end of the range	20 ac by 2022; 10 ac every 5 years afterward
MS 3b-3 Restore 8 acre-feet of floodplain access, storing 3.5 tons/yr sediment. E.g., Kelsey Cr.				

Note: Select practices will be monitored for effectiveness

Table MS-4.3 Main Stem Sediment
041100020305 and -20203 (part)

DRAFT

Goal				Amount to complete, time frame (contingent on funding, resources, landowner willingness)
Objective	Actions	Lead/ cooperating organizations	Resources needed/cost	
	1 Map target areas to investigate for wetland, floodplain, riparian, habitat, or stream corridor restoration/protection/ enhancement	WC, partners	available mapping - compile and build on previous efforts	1 map by 2014, revisit and update if necessary every 3 years
	2 Meet with landowners to determine interest	WC, partners		
	3 Submit grant proposals			
	4 Design & Restore floodplain access/flood storage			
	5 Public outreach			
MS 3b-4 Restore 4,000 If of incised channel, stabilizing the channels to reduce erosion				
Goal MS 3c Reduce/treat urban runoff to reduce annual loading of sediment by 4.6 tons.				
MS 3c-1 Retrofit stormwater volume devices to improve water quality from 100 acres, reducing loading of sediment by 4.5 tons/year.				
	1 Stormwater retrofit inventory		WC/NEFCO with communities	
	2 Submit grant application.			
	3 Design/construct retrofit for existing stormwater (volume) infra-structure to improve water quality	Communities	Varies, depending on treatment provided (e.g., \$400/acre treated to \$17,000 per acre treated)	Retrofit approx. 5 by 2022 to treat 100 ac res.
MS 3c-2 Retrofit 1,000 If of existing drainage as no-mow grass, vegetated swale, or through daylighting to reduce sediment load by 0.1 tons/yr				
	1 Workshop on improving drainage/maintaining ditches for water quality improvements	SWCD		
	2 Install no-mow grass/retrofit			
	3 Stormwater management design manual for Portage County	Portage SWCD	In-house task	1 manual by 2014
MS 3c-3 Facilitate review and update of local codes to include measures for green infrastructure				
	1 Green code audit workshop			
	2 Review codes in two communities for green infrastructure language	partners	volunteers/consultant	
	3 update code language		possibly outside consultant/funding	1 community by 2022
MS 3c-4 Conduct workshops on use BMPs at urban sites				
	1 Stormwater management design manual for Portage County	Portage SWCD	In-house task	1 manual by 2015
	2 Workshops for community officials on developing/enforcing riparian setbacks	partners, PIPE		2 workshops by 2015; additional workshops - included in general workshop series
	3 Workshops for community officials on enforcing bmp requirements			

Note: Select practices will be monitored for effectiveness

Table MS-4.3 Main Stem Sediment
041100020305 and -20203 (part)

DRAFT

Goal				Amount to complete, time frame
<i>Objective</i>	<i>Actions</i>	<i>Lead/ cooperating organizations</i>	<i>Resources needed/cost</i>	(contingent on funding, resources, landowner willingness)
<i>MS 3c-5 Update, increase, and disseminate available information concerning sediment from urban runoff</i>				
	1 Continue to compile, centralize, and make available studies, data, information sources on the watershed, including recreational opportunities, volunteer needs, permitting or regulatory issues; green infrastructure information sources, etc.	WC	Website, technical information and outreach materials	Update and develop pages for website by Dec. 2013, then on-going
	2 Chemical or biological sampling/assessment along streams - volunteer, intern, or class	Community/partner sponsors, Ohio EPA, KSU interns/classes	possibly funding for stipends, analysis, equipment	Sampling at 1 location every 3 years. 3 sample sets by 2022.
	3 Survey of yard management practices	WC/partners		
	4 Continue to develop stream database			
	5 e-newsletter or article issued 3 times per year	wc	website, share with partners	
	6 Develop/reproduce informational brochure/ website article concerning topics of interest, e.g., reducing runoff, recreational opportunities, private wells, septic systems etc.	WC, health depts, SWCDs	technical/outreach materials, possibly printing costs	10 by 2022; 1 each year
<i>MS 3c-6 Increase/sponsor 25 stewardship activities related to non-point source pollution and watershed issues.</i>				
	1 Establish clean-up/monitoring/planting efforts at additional tributaries and lakes	WC, communities, parks, residents, home-owners' associations, lake associations	Funding or donation of trash disposal, refreshments, monitoring supplies, crew leaders, volunteers; training for monitoring/planting	1 new tributary or lake monitoring, clean-up, or other stewardship program by 2018
	2 Distribute 50 rain barrels through workshops	SWCDs/ Communities	Space for workshop; rain barrel kits	50 rain barrels distributed
	3 Survey of yard management practices	WC/partners		
	4 Develop/reproduce informational brochure or website article concerning topics of interest, including reducing runoff, recreational opportunities, private wells, septic systems etc.	WC, health depts, SWCDs	technical/outreach materials, possibly printing costs	10 by 2022; 1 each year
	5 Educational outreach workshops on topics of importance, including LID/green infrastructure, restoration, field trips for examples	Partners, WC, communities	Location, speaker, supplies	5 workshops by 2022; 1 every 2 years
	6 Work with schools or city day camps to develop/encourage use of watershed care activities/curricular items	WC, SWCDs, partners, schools		1 educational outreach program/curriculum item by 2018
	7 Breakneck Creek Day (others?)	Portage Parks, partners		1 per year
	8 Watershed "brand," logo, art project	WC, Kent State/ Standing Rock Gallery/River Day communities	Host for project, graphic design capabilities	1 logo or art project by 2015, 1 every 3 years after;
	9 Create social network or google presence	WC		1 by 2014

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Table MS-4.3 Main Stem Sediment
041100020305 and -20203 (part)

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Goal				Amount to complete, time frame (contingent on funding, resources, landowner willingness)
Objective	Actions	Lead/ cooperating organizations	Resources needed/cost	
MCR-1 Establish 1 neighborhood-scale green infrastructure projects as demonstration within the developed areas of one of the Middle Cuyahoga River subwatersheds, where suitable neighborhoods are identified, reducing loading of nitrogen by 200 lb/year, phosphorous by 25 lb/yr, and sediment by 5 tons/yr				
	1 Work with communities to identify suitable target WC, partners neighborhoods			
	2 Workshops/meetings to gauge neighborhood support			
	3 Determine/establish maintenance framework (e.g., easements, homeowner participation)	partner community		
	4 Get grant(s)			
	5 Design/build	outside consultant	Site, outside funding. Design ~\$25-50,000; Rain gardens \$15-20/sq. foot; Green street bump-outs \$20,000 each; per-meable concrete \$12-15/ sq. ft	1 project by 2022
	6 Outreach, neighborhood participation			
Goal MS 3d Reduce causes of streambank erosion by reducing channel loading/increasing flood storage by 360,980 cu ft. in a 3/4 in storm.				
MS 3d-1 Increase coordination between communities to reduce stormwater effects				
	1 Coordinate with nearby communities/schools to identify areas of concern or opportunity			2 meetings/yr
	3 Coordinated stormwater study on target areas??		outside funding or assistance	
	2 Workshops with public officials to address shared stormwater concerns			2 workshops
MS 3d-2 Install biofiltration at developed sites totaling 20,000 square feet and reducing runoff by 3,750 cubic feet in a 3/4-inch storm. Target gorge area, other urban				
	1 Identify parcel(s) and landowner(s) for project	partners, WC		
	2 Grants	WC/partners		
	3 Design/construct BMPs	outside consultant		
MS 3d-3 Restore 10 ac of wetland, reducing channel loading by 6,600 cu ft in a 3/4 in event.				
Actions: See MS 3b-2				
MS 3d-4 Restore 8 acre-feet of floodplain access, increasing storage volume by 348,480 cu ft.				
Actions: See MS 3b-3				
MS 3d-5 Install 20,000 square feet of rain gardens, to reducing channel loading by 3750 cu ft in a 3/4 in storm				
	1 Identify partners	WC, partners		
	2 Submit grant application	WC/partners		
	3 Workshop/installation	WC/partners		

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Table MS-4.3 Main Stem Sediment
041100020305 and -20203 (part)

DRAFT

Goal				Amount to complete, time frame
<i>Objective</i>	<i>Actions</i>	<i>Lead/ cooperating organizations</i>	<i>Resources needed/cost</i>	(contingent on funding, resources, landowner willingness)
MS 3d-6 Facilitate installation of 50 rain barrels, thereby reducing stream channel loading by 275 cu ft in a 3/4-inch storm.				
	1 Submit grant proposal/seek community funding			
	2 Obtain rain barrel materials		barrels, plumbing e.g., \$40 per barrel setup	
	4 Workshop			2 workshops
	5 Outreach			
Goal MS 3-e Protect wetlands and beneficial watershed features to reduce future loading of sediment by 31 tons/yr				
MS 3e-1 Protect 8,000 linear feet of riparian buffer by increasing the use and effectiveness of riparian setbacks, reducing loading of sediment by 6 tons/yr				
	1 Workshops for community officials on developing/enforcing riparian setbacks	partners, PIPE		2 workshops by 2015; additional workshops - included in general workshop series
	2 Comment on wetland alteration permit applications concerning impacts to watershed functions/riparian setbacks	WC and partners		on-going
	3 Increase the number of communities using riparian setbacks	WC, communities, Counties	Outreach	1 additional community with riparian setbacks by 2022
	4 Install signage for riparian areas in publicly visible places	Partners	\$200-\$500 per sign. Outside funding or community sign facility	Signs at 2 locations by 2022; signs at 1 additional location every 5 years afterward
	5 Continued outreach	Partners		brochure, workshops on enforcement, outreach to homeowners etc.
MS 3e-2 Protect 25 acres of wetlands through acquisition of land/easements, preventing increased loading of sediment by 25 tons/yr				
Target areas: remaining wetlands in NE Tallmadge, upstream end of Kelsey Creek, other remaining wetlands				
	1 Mapping			
	2 Contact landowners/partner land trusts			
	3 Submit grant proposal			
	4 Acquire wetlands/easements			

Note: Select practices will be monitored for effectiveness

Table MS 4.4 Main Stem Nitrogen

041100020305, -20203 (part)

Problem Statement MS 4: Nitrogen

Middle Cuyahoga River nitrate+nitrogen levels measured in 2007 range from 0.9 to 6 mg/l, often exceeding the EOLP median (1.0 mg/l) and the state guidelines (1.5 mg/l). The STEP-L model indicates that the watershed contributes 53,882 lb of nitrogen from runoff and 1,354 lb per year from approximately 2 miles of eroding streambanks due to excess stormwater and inadequate flood storage. Included in this total, approx. 3,500 linear feet of Kelsey Cr. in Kennedy Park, Water Works Park, and Brookledge Golf Course is incised with eroding banks up to 6 feet tall. Walnut Creek in Adell Durbin Park is incised from one foot to several feet, depending on the slope. Small headwater tributaries in Munroe Falls and other areas are incised by one to five feet. Mapping indicates alteration of at least 451 acres of wetland (after soils mapping), loss of riparian features (floodplain access, riparian zone) of nearly 15.5 miles of streams, and alteration of 60-96% of riparian corridor within 75 feet. These figures do not reflect altered pre-existing wetlands or culverted streams in the older urban areas. The loss of beneficial watershed features reduces the natural uptake/denitrification of nitrogen, as well as the flood-storage capacity and vertical stability of watershed tributaries, which contributes to bank erosion and associated nitrogen loading. Loss of riparian vegetation with further development would result in increased loading and reduced storage in the future.

Goal		Lead/ cooperating organizations	Resources needed/cost	Amount to complete, time frame (contingent on funding, resources, landowner willingness)
Objective	Actions			
Goal MS 4a Reduce streambank erosion, thereby reducing nitrogen loading by 668 lb per year.				
<i>MS 4a-1 Stabilize 4,000 lf of Kelsey Creek banks and restore vertical stability/channel morphology thereby reducing nitrogen loading by 334 lb/yr.</i>				
Actions: See MS 3a-1				
<i>MS 4a-2 Develop master plan for Kelsey Creek</i>				
<i>MS 4a-3 Stabilize 4,000 lf of other eroding tributary banks, improve morphology, and restore vertical stability, thereby reducing nitrogen loading by 334 lb/year.</i>				
Target areas: eroding streams Cuy. Falls, MF, Stow, Silver Springs, Tallmadge, etc.				
Actions: See MS 3a-3				
<i>MS 4a-4 Restore 4,000 lf of incised channel, improving vertical stability and reducing streambank erosion.</i>				
Goal MS 4b Restore/improve riparian/channel features to reduce existing nitrogen loading by 530 lb/year.				
<i>MS 4b-1. Plant 25 ac of deep-rooted riparian vegetation, reducing loading of nitrogen by 200 lb/yr.</i>				
Actions: See MS 3b-1				
<i>MS 4b-2 Restore 10 ac of wetland, reducing loading of nitrogen by 280 lb/year.</i>				
Actions: See MS 3b-2				
<i>MS 4b-3 Restore 8 acre-feet of floodplain access, storing 50 lb/yr nitrogen. E.g., Kelsey Cr., other incised/channelized streams</i>				
Actions: See MS 3b-3				
Goal MS 4c Reduce NPS pollution from urban runoff to reduce annual loading of nitrogen by 76.8 lb/yr.				
<i>MS 4c-1 Retrofit stormwater volume devices treating 100 acres to improve water quality, reducing loading of nitrogen by 70 lb/yr.</i>				
Actions: See MS 3c-1				
<i>MS 4c-2 Retrofit 1,000 lf of existing drainage with no-mow grass, vegetated swale, or daylighting to reduce nitrogen load by 0.8 lb/yr</i>				
Actions: See MS 3c-2.				
<i>MS 4c-3 Retrofit 20,000 sq ft of developed sites with bioinfiltration/permeable pavement to reduce nitrogen by 4 lb/yr</i>				
Actions: See MS 3d-2.				
<i>MS 4c-4 Install 20,000 square feet of rain gardens to reduce nitrogen by 2 lb/yr</i>				

Note: Select practices will be monitored for effectiveness

Table MS 4.5 - Main Stem Phosphorous

DRAFT

041100020305, -20203 (part)

Problem Statement MS 5: phosphorous

Ohio EPA documents note large diurnal swings in dissolved oxygen and appearance of algae, indicating nutrient enrichment, and phosphorous is the limiting nutrient. Phosphorous levels range from 0.04 to 0.46 mg/l in the Middle Cuyahoga, occasionally exceeding EOLP and state guidelines especially after a rain event. The STEP-L model indicates that the watershed contributes 9,391 pounds/year of phosphorous from runoff and 2 miles of eroding streambanks due to excess storm water and inadequate flood storage. Included in this total, approx. 3,500 linear feet of Kelsey Cr. in Kennedy and Water Works Park, and Brookledge Golf Course is incised with eroding banks up to 6 feet tall. Walnut Creek in Adell Durbin Park is incised from one foot to several feet. Small headwater tributaries throughout the subwatershed are incised by one to five feet. Mapping indicates alteration of at least 451 acres of wetland (after soils mapping), loss of riparian features (floodplain access, riparian zone) of nearly 15.5 miles of streams, and alteration of 60-96% of riparian corridor within 75 feet. These figures do not reflect altered pre-existing wetlands or culverted streams in the older urban areas. The loss of beneficial watershed features reduces the flood-storage capacity and vertical stability of watershedtributaries. Potential loss of riparian vegetation with further development could result in increased loading and reduced storage in the future.

Goal		Lead/ cooperating organizations	Resources needed/cost	Amount to complete, time frame (contingent on funding, resources, landowner willingness)
<i>Objective</i>	<i>Actions</i>			
Goal MS 5a Reduce streambank erosion, thereby reducing phosphorous loading by 264 lb per year.				
<i>MS 5a-1 Stabilize 4,000 lf of Kelsey Creek banks and restore vertical stability/channel morphology thereby reducing phosphorous loading by 132 lb/yr.</i>				
<i>Actions: See MS 3a-1</i>				
<i>MS 5a-2 Develop master plan for Kelsey Creek</i>				
<i>MS 5a-3 Stabilize 4,000 lf of other eroding tributary banks, improve morphology, and restore vertical stability, thereby reducing phosphorous loading by 132 lb/year.</i>				
<i>Target areas: eroding streams Cuy. Falls, MF, Stow, Silver Springs, Tallmadge, etc.</i>				
<i>Actions: See MS 3a-3</i>				
<i>MS 5a-4 Restore 4,000 lf of incised channel, improving vertical stability and reducing streambank erosion.</i>				
Goal MS 5b Restore/improve riparian features to reduce existing phosphorous loading by 104 lb/year.				
<i>MS 5b-1. Plant 25 ac of deep-rooted riparian vegetation, preferably native vegetation, reducing loading of phosphorous by 35 lb/yr.</i>				
<i>Actions: See MS 3b-1</i>				
<i>MS 5b-2 Restore 10 ac of wetland, reducing loading of phosphorous by 62 lb/year.</i>				
<i>Actions: See MS 3b-2</i>				
<i>MS 5b-3 Restore 8 acre-feet of floodplain access, storing 7 lb/yr phosphorous. E.g., Kelsey Cr., other incised/channelized streams</i>				
<i>Actions: See MS 3b-3</i>				
Goal MS 5c Reduce NPS pollution from urban runoff to reduce annual loading of phosphorous by 11.9 lb/yr.				
<i>MS 5c-1 Retrofit stormwater volume devices treating 100 acres to improve water quality, reducing loading of nitrogen by 10 lb/yr.</i>				
<i>Actions: See MS 3c-1</i>				
<i>MS 5c-2 Retrofit 1,000 lf of drainage with no-mow grass, vegetated swale, or daylighting to reduce phosphorous load by 0.4 lb/yr</i>				
<i>Actions: See MS 3c-2.</i>				
<i>MS 5c-3 Retrofit 20,000 sq ft of developed sites with bioinfiltration/permeable pavement to reduce phosphorous by 0.9 lb/yr</i>				
<i>Actions: See MS 3d-2.</i>				

Note: Select practices will be monitored for effectiveness

Table MS 4.5 - Main Stem Phosphorous

DRAFT

041100020305, -20203 (part)

Goal				Amount to complete, time frame
Objective	Actions	Lead/ cooperating organizations	Resources needed/cost	(contingent on funding, resources, landowner willingness)
MS 5c-4 Install 20,000 square feet of rain gardens to reduce phosphorous by 0.6 lb/yr				
Actions: See MS 3d-5.				
MS 5c-5 Facilitate review and update of local codes to include measures for green infrastructure				
Actions: See MS 3c-3.				
MS 5c-6 Conduct workshops on use BMPs at urban sites				
Actions: See MS 3c-4.				
MS 5c-7 Update, increase, and disseminate available information concerning pollutants from urban runoff				
Actions: See MS 3c-5.				
MS 5c-8 Increase/sponsor 25 stewardship activities related to non-point source pollution and watershed issues.				
Actions: See MS 3c-6.				
MCR-1 Establish 1 neighborhood-scale green infrastructure projects as demonstration within the developed areas of one of the Middle Cuyahoga River subwatersheds, where suitable neighborhoods are identified, reducing loading of phosphorous by 25 lb/yr.				
Goal MS 5d Reduce causes of streambank erosion by reducing channel loading by 360,980 cu ft in a 3/4 inch storm.				
MS 5d-1 Increase coordination between communities to reduce stormwater effects				
Actions: See MS 3d-1				
MS 5d-2 Install biofiltration at developed sites totaling 20,000 square feet and reducing runoff by 3,750 cubic feet in a 3/4-inch storm. Target gorge area, other urban				
Actions: See MS 3d-2				
MS 5d-3 Restore 10 ac of wetland, reducing channel loading by 6,600 cu ft in a 3/4 in event.				
Actions: See MS 3b-2				
MS 5d-4 Restore 8 acre-feet of floodplain access, increasing storage volume by 348,480 cu ft.				
Actions: See MS 3b-3				
MS 5d-5 Install 20,000 square feet of rain gardens, to reducing channel loading by 3750 cu ft in a 3/4 in storm				
Actions: See MS 3d-5.				
MS 5d-6 Facilitate installation of 50 rain barrels, thereby reducing stream channel loading by 275 cu ft in a 3/4-inch storm.				
Actions: See MS 3d-6				
MS 5d-7 Increase stewardship and understanding of watershed protection				
Actions: See MS 3c-5, 3c-6				
Goal MS 5-e Protect wetlands and beneficial watershed features to reduce future loading of phosphorous by 172 lb/yr				
MS 5e-1 Protect 8,000 linear feet of riparian buffer by increasing the use and effectiveness of riparian setbacks, reducing loading of phosphorous by 14 lb/yr				
Actions: See MS 3e-1.				
MS 5e-2 Protect/enhance 25 acres of wetlands, preventing additional phosphorous loading of 158 lb/yr.				
Target areas: remaining wetlands in NE Tallmadge, upstream end of Kelsev Creek, other remaining wetlands				
Actions: See MS 3e-2				

Note: Select practices will be monitored for effectiveness

Table MS 4.4 Main Stem Nitrogen
041100020305, -20203 (part)

DRAFT

Goal			Amount to complete, time frame (contingent on funding, resources, landowner willingness)
Objective	Actions	Lead/ cooperating organizations	Resources needed/cost
	Actions: See MS 3d-5.		
MS 4c-5	Facilitate review and update of local codes to include measures for green infrastructure		
	Actions: See MS 3c-3.		
MS 4c-6	Conduct workshops on use BMPs at urban sites		
	Actions: See MS 3c-4.		
MS 4c-7	Update, increase, and disseminate available information concerning sediment from urban runoff		
	Actions: See MS 3c-5.		
MS 4c-8	Increase/sponsor 25 stewardship activities related to non-point source pollution and watershed issues.		
	Actions: See MS 3c-6.		
MCR-1	Establish 1 neighborhood-scale green infrastructure projects as demonstration within the developed areas of one of the Middle Cuyahoga River subwatersheds, where suitable neighborhoods are identified, reducing loading of nitrogen by 200 lb/year, phosphorous by 25 lb/yr, and nitrogen by 5 lb/yr		
	Actions: See MS 3a-1		
Goal MS 4d	Reduce causes of streambank erosion by reducing channel loading by 360,980 cu ft in a 3/4 inch storm.		
MS 4d-1	Increase coordination between communities to reduce stormwater effects		
	Actions: See MS 3d-1		
MS 4d-2	Install biofiltration at developed sites totaling 20,000 square feet and reducing runoff by 3,750 cubic feet in a 3/4-inch storm. Target gorge area, other urban		
	Actions: See MS 3d-2		
MS 4d-3	Restore 10 ac of wetland, reducing channel loading by 6,600 cu ft in a 3/4 in event.		
	Actions: See MS 3b-2		
MS 4d-4	Restore 8 acre-feet of floodplain access, increasing storage volume by 348,480 cu ft.		
	Actions: See MS 3b-3		
MS 4d-5	Install 20,000 square feet of rain gardens, to reducing channel loading by 3750 cu ft in a 3/4 in storm		
	Actions: See MS 3d-5.		
MS 4d-6	Facilitate installation of 50 rain barrels, thereby reducing stream channel loading by 275 cu ft in a 3/4-inch storm.		
	Actions: See MS 3d-6		
MS 4d-7	Increase stewardship and understanding of watershed protection		
	Actions: See MS 3c-5, 3c-6		
Goal MS 4-e	Protect wetlands and beneficial watershed features to reduce future loading of nitrogen by 1,480 lb/yr		
MS 4e-1	Protect 8,000 linear feet of riparian buffer by increasing the use and effectiveness of riparian setbacks, reducing loading of nitrogen by 80 lb/yr		
	Actions: See MS 3e-1.		
MS 4e-2	Protect 25 acres of wetlands through acquisition of land/easements, preventing increased loading of nitrogen by 1400 lb/yr		
	Target areas: remaining wetlands in NE Tallmadge, upstream end of Kelsey Creek, other remaining wetlands		
	Actions: See MS 3e-2.		

Note: Select practices will be monitored for effectiveness

DRAFT
Table MS 4.6 Main Stem Groundwater/Contamination
 041100020305, -20203

Problem Statement MS-6: Groundwater, Public Water Supplies

The subwatershed contains the Cuyahoga Falls public water supply, a groundwater supply recharged by surface water and susceptible to contamination from surface spills and leaks to groundwater. The City of Cuyahoga Falls has developed a source water protection plan and owns approximately one-third of the five-year zone of contribution. However, the 5-year zone of influence is partially privately owned and controlled, and the wellfield is recharged by the Cuyahoga River, susceptible to spills.

Goals		Amount to complete, time frame	
<i>Objectives</i>	Lead/ cooperating	(contingent on funding, resources, landowner willingness)	
Actions	Organizations	Resources needed/cost	
Goal MS 6a Reduce risks of groundwater contamination from fracking or other releases from existing sites.			
<i>MS 6a-1 Determine status of 9 DERR listed sites</i>			
Coordinate with Ohio EPA to determine status of nearby DERR site.			
<i>MS 6a-2 Increase awareness of potential hazards and protective measures associated with fracking</i>			
1 Coordinate with state agencies and communities concerning fracking and controls			
2 Coordinate with state agencies to receive notification of drilling permit requests			
2 Outreach to communities and property owners - website, brochures, etc.			
Goal MS 6b Reduce risks of groundwater contamination from land use or spills.			
<i>MS 6b-1 Provide public and agency outreach efforts to assist with implementation of 2 source water protection plans</i>			
1 Coordinate with water suppliers concerning outreach/education needs			
2 Apply for funding as needed for printing/outreach			
3 Develop and disseminate outreach materials - written, website			
<i>MS 6b-2 Update, increase, and disseminate available information concerning watershed protection</i>			
Actions: See MS 3c-9			
<i>MS 6b-3 Increase/sponsor 25 stewardship activities related to non-point source pollution and watershed issues.</i>			
Actions: See MS 3c-10			

Note: Select practices will be monitored for effectiveness

Table MS 4.7 Main Stem Flooding Problems *DRAFT*

041100020305. 20203 (part)

Problem Statement MS 7: Flooding/overloaded channels

While flooding is not an extensive problem in this subwatershed, excess water volume and alteration of floodplains and wetlands is causing problems locally and downstream in the Cuyahoga River. Local flooding has been noted at the headwaters, where wetlands and floodplains have been altered by residential development, as shown on Figure MS-2. Downstream in the lower Cuyahoga watershed, neighborhoods are experiencing repeated flooding, roads are threatened or washed out during extreme events, and steep banks of the Cuyahoga River in the National Park are eroding, threatening the historic/recreational towpath trail and scenic railroad. The local bank erosion has been noted under Problem Statement MS-3. The subwatershed is nearly 26% impervious, generating an additional 1 million cubic feet in a 3/4-inch storm compared to an undeveloped watershed. Mapping indicates alteration of at least 451 acres of wetland (after soils mapping), loss of riparian features (floodplain access, riparian zone) along nearly 15.5 miles of streams, and alteration of 60-96% of riparian corridor within 75 feet. These figures do not reflect altered pre-existing wetlands or culverted streams in the older urban areas. The loss of beneficial watershed features reduces the flood-storage capacity and vertical stability of watershed tributaries. Loss of riparian vegetation with further development could result in increased loading and reduced storage in the future.

Goal				Amount to complete, time frame
<i>Objective</i>	<i>Actions</i>	<i>Lead/ cooperating organizations</i>	<i>Resources needed/cost</i>	(contingent on funding, resources, landowner willingness)
Goal MS 7a Address flooding problems in one area by restoring altered watershed hydrology/watershed characteristics				
<i>MS 7a-1 Conduct 1 stormwater management study focusing on flooding problem area to identify potential landscape restoration opportunities that will reduce problem flooding.</i>				
	1 Develop detailed maps for areas of interest identifying topography, existing and altered wetlands, drainage, and imperviousness.			
	2 Conduct engineering study	partner community	Outside funding for consultant	
	3 Outreach with neighborhoods to discuss feasible approaches			
	4 Submit grant proposal	wc/city or county staff		
	5 Construct improvements		outside consultant	
Goal MS 7b Reduce channel loading or increasing storage by 360,980 cu ft in a 3/4 in storm.				
<i>MS 7b-1 Increase coordination between communities to reduce stormwater effects</i>				
	Actions: See MS 3d-1			
<i>MS 7b-2 Install biofiltration at developed sites totaling 20,000 square feet and reducing runoff by 3,750 cubic feet in a 3/4-inch storm. Target gorge area, other urban</i>				
	Actions: See MS 3d-2			
<i>MS 7b-3 Restore 10 ac of wetland, reducing channel loading by 6,600 cu ft in a 3/4 in event.</i>				
	Actions: See MS 3b-2			
<i>MS 7b-4 Restore 8 acre-feet of floodplain access, increasing storage volume by 348,480 cu ft.</i>				
	Actions: See MS 3b-3			
<i>MS 7b-5 Install 20,000 square feet of rain gardens, to reducing channel loading by 3750 cu ft in a 3/4 in storm</i>				
	Actions: See MS 3d-5.			
<i>MS 7b-6 Facilitate installation of 50 rain barrels, thereby reducing stream channel loading by 275 cu ft in a 3/4-inch storm.</i>				
	Actions: See MS 3d-6			
<i>MS 7b-7 Restore 4,000 lf of incised channel, improving vertical stability and reducing streambank erosion.</i>				
<i>MS 7b-8 Increase stewardship and understanding of watershed protection</i>				

Note: Select practices will be monitored for effectiveness

Table MS 4.7 Main Stem Flooding Problems *DRAFT*

041100020305, 20203 (part)

Goal	Objective	Actions	Lead/ cooperating organizations	Resources needed/cost	Amount to complete, time frame (contingent on funding, resources, landowner willingness)
Actions: See MS 3c-5, 3c-6					
<i>MCR-1 Establish 1 neighborhood-scale green infrastructure projects as demonstration within the developed areas of one of the Middle Cuyahoga River subwatersheds, where suitable neighborhoods are identified, reducing loading of phosphorous by 25 lb/yr.</i>					
Goal MS-7c Protect wetlands and beneficial watershed features to reduce future channel loading by 26,400 cu ft in a 3/4 in storm					
<i>MS 7e-1 Protect 8,000 linear feet of riparian buffer by increasing the use and effectiveness of riparian setbacks, reducing channel loading by 9,900 cu ft in a 3/4 in storm.</i>					
Actions: See MS 3e-1.					
<i>MS 7e-2 Protect 25 acres of wetlands through acquisition of land/easements, preventing increased channel loading by 16,500 cu ft/yr</i>					
<i>Target areas: remaining wetlands in NE Tallmadge, upstream end of Kelsey Creek, other remaining wetlands</i>					
Actions: See MS 3e-2					

Note: Select practices will be monitored for effectiveness

Table MS-8 Main Stem Habitat - Incised

DRAFT

041100020305. 20203 (part)

Problem Statement MS 8: Habitat - Incised Channels

Approximately 4.9 miles of stream channel are incised due to excessive runoff, lack of riparian vegetation, and low-head dam removal. The QHEI analysis for 1800 lf of Kelsey Creek in Kennedy Park (Cuy. Falls) results in a score of 53.5 or "fair." The habitat is affected by unstable form and substrate, reduced pools, lack of riparian features. The QHEI analysis indicates the stream will continue to degrade without stabilization. The remaining incised streams (4.5 miles) present similar characteristics but with less severe downcutting.

Goal	Lead/ cooperating organizations	Resources needed/cost	Amount to complete, time frame (contingent on funding, resources, landowner willingness)
<i>Objective</i>	<i>Actions</i>		
Goal MS 8a Restore stable form, floodplain access, and vegetated riparian corridor along 2,000 lf of Kelsey Creek, raising QHEI by 5 points to 58.5 in Kennedy Park.			
<i>MS 8a-1 Re-establish floodplain access on 2 banks of Kelsey Creek along 1,000 lf of channel in Kennedy Park.</i>			
<i>Actions: See MS 3a-1</i>			
<i>MS 8a-2 Replace 1.5 acres of riparian lawn with native shrubs, trees, and wet meadow along Kelsey Creek.</i>			
<i>MS 8-3 Re-establish floodplain access along 1,000 lf of channel in Brookledge Golf Course.</i>			
Goal MS 8b Improve habitat along 2,000 lf of other eroding tributaries.			
<i>MS 8b-1 Stabilize tributary banks along 1,000 lf of other eroding tributaries, improve morphology, and restore vertical stability</i>			
<i>Target areas: eroding streams MF, Stow, Silver Springs, Tallmadge, etc.</i>			
<i>Actions: See MS 3a-2</i>			
<i>MS 8b-1 Plant deep-rooted riparian vegetation along 23.5 ac of other eroding tributaries and former dam pool sediment.</i>			
<i>Target areas: eroding streams MF, Stow, Silver Springs, Tallmadge, etc.</i>			
<i>Actions: See MS 3b-2</i>			
Goal MS 8c Reduce causes of streambank erosion by reducing channel loading by 360,980 cu ft in a 3/4 inch storm.			
<i>MS 8c-1 Increase coordination between communities to reduce stormwater effects</i>			
<i>Actions: See MS 3d-1</i>			
<i>MS 8c-2 Install biofiltration at developed sites totaling 20,000 square feet and reducing runoff by 3,750 cubic feet in a 3/4-inch storm. Target gorge area, other urban</i>			
<i>Actions: See MS 3d-2</i>			
<i>MS 8c-3 Restore 10 ac of wetland, reducing channel loading by 6,600 cu ft in a 3/4 in event.</i>			
<i>Actions: See MS 3b-2</i>			
<i>MS 8c-4 Restore 8 acre-feet of floodplain access, increasing storage volume by 348,480 cu ft.</i>			
<i>Actions: See MS 3b-3</i>			
<i>MS 8c-5 Install 20,000 square feet of rain gardens, to reducing channel loading by 3750 cu ft in a 3/4 in storm</i>			
<i>Actions: See MS 3d-5.</i>			
<i>MS 8c-6 Facilitate installation of 50 rain barrels, thereby reducing stream channel loading by 275 cu ft in a 3/4-inch storm.</i>			
<i>Actions: See MS 3d-6</i>			
<i>MS 8c-7 Increase stewardship and understanding of watershed protection</i>			
<i>Actions: See MS 3c-5, 3c-6</i>			
<i>MCR-1 Establish 1 neighborhood-scale green infrastructure projects as demonstration within the developed areas of one of the Middle Cuyahoga River subwatersheds, where suitable neighborhoods are identified, reducing loading of nitrogen by 200 lb/year, phosphorous by 25 lb/yr, and sediment by 5 tons/yr</i>			

Note: Select practices will be monitored for effectiveness

Table MS-9 Main Stem Habitat Alterations *DRAFT*

041100020305 20203 (part)

Problem Statement MS 9: Habitat Impacts due to Altered Riparian Characteristics

Riparian habitat has been degraded throughout the subwatershed by development, bank erosion/siltation due to overloaded channels, and alteration of watershed features such as riparian zones, floodplains, and wetlands. Mapping indicates alteration of at least 451 acres of wetland (after soils mapping), loss of riparian features (floodplain access, riparian zone) along nearly 11 miles of streams, and alteration of 60-96% of riparian corridor within 75 feet. These figures do not reflect altered pre-existing wetlands or culverted streams in the older urban areas. Further development could encroach on/fragment remaining riparian vegetation, wetlands, or connected habitat complexes, especially where riparian setbacks are lacking. Removal of three dams will restore river habitat, but the newly exposed dam pool sediments will lack forest cover. Removal of the Kelsey Creek dam left 1 acre of sparsely vegetated dam pool sediment. Former dam pool sediments along the river are growing in slowly with woody vegetation.

Goal		Lead/ cooperating organizations	Resources needed/cost	Amount to complete, time frame (contingent on funding, resources, landowner willingness)
<i>Objective</i>	<i>Actions</i>			
Goal MS 9a Restore 3 miles of riverine habitat and associated riparian vegetation				
<i>MS 9a-1 Remove two low-head dams in Cuyahoga Falls</i>		City of Cuyahoga Falls		
	Actions: See MS 1a-1			
<i>MS 9a-2 Coordinate with partners and community to assist as appropriate with removal of Ohio Edison Dam</i>				
	Actions: See MS 1a-2			
Goal MS 9b Improve habitat by restoring 53 acres of altered watershed hydrology/watershed characteristics				
<i>MS 9b-1 Plant 25 ac of deep-rooted native riparian vegetation along former dam pool margins/sediments and unvegetated tributary banks.</i>				
	Actions: See MS 3b-1			
<i>MS 9b-2 Restore/enhance 10 ac of wetland.</i>				
	Actions: See MS 3b-2			
<i>MS 9b-3 Restore 8 acre-feet of floodplain access.</i>				
	Actions: See MS 3b-3			
<i>MS 9b-7 Treat/remove 10 acres of invasive species</i>				
Goal MS 9c Protect 40 ac wetlands and beneficial watershed features				
<i>target - remaining intact systems, areas providing multiple ecological benefit, habitat connectivity</i>				
<i>MS 9c-1 Protect 8,000 linear feet of riparian buffer by increasing the use and effectiveness of riparian setbacks.</i>				
	Actions: See MS 3e-1.			
<i>MS 9c-2 Protect/enhance 25 acres of intact wetlands. Target areas: remaining wetlands in NE Tallmadge, upstream end of Kelsey Creek, other remaining wetlands</i>				
	Actions: See MS 3e-2			

Note: Select practices will be monitored for effectiveness

Table MS 4.10 Main Stem Recreational Opportunities

041100020305, 20203

Problem Statement MS-10: Recreational Opportunities

The Cuyahoga River is designated a category A recreational water. Recreational opportunities and use are increasing along the river, with the addition of the new canoe livery in Kent. Local communities and MetroParks offer several parks along the river and tributaries, providing an opportunity for stewardship, linked parks, and additional conservation. Cuyahoga River partners are working toward designating the Cuyahoga River a water trail, with maintained access points. The Gorge offers extreme rapids for kayakers, and could grow as a destination with the removal of the two low-head dams and the Ohio Edison dam. Several detriments to recreational use still remain.

CSOs in the Gorge present health risks. Debris remains in the river, posing hazards for boating or wading. After heavy rains, high levels of bacteria have been found upstream of the CSO discharge area from an undetermined source. Access for pullouts is limited in the Gorge, and there is limited direct access to the river along much of its length.

There is no centralized source of information concerning recreational opportunities along the river and tributaries.

Goal		Lead/ cooperating organizations	Resources needed/cost	Amount to complete, time frame (contingent on funding, resources, landowner willingness)
<i>Objective</i>	<i>Actions</i>			
Goal MS 10a Increase safety for recreational users				
<i>MS 10a-1 Conduct 15 river/riverbank clean-ups to remove debris from</i>				
		partners (KSU, Kent, Cuy. Falls, WC, Summit Co. etc.)		
	1 Continue coordination with river community partners			
	2 Seek funds (grants, donations, budgets) for refreshments, materials, waste disposal			
	3 Conduct spring (River Day) and fall cleanups on approximately annual basis			
<i>MS 10a-2 Conduct 3 clean-ups at additional tributaries or lakes.</i>				
	1 Outreach with neighborhoods, lake associations			
	2 Seek funds (grants, donations, budgets) for refreshments, materials, waste disposal			
	3 Clean-up events			
<i>MS 10a-3 Monitor the river for e. coli following six rain storms at canoe launch/pull-out areas..</i>				
	1 Coordinate sampling/assessment with local WWTPs			
	2 Monitor following six rain events			
	3 Coordinate results with communities/Ohio EPA.			
	4 Identify likely hot spots or sources			
	4 Develop outreach for website			
Goal MS 10b Increase/improve recreational opportunities related to the Cuyahoga River and Main Stem tributaries.				
<i>MS 10b-1 Construct 3 miles of boardwalk/trail to/along the Cuyahoga River or its tributaries</i>				
<i>MS 10b-3 Plan additional bike-hike/greenway link</i>				
	1 Identify potential locations to connect parks/tributaries			

Note: Select practices will be monitored for effectiveness

DRAFT
Table MS 4.10 Main Stem Recreational Opportunities
 041100020305, 20203

Goal		Lead/ cooperating organizations	Resources needed/cost	Amount to complete, time frame (contingent on funding, resources, landowner willingness)
<i>Objective</i>	<i>Actions</i>			
	2 Hold meetings to determine feasibility			
	3 Submit grant proposal			
	4 Develop conceptual design for links			
<i>MS 10b-3 Increase/improve access points along Cuyahoga River or tributary by 3 publicly accessible location</i>				
	1 Submit grant proposal			
	2 Work with communities and water trail partners to design appropriate access			
	3 Construct access points and related facilities (e.g., parking, signs, etc.) as appropriate			
<i>MS 10b-4 Develop 2 quests or 1 virtual watershed tour</i>				
	1 Determine appropriate River Quest structure (cuyahoga canalway or new one)	WC, partners, volunteers, parks	Permission to develop quests, printing costs	2 quests by 2017 or 1 watershed tour by 2017
	2 Public workshop concerning River quests			1 workshop by 2014
	3 Seek quests from volunteer groups	WC, partners, volunteers, parks	reviewers, outreach	
	4 Review, print, distribute		funding for printing, place on website	
Goal MS 10c: Increase awareness of recreational opportunities, stewardship, and watershed issues.				
<i>MS 10c-1. Economic impact study recreational uses</i>		WC with KSU	outside funding	1 study by 2018
	1 Coordinate with KSU and others on study			
	2 Submit grant proposal			
	3 Conduct study			
	4 Publicize			
<i>MS 10c-2. Increase signage related to watershed at local parks.</i>				
	1 apply for funding			
	2 Design, install signs			
	3 Continued outreach with local communities			
<i>MS 10c-3 Update, increase, and disseminate available information concerning recreational opportunities and care of Cuyahoga River, its tributaries, and watershed.</i>				
	1 Web page of recreational opportunities/access	wc		
	2 Monitor 8 wet-weather events for coliform in river	wc, partner with WWTP		
	3 Other Actions - see MS 3c-9			
<i>MS 10c-4. Increase stewardship activities related to watershed issues</i>				
	1 Annual river/tributary/lake clean-ups			
	Actions - See MS 10a-1, 9a-2			
	2 Additional stewardship activities - see MS 3c-10			

Note: Select practices will be monitored for effectiveness