

Appendix L.
Implementation Plan Actions

Tables

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Table L-1. Recommendations for improving water quality in impaired areas in the Sandusky Bay and frontal Lake Erie tributaries and Sandusky River (lower) tributaries and mainstem TMDL project area

Location Description (10-digit HUC) Location Description (12-digit HUC) Sources (Causes)	Restoration Categories											
	Bank & Riparian Restoration	Stream Restoration	Wetland Restoration	Conservation Easements	Dam Modification or Removal	Levee or Dike Modification or Removal	Abandoned Mine Land Reclamation	Home Sewage Planning and Improvement	Education and Outreach	Agricultural Best Management Practices	Storm Water Best Management Practices	Regulatory Point Source Controls
Tymochtee Creek to Wolf Creek (04100011 90 01)												
crop production (sediment)										x		
Wolf Creek to Sandusky Bay (04100011 90 02)												
crop production (nutrients, sediment)										x		
impoundment (poor habitat)												
municipal point source discharges (nutrients)												x
Mills Creek-Frontal Lake Erie (04100011 01)												
Sawmill Creek (01 01)												
<i>not impaired or aquatic life</i>												
Pipe Creek-Frontal Sandusky Bay (01 02)												
channelization (sediment)	x											
urban runoff/storm sewers (flow alterations)											x	
Mills Creek (01 03)												
municipal point source (nutrients)												x
crop production (nutrients, sediment)										x		
livestock (organic enrichment, sediment, nutrients)										x		
septic systems (organic enrichment)								x				
urban runoff/storm sewers (sediment)											x	
combined sewer overflows (organic enrichment)												x
loss of riparian habitat (sediment)	x											

Location Description (10-digit HUC) Location Description (12-digit HUC) Sources (Causes)	Restoration Categories											
	Bank & Riparian Restoration	Stream Restoration	Wetland Restoration	Conservation Easements	Dam Modification or Removal	Levee or Dike Modification or Removal	Abandoned Mine Land Reclamation	Home Sewage Planning and Improvement	Education and Outreach	Agricultural Best Management Practices	Storm Water Best Management Practices	Regulatory Point Source Controls
Pickerel Creek-Frontal Sandusky Bay (04100011 02)												
Frontal South Side of Sandusky Bay (02 01)												
crop production (sediment)										x		
natural sources												
Strong Creek (02 02)												
<i>not impaired or aquatic life</i>												
Pickerel Creek (02 03)												
crop production (sediment)										x		
channel erosion- hydromodifications (sediment)	x											
streambank destabilization (sediment)	x											
Raccoon Creek (02 04)												
combined sewer overflows (organic enrichment, nutrients)												x
urban runoff/storm sewers (sediment)											x	
channelization (poor habitat, sediment)	x											
municipal point source (nutrients, organic enrichment)												x
crop production (nutrients, sediment, pesticides)										x		
specialty crop production (nutrients, pesticides)										x		
South Creek (02 05)												
crop production (nutrients)										x		

Location Description (10-digit HUC) Location Description (12-digit HUC) Sources (Causes)	Restoration Categories											
	Bank & Riparian Restoration	Stream Restoration	Wetland Restoration	Conservation Easements	Dam Modification or Removal	Levee or Dike Modification or Removal	Abandoned Mine Land Reclamation	Home Sewage Planning and Improvement	Education and Outreach	Agricultural Best Management Practices	Storm Water Best Management Practices	Regulatory Point Source Controls
septic systems (organic enrichment, nutrients)								x				
livestock (nutrients)										x		
channelization (sediment)	x											
Wolf Creek (04100011 10)												
East Branch East Branch Wolf Creek (10 01)												
crop production (nutrients)										x		
unspecified urban stormwater (poor habitat)											x	
Town of New Riegel-East Branch Wolf Creek (10 02)												
package plant (nutrients)												x
un-sewered areas (nutrients)												x
Snuff Creek-East Branch Wolf Creek (10 03)												
<i>not impaired or aquatic life</i>												
Wolf Creek (10 04)												
channelization (poor habitat)	x											
crop production (nutrients)										x		
Rock Creek-Sandusky River (04100011 11)												
Rock Creek (11 01)												
crop production (nutrients, organic enrichment)										x		
channelization (poor habitat, siltation)	x											
flow modification (flow alteration)												
removal of riparian vegetation (poor habitat, siltation)	x											

Location Description (10-digit HUC) Location Description (12-digit HUC) Sources (Causes)	Restoration Categories											
	Bank & Riparian Restoration	Stream Restoration	Wetland Restoration	Conservation Easements	Dam Modification or Removal	Levee or Dike Modification or Removal	Abandoned Mine Land Reclamation	Home Sewage Planning and Improvement	Education and Outreach	Agricultural Best Management Practices	Storm Water Best Management Practices	Regulatory Point Source Controls
Morrison Creek (11 02)												
crop production (nutrients, organic enrichment)										x		
channelization (poor habitat, siltation)	x											
flow modification (flow alteration)												
removal of riparian vegetation (poor habitat, siltation)	x											
Willow Creek-Sandusky River (11 03)												
crop production (nutrients, organic enrichment)										x		
channelization (poor habitat, siltation)	x											
flow modification (flow alteration)												
removal of riparian vegetation (poor habitat, siltation)	x											
Sugar Creek (11 04)												
<i>not impaired or aquatic life</i>												
Spicer Creek-Sandusky River (11 05)												
crop production (nutrients)										x		
manure runoff (organic enrichment, nutrients)										x		
Green Creek (04100011 12)												
Westerhouse Ditch (12 01)												
<i>not impaired or aquatic life</i>												
Beaver Creek (12 02)												
crop production (sediment)										x		

Location Description (10-digit HUC) Location Description (12-digit HUC) Sources (Causes)	Restoration Categories											
	Bank & Riparian Restoration	Stream Restoration	Wetland Restoration	Conservation Easements	Dam Modification or Removal	Levee or Dike Modification or Removal	Abandoned Mine Land Reclamation	Home Sewage Planning and Improvement	Education and Outreach	Agricultural Best Management Practices	Storm Water Best Management Practices	Regulatory Point Source Controls
channelization (poor habitat, sediment)	x											
Green Creek (12 03)												
crop production (sediment)										x		
channel erosion- hydromodifications (sediment)	x											
Muskellunge Creek-Sandusky River (04100011 13)												
Muskellunge Creek (13 01)												
crop production (nutrients, sediment)										x		
Indian Creek-Sandusky River (13 02)												
<i>not impaired or aquatic life</i>												
Mouth Sandusky River (13 03)												
crop production (nutrients, sediment)										x		
un-sewered areas (nutrients)												x
channelization (poor habitat, sediment)	x											
Muddy Creek-Frontal Sanduskey Bay (04100011 14)												
Gries Ditch (14 01)												
<i>not impaired or aquatic life</i>												
Town of Helena-Muddy Creek (14 02)												
<i>not impaired or aquatic life</i>												
Little Muddy Creek (14 03)												
channelization (sediment)	x											
crop production (nutrients, sediment)										x		
Town of Lindsey-Muddy Creek (14 04)												
channelization (poor habitat, flow alterations, nutrients)	x											

Location Description (10-digit HUC) Location Description (12-digit HUC) Sources (Causes)	Restoration Categories											
	Bank & Riparian Restoration	Stream Restoration	Wetland Restoration	Conservation Easements	Dam Modification or Removal	Levee or Dike Modification or Removal	Abandoned Mine Land Reclamation	Home Sewage Planning and Improvement	Education and Outreach	Agricultural Best Management Practices	Storm Water Best Management Practices	Regulatory Point Source Controls
North Side Sandusky Bay Frontal (14 05)												
<i>insufficient data</i>												

Table L-2. Recommended implementation actions in the Sandusky River (lower) mainstem large river assessment units (HUCs 04100011 90 01 and 90 02)

Restoration Categories		Specific Restoration Actions	Large River Assessment Units	
			Tymochtee Creek to Wolf Creek (04100011 90 01)	Wolf Creek to Sandusky Bay (04100011 90 02)
Bank & Riparian Restoration	constructed	Restore streambank using bio-engineering		
		Restore streambank by recontouring or regrading		
	planted	Plant grasses in riparian areas		
		Plant prairie grasses in riparian areas		
		Remove/treat invasive species		
		Plant trees or shrubs in riparian areas		
Stream Restoration	Restore flood plain			
	Restore stream channel			
	Install in-stream habitat structures			
	Install grade structures			
	Construct 2-stage channel			
	Restore natural flow			
Wetland Restoration	Reconnect wetland to stream			
	Reconstruct & restore wetlands			
	Plant wetland species			
Conservation Easements	Acquire conservation easements			
Dam Modification or Removal	Remove dams		x	
	Modify dams		x	
	Remove associated dam support structures			
	Install fish passage and/or habitat structures			
	Restore natural flow			
Levee or Dike Modification or Removal	Remove levees			
	Breach or modify levees			
	Remove dikes			
	Modify dikes			
	Restore natural flood plain function			
Home Sewage Planning and Improvement	Develop HSTS plan			
	Inspect HSTS			
	Repair or replace traditional HSTS			
	Repair or replace alternative HSTS			
Education and Outreach	Host meetings, workshops, and/or other events			
	Distribute educational materials			

Restoration Categories		Specific Restoration Actions	Large River Assessment Units	
			Tymochtee Creek to Wolf Creek (04100011 90 01)	Wolf Creek to Sandusky Bay (04100011 90 02)
Agricultural Best Management Practices	farmland	Plant cover/manure crops	x	x
		Implement conservation tillage practices	x	x
		Implement grass/legume rotations		
		Convert to permanent hayland		
		Install grassed waterways	x	x
		Install vegetated buffer areas/strips		
		Install location-specific conservation buffer		
		Install / restore wetlands		
	nutrients / agro-chemicals	Conduct soil testing		x
		Install nitrogen reduction practices		x
		Develop nutrient management plans		x
	drainage	Install sinkhole stabilization structures		
		Install controlled drainage system		x
		Implement drainage water management		x
		Construct overwide ditch		
		Construct 2-stage channel		
	livestock	Implement prescribed & conservation grazing practices		
		Install livestock exclusion fencing		
		Install livestock crossings		
		Install alternative water supplies		
		Install livestock access lanes		
	manure	Implement manure management practices		
		Construct animal waste storage structures		
		Implement manure transfer practices		
		Install grass manure spreading strips		
	misc. infrastructure and mgt	Install chemical mixing pads		
		Install heavy use feeding pads		
		Install erosion & sediment control structures		
Install roof water management practices				
Install milkhouse waste treatment practices				
Develop whole farm management plans				
Storm Water Best Management Practices	planning	Develop/implement local ordinances/resolutions		
		Develop local comprehensive land use plans		
	construction practices	Implement erosion controls		
		Implement sediment controls		

Restoration Categories		Specific Restoration Actions	Large River Assessment Units	
			Tymochtee Creek to Wolf Creek (04100011 90 01)	Wolf Creek to Sandusky Bay (04100011 90 02)
	post construction practices	Implement non-sediment controls		
		Reduce pollutant(s) through treatment		
		Reduce pollutant(s) through flow/volume management		
	post development/storm water retrofit	Implement erosion controls		
		Implement sediment controls		
		Implement non-sediment controls		
		Reduce pollutant(s) through flow/volume management		
Regulatory Point Source Controls (includes Storm Water, Sanitary, and Industrial)	planning	Develop long-term control plan (CSOs)		
		Develop/implement local ordinances/resolutions		
		Develop water quality management/208 plans		
	collection and new treatment	Install sewer systems in communities		
		Implement long-term control plan (CSOs)		x
		Eliminate SSOs/CSOs/by-passes		
	enhanced treatment	Issue permit(s) and/or modify permit limit(s)		
		Improve quality of effluent		
	monitoring	Establish ambient monitoring program		
		Increase effluent monitoring		
	alternatives	Establish water quality trading		
	construction practices	Issue permit(s) and/or modify permit limit(s)		
		Implement erosion controls		
		Implement sediment controls		
	post construction practices	Implement non-sediment controls		
		Issue permit(s) and/or modify permit limit(s)		
		Reduce pollutant(s) through treatment		
	post development/storm water retrofit	Reduce pollutant(s) through flow/volume management		
		Issue permit(s) and/or modify permit limit(s)		
		Implement erosion controls		
		Implement sediment controls		
Implement non-sediment controls				
Reduce pollutant(s) through treatment				
Reduce pollutant(s) through flow/volume management				
	Reduce volume to CSOs			

Table L-3. Recommended implementation actions in *Mills Creek-Frontal Lake Erie* (HUC 04100011 01)

Restoration Categories		Specific Restoration Actions	Mills Creek-Frontal Lake Erie (04100011 01)		
			Sawmill Creek (01 01)	Pipe Creek-Frontal Sandusky Bay (01 02)	Mills Creek (01 03)
Bank & Riparian Restoration	constructed	Restore streambank using bio-engineering			
		Restore streambank by recontouring or regrading			
	planted	Plant grasses in riparian areas		X	X
		Plant prairie grasses in riparian areas		X	X
		Remove/treat invasive species			
	Plant trees or shrubs in riparian areas		X	X	
Stream Restoration		Restore flood plain			
		Restore stream channel			
		Install in-stream habitat structures			
		Install grade structures			
		Construct 2-stage channel		X	X
		Restore natural flow			
Wetland Restoration		Reconnect wetland to stream			
		Reconstruct & restore wetlands			
		Plant wetland species			
Conservation Easements		Acquire conservation easements			
Dam Modification or Removal		Remove dams			
		Modify dams			
		Remove associated dam support structures			
		Install fish passage and/or habitat structures			
		Restore natural flow			
Levee or Dike Modification or Removal		Remove levees			
		Breach or modify levees			
		Remove dikes			
		Modify dikes			
		Restore natural flood plain function			
Home Sewage Planning and Improvement		Develop HSTS plan		X	X
		Inspect HSTS		X	X
		Repair or replace traditional HSTS		X	X
		Repair or replace alternative HSTS		X	X
Education and Outreach		Host meetings, workshops, and/or other events			

Restoration Categories		Specific Restoration Actions	Mills Creek-Frontal Lake Erie (04100011 01)		
			Sawmill Creek (01 01)	Pipe Creek-Frontal Sandusky Bay (01 02)	Mills Creek (01 03)
		Distribute educational materials			
Agricultural Best Management Practices	farmland	Plant cover/manure crops		X	X
		Implement conservation tillage practices		X	X
		Implement grass/legume rotations			
		Convert to permanent hayland			
		Install grassed waterways			
		Install vegetated buffer areas/strips		X	X
		Install location-specific conservation buffer			X
		Install / restore wetlands			X
	nutrients / agro-chemicals	Conduct soil testing			X
		Install nitrogen reduction practices			X
		Develop nutrient management plans			X
	drainage	Install sinkhole stabilization structures			
		Install controlled drainage system			X
		Implement drainage water management			X
		Construct overwide ditch			X
		Construct 2-stage channel			X
	livestock	Implement prescribed & conservation grazing practices			X
		Install livestock exclusion fencing			X
		Install livestock crossings			X
		Install alternative water supplies			
		Install livestock access lanes			
	manure	Implement manure management practices			X
		Construct animal waste storage structures			
		Implement manure transfer practices			
		Install grass manure spreading strips			
	misc. infrastructure and mgt	Install chemical mixing pads			
		Install heavy use feeding pads			
Install erosion & sediment control structures					
Install roof water management practices					
Install milkhouse waste treatment practices					
Develop whole farm management plans					
Storm Water Best	planning	Develop/implement local ordinances/resolutions			
		Develop local comprehensive land use plans			

Restoration Categories		Specific Restoration Actions	Mills Creek-Frontal Lake Erie (04100011 01)		
			Sawmill Creek (01 01)	Pipe Creek-Frontal Sandusky Bay (01 02)	Mills Creek (01 03)
Management Practices	construction practices	Implement erosion controls			
		Implement sediment controls			
		Implement non-sediment controls			
	post construction practices	Reduce pollutant(s) through treatment			
		Reduce pollutant(s) through flow/volume management			
	post development/storm water retrofit	Implement erosion controls			
		Implement sediment controls			
		Implement non-sediment controls			
		Reduce pollutant(s) through treatment			
		Reduce pollutant(s) through flow/volume management		X	X
Regulatory Point Source Controls (includes Storm Water, Sanitary, and Industrial)	planning	Develop long-term control plan (CSOs)			
		Develop/implement local ordinances/resolutions			
		Develop water quality management/208 plans			
	collection and new treatment	Install sewer systems in communities			
		Implement long-term control plan (CSOs)			
		Eliminate SSOs/CSOs/by-passes			
	enhanced treatment	Issue permit(s) and/or modify permit limit(s)			X
		Improve quality of effluent			X
	monitoring	Establish ambient monitoring program			
		Increase effluent monitoring			
	alternatives	Establish water quality trading			
	construction practices	Issue permit(s) and/or modify permit limit(s)			
		Implement erosion controls			
		Implement sediment controls			
		Implement non-sediment controls			
	post construction practices	Issue permit(s) and/or modify permit limit(s)			
		Reduce pollutant(s) through treatment			
		Reduce pollutant(s) through flow/volume management			
	post development/storm water retrofit	Issue permit(s) and/or modify permit limit(s)			
		Implement erosion controls			
		Implement sediment controls			
		Implement non-sediment controls			
		Reduce pollutant(s) through treatment			
Reduce pollutant(s) through flow/volume management					
	Reduce volume to CSOs				

Table L-4. Recommended implementation actions in *Pickereel Creek-Frontal Sandusky Bay* (HUC 04100011 02)

Restoration Categories		Specific Restoration Actions	Pickereel Creek-Frontal Sandusky Bay (04100011 02)				
			Frontal South Side of Sandusky Bay (02 01)	Strong Creek (02 02)	Pickereel Creek (02 03)	Raccoon Creek (02 04)	South Creek (02 05)
Bank & Riparian Restoration	constructed	Restore streambank using bio-engineering			X		
		Restore streambank by recontouring or regrading			X		
	planted	Plant grasses in riparian areas	X		X	X	X
		Plant prairie grasses in riparian areas	X		X	X	X
		Remove/treat invasive species					
		Plant trees or shrubs in riparian areas	X		X	X	X
Stream Restoration	Restore flood plain						
	Restore stream channel						
	Install in-stream habitat structures						
	Install grade structures						
	Construct 2-stage channel	X		X	X	X	
	Restore natural flow						
Wetland Restoration	Reconnect wetland to stream						
	Reconstruct & restore wetlands						
	Plant wetland species						
Conservation Easements	Acquire conservation easements						
Dam Modification or Removal	Remove dams						
	Modify dams						
	Remove associated dam support structures						
	Install fish passage and/or habitat structures						
	Restore natural flow						
Levee or Dike Modification or Removal	Remove levees						
	Breach or modify levees						
	Remove dikes						
	Modify dikes						
	Restore natural flood plain function						
Home Sewage Planning and Improvement	Develop HSTS plan		X			X	
	Inspect HSTS		X			X	
	Repair or replace traditional HSTS		X			X	
	Repair or replace alternative HSTS		X			X	

Restoration Categories		Specific Restoration Actions	Pickereel Creek-Frontal Sandusky Bay (04100011 02)				
			Frontal South Side of Sandusky Bay (02 01)	Strong Creek (02 02)	Pickereel Creek (02 03)	Raccoon Creek (02 04)	South Creek (02 05)
Education and Outreach		Host meetings, workshops, and/or other events					
		Distribute educational materials					
Agricultural Best Management Practices	farmland	Plant cover/manure crops	x			x	x
		Implement conservation tillage practices	x			x	x
		Implement grass/legume rotations					
		Convert to permanent hayland					
		Install grassed waterways					
		Install vegetated buffer areas/strips	x			x	x
		Install location-specific conservation buffer	x			x	x
		Install / restore wetlands				x	x
	nutrients / agro-chemicals	Conduct soil testing				x	x
		Install nitrogen reduction practices				x	x
		Develop nutrient management plans				x	x
	drainage	Install sinkhole stabilization structures					
		Install controlled drainage system					
		Implement drainage water management				x	x
		Construct overwide ditch				x	x
		Construct 2-stage channel					
	livestock	Implement prescribed & conservation grazing practices					x
		Install livestock exclusion fencing					x
		Install livestock crossings					
		Install alternative water supplies					
		Install livestock access lanes					
	manure	Implement manure management practices					x
		Construct animal waste storage structures					
		Implement manure transfer practices					
		Install grass manure spreading strips					
	misc. infrastructure and mgt	Install chemical mixing pads					
Install heavy use feeding pads							
Install erosion & sediment control structures							
Install roof water management practices							
Install milkhouse waste treatment practices							
Develop whole farm management plans							

Restoration Categories		Specific Restoration Actions	Pickerel Creek-Frontal Sandusky Bay (04100011 02)				
			Frontal South Side of Sandusky Bay (02 01)	Strong Creek (02 02)	Pickerel Creek (02 03)	Raccoon Creek (02 04)	South Creek (02 05)
Storm Water Best Management Practices	planning	Develop/implement local ordinances/resolutions					
		Develop local comprehensive land use plans					
	construction practices	Implement erosion controls					
		Implement sediment controls					
		Implement non-sediment controls					
	post construction practices	Reduce pollutant(s) through treatment					
		Reduce pollutant(s) through flow/volume management					
	post development/storm water retrofit	Implement erosion controls					
		Implement sediment controls					
		Implement non-sediment controls					
		Reduce pollutant(s) through treatment					
Reduce pollutant(s) through flow/volume management					X		
Regulatory Point Source Controls (includes Storm Water, Sanitary, and Industrial)	planning	Develop long-term control plan (CSOs)					
		Develop/implement local ordinances/resolutions					
		Develop water quality management/208 plans					
	collection and new treatment	Install sewer systems in communities		X			
		Implement long-term control plan (CSOs)				X	
		Eliminate SSOs/CSOs/by-passes					
	enhanced treatment	Issue permit(s) and/or modify permit limit(s)				X	
		Improve quality of effluent				X	
	monitoring	Establish ambient monitoring program					
		Increase effluent monitoring					
	alternatives	Establish water quality trading					
	construction practices	Issue permit(s) and/or modify permit limit(s)					
		Implement erosion controls					
		Implement sediment controls					
		Implement non-sediment controls					
	post construction practices	Issue permit(s) and/or modify permit limit(s)					
		Reduce pollutant(s) through treatment					
Reduce pollutant(s) through flow/volume management							
post development/storm water retrofit	Issue permit(s) and/or modify permit limit(s)						
	Implement erosion controls						
	Implement sediment controls						
	Implement non-sediment controls						

Restoration Categories		Specific Restoration Actions	Pickereel Creek-Frontal Sandusky Bay (04100011 02)				
			Frontal South Side of Sandusky Bay (02 01)	Strong Creek (02 02)	Pickereel Creek (02 03)	Raccoon Creek (02 04)	South Creek (02 05)
		Reduce pollutant(s) through treatment					
		Reduce pollutant(s) through flow/volume management					
		Reduce volume to CSOs					

Table L-5. Recommended implementation actions in Green Creek (HUC 04100011 12)

Restoration Categories		Specific Restoration Actions	Green Creek (04100011 12)		
			Westerhouse Ditch (12 01)	Beaver Creek (12 02)	Green Creek (12 03)
Bank & Riparian Restoration	constructed	Restore streambank using bio-engineering			
		Restore streambank by recontouring or regrading			
	planted	Plant grasses in riparian areas			
		Plant prairie grasses in riparian areas			
		Remove/treat invasive species			
		Plant trees or shrubs in riparian areas			
Stream Restoration		Restore flood plain		x	x
		Restore stream channel			
		Install in-stream habitat structures			
		Install grade structures			
		Construct 2-stage channel		x	x
		Restore natural flow			
Wetland Restoration		Reconnect wetland to stream			
		Reconstruct & restore wetlands			
		Plant wetland species			
Conservation Easements		Acquire conservation easements			
Dam Modification or Removal		Remove dams			
		Modify dams			
		Remove associated dam support structures			
		Install fish passage and/or habitat structures			
		Restore natural flow			
Levee or Dike Modification or Removal		Remove levees			
		Breach or modify levees			
		Remove dikes			
		Modify dikes			
		Restore natural flood plain function			
Home Sewage Planning and Improvement		Develop HSTS plan			
		Inspect HSTS			
		Repair or replace traditional HSTS			
		Repair or replace alternative HSTS			
Education and Outreach		Host meetings, workshops, and/or other events			
		Distribute educational materials			
Agricultural Best	farmland	Plant cover/manure crops		x	x
		Implement conservation tillage practices		x	x

Restoration Categories		Specific Restoration Actions	Green Creek (04100011 12)		
			Westerhouse Ditch (12 01)	Beaver Creek (12 02)	Green Creek (12 03)
Management Practices		Implement grass/legume rotations			
		Convert to permanent hayland			
		Install grassed waterways			
		Install vegetated buffer areas/strips			
		Install location-specific conservation buffer			
		Install / restore wetlands			
	nutrients / agro- chemicals	Conduct soil testing			
		Install nitrogen reduction practices			
		Develop nutrient management plans			
	drainage	Install sinkhole stabilization structures			
		Install controlled drainage system			
		Implement drainage water management			
		Construct overwide ditch		x	x
		Construct 2-stage channel		x	x
	livestock	Implement prescribed & conservation grazing practices			
		Install livestock exclusion fencing			
		Install livestock crossings			
		Install alternative water supplies			
		Install livestock access lanes			
	manure	Implement manure management practices			
		Construct animal waste storage structures			
		Implement manure transfer practices			
		Install grass manure spreading strips			
	misc. infrastructure and mgt	Install chemical mixing pads			
		Install heavy use feeding pads			
		Install erosion & sediment control structures			
		Install roof water management practices			
Install milkhouse waste treatment practices					
Develop whole farm management plans					
Storm Water Best Management Practices	planning	Develop/implement local ordinances/resolutions			
		Develop local comprehensive land use plans			
	construction practices	Implement erosion controls			
		Implement sediment controls			
		Implement non-sediment controls			
	post construction practices	Reduce pollutant(s) through treatment			
		Reduce pollutant(s) through flow/volume management			

Restoration Categories		Specific Restoration Actions	Green Creek (04100011 12)		
			Westerhouse Ditch (12 01)	Beaver Creek (12 02)	Green Creek (12 03)
	post development/ storm water retrofit	Implement erosion controls			
		Implement sediment controls			
		Implement non-sediment controls			
		Reduce pollutant(s) through treatment			
		Reduce pollutant(s) through flow/volume management			
Regulatory Point Source Controls (includes Storm Water, Sanitary, and Industrial)	planning	Develop long-term control plan (CSOs)			
		Develop/implement local ordinances/resolutions			
		Develop water quality management/208 plans			
	collection and new treatment	Install sewer systems in communities			
		Implement long-term control plan (CSOs)			
		Eliminate SSOs/CSOs/by-passes			
	enhanced treatment	Issue permit(s) and/or modify permit limit(s)			
		Improve quality of effluent			
	monitoring	Establish ambient monitoring program			
		Increase effluent monitoring			
	alternatives	Establish water quality trading			
	construction practices	Issue permit(s) and/or modify permit limit(s)			
		Implement erosion controls			
		Implement sediment controls			
	post construction practices	Implement non-sediment controls			
		Issue permit(s) and/or modify permit limit(s)			
		Reduce pollutant(s) through treatment			
	post development/ storm water retrofit	Reduce pollutant(s) through flow/volume management			
		Issue permit(s) and/or modify permit limit(s)			
		Implement erosion controls			
		Implement sediment controls			
		Implement non-sediment controls			
		Reduce pollutant(s) through treatment			
		Reduce pollutant(s) through flow/volume management			
		Reduce volume to CSOs			

Table L-6. Recommended implementation actions in *Wolf Creek* (HUC 04100011 10)

Restoration Categories		Specific Restoration Actions	Wolf Creek (04100011 10)			
			East Branch East Branch Wolf Creek (10 01)	Town of New Riegel-East Branch Wolf Creek (10 02)	Snuff Creek-East Branch Wolf Creek (10 03)	Wolf Creek (10 04)
Bank & Riparian Restoration	constructed	Restore streambank using bio-engineering				
		Restore streambank by recontouring or regrading				
	planted	Plant grasses in riparian areas	x			x
		Plant prairie grasses in riparian areas	x			x
		Remove/treat invasive species				
	Plant trees or shrubs in riparian areas	x			x	
Stream Restoration		Restore flood plain				
		Restore stream channel				
		Install in-stream habitat structures				
		Install grade structures				
		Construct 2-stage channel				x
		Restore natural flow				
Wetland Restoration		Reconnect wetland to stream				
		Reconstruct & restore wetlands				
		Plant wetland species				
Conservation Easements		Acquire conservation easements				
Dam Modification or Removal		Remove dams				
		Modify dams				
		Remove associated dam support structures				
		Install fish passage and/or habitat structures				
		Restore natural flow				
Levee or Dike Modification or Removal		Remove levees				
		Breach or modify levees				
		Remove dikes				
		Modify dikes				
		Restore natural flood plain function				
Home Sewage Planning and Improvement		Develop HSTS plan				
		Inspect HSTS				
		Repair or replace traditional HSTS				
		Repair or replace alternative HSTS				
Education and Outreach		Host meetings, workshops, and/or other events				

Restoration Categories		Specific Restoration Actions	Wolf Creek (04100011 10)			
			East Branch East Branch Wolf Creek (10 01)	Town of New Riegel-East Branch Wolf Creek (10 02)	Snuff Creek-East Branch Wolf Creek (10 03)	Wolf Creek (10 04)
		Distribute educational materials				
Agricultural Best Management Practices	farmland	Plant cover/manure crops	x			x
		Implement conservation tillage practices				
		Implement grass/legume rotations				
		Convert to permanent hayland				
		Install grassed waterways				
		Install vegetated buffer areas/strips	x			x
		Install location-specific conservation buffer				
		Install / restore wetlands				
	nutrients / agro-chemicals	Conduct soil testing	x			x
		Install nitrogen reduction practices	x			x
		Develop nutrient management plans	x			x
	drainage	Install sinkhole stabilization structures				
		Install controlled drainage system	x			x
		Implement drainage water management	x			x
		Construct overwide ditch				x
		Construct 2-stage channel				x
	livestock	Implement prescribed & conservation grazing practices				
		Install livestock exclusion fencing				
		Install livestock crossings				
		Install alternative water supplies				
		Install livestock access lanes				
	manure	Implement manure management practices				
		Construct animal waste storage structures				
		Implement manure transfer practices				
		Install grass manure spreading strips				
	misc. infrastructure and mgt	Install chemical mixing pads				
		Install heavy use feeding pads				
Install erosion & sediment control structures						
Install roof water management practices						
Install milkhouse waste treatment practices						
Develop whole farm management plans						

Restoration Categories		Specific Restoration Actions	Wolf Creek (04100011 10)			
			East Branch East Branch Wolf Creek (10 01)	Town of New Riegel-East Branch Wolf Creek (10 02)	Snuff Creek-East Branch Wolf Creek (10 03)	Wolf Creek (10 04)
Storm Water Best Management Practices	planning	Develop/implement local ordinances/resolutions				
		Develop local comprehensive land use plans				
	construction practices	Implement erosion controls				
		Implement sediment controls				
		Implement non-sediment controls				
	post construction practices	Reduce pollutant(s) through treatment				
		Reduce pollutant(s) through flow/volume management				
	post development/storm water retrofit	Implement erosion controls				
		Implement sediment controls				
		Implement non-sediment controls				
Reduce pollutant(s) through flow/volume management						
Regulatory Point Source Controls (includes Storm Water, Sanitary, and Industrial)	planning	Develop long-term control plan (CSOs)				
		Develop/implement local ordinances/resolutions				
		Develop water quality management/208 plans				
	collection and new treatment	Install sewer systems in communities				
		Implement long-term control plan (CSOs)				
		Eliminate SSOs/CSOs/by-passes				
	enhanced treatment	Issue permit(s) and/or modify permit limit(s)		X		
		Improve quality of effluent		X		
	monitoring	Establish ambient monitoring program				
		Increase effluent monitoring		X		
	alternatives	Establish water quality trading				
	construction practices	Issue permit(s) and/or modify permit limit(s)				
		Implement erosion controls				
		Implement sediment controls				
		Implement non-sediment controls				
post construction practices	Issue permit(s) and/or modify permit limit(s)					
	Reduce pollutant(s) through treatment					
	Reduce pollutant(s) through flow/volume management	X				

Table L-7. Recommended implementation actions in *Rock Creek-Sandusky River* (HUC 04100011 11)

Restoration Categories		Specific Restoration Actions	Rock Creek-Sandusky River (04100011 11)				
			Rock Creek (11 01)	Morrison Creek (11 02)	Willow Creek-Sandusky River (11 03)	Sugar Creek (11 04)	Spicer Creek-Sandusky River (11 05)
Bank & Riparian Restoration	constructed	Restore streambank using bio-engineering					
		Restore streambank by recontouring or regrading					
	planted	Plant grasses in riparian areas			X		
		Plant prairie grasses in riparian areas			X		
		Remove/treat invasive species					
		Plant trees or shrubs in riparian areas			X		
Stream Restoration	Restore flood plain						
	Restore stream channel						
	Install in-stream habitat structures						
	Install grade structures						
	Construct 2-stage channel						
	Restore natural flow						
Wetland Restoration	Reconnect wetland to stream						
	Reconstruct & restore wetlands						
	Plant wetland species						
Conservation Easements	Acquire conservation easements						
Dam Modification or Removal	Remove dams						
	Modify dams						
	Remove associated dam support structures						
	Install fish passage and/or habitat structures						
	Restore natural flow						
Levee or Dike Modification or Removal	Remove levees						
	Breach or modify levees						
	Remove dikes						
	Modify dikes						
	Restore natural flood plain function						
Home Sewage Planning and Improvement	Develop HSTS plan						
	Inspect HSTS						
	Repair or replace traditional HSTS						
	Repair or replace alternative HSTS						
Education and Outreach	Host meetings, workshops, and/or other events						

Restoration Categories		Specific Restoration Actions	Rock Creek-Sandusky River (04100011 11)				
			Rock Creek (11 01)	Morrison Creek (11 02)	Willow Creek-Sandusky River (11 03)	Sugar Creek (11 04)	Spicer Creek-Sandusky River (11 05)
		Distribute educational materials					
Agricultural Best Management Practices	farmland	Plant cover/manure crops	X	X	X		X
		Implement conservation tillage practices					
		Implement grass/legume rotations					
		Convert to permanent hayland					
		Install grassed waterways					
		Install vegetated buffer areas/strips			X		X
		Install location-specific conservation buffer					
	nutrients / agro-chemicals	Install / restore wetlands					
		Conduct soil testing	X	X	X		X
		Install nitrogen reduction practices	X	X	X		X
	drainage	Develop nutrient management plans	X	X	X		X
		Install sinkhole stabilization structures					
		Install controlled drainage system	X	X	X		X
		Implement drainage water management	X	X	X		X
		Construct overwide ditch					
	livestock	Construct 2-stage channel					
		Implement prescribed & conservation grazing practices					X
		Install livestock exclusion fencing					
		Install livestock crossings					
		Install alternative water supplies					
	manure	Install livestock access lanes					
		Implement manure management practices					X
		Construct animal waste storage structures					
		Implement manure transfer practices					
	misc. infrastructure and mgt	Install grass manure spreading strips					X
		Install chemical mixing pads					
Install heavy use feeding pads							
Install erosion & sediment control structures							
Install roof water management practices							
Install milkhouse waste treatment practices							
Storm Water	planning	Develop whole farm management plans					
		Develop/implement local ordinances/resolutions					

Restoration Categories		Specific Restoration Actions	Rock Creek-Sandusky River (04100011 11)					
			Rock Creek (11 01)	Morrison Creek (11 02)	Willow Creek-Sandusky River (11 03)	Sugar Creek (11 04)	Spicer Creek-Sandusky River (11 05)	
Best Management Practices		Develop local comprehensive land use plans						
	construction practices	Implement erosion controls						
		Implement sediment controls						
		Implement non-sediment controls						
	post construction practices	Reduce pollutant(s) through treatment						
		Reduce pollutant(s) through flow/volume management						
	post development/storm water retrofit	Implement erosion controls						
		Implement sediment controls						
		Implement non-sediment controls						
		Reduce pollutant(s) through treatment						
		Reduce pollutant(s) through flow/volume management						
	Regulatory Point Source Controls (includes Storm Water, Sanitary, and Industrial)	planning	Develop long-term control plan (CSOs)					
			Develop/implement local ordinances/resolutions					
Develop water quality management/208 plans								
collection and new treatment		Install sewer systems in communities						
		Implement long-term control plan (CSOs)						
		Eliminate SSOs/CSOs/by-passes						
enhanced treatment		Issue permit(s) and/or modify permit limit(s)						
		Improve quality of effluent						
monitoring		Establish ambient monitoring program						
		Increase effluent monitoring						
alternatives		Establish water quality trading						
construction practices		Issue permit(s) and/or modify permit limit(s)						
		Implement erosion controls						
		Implement sediment controls						
		Implement non-sediment controls						
post construction practices		Issue permit(s) and/or modify permit limit(s)						
		Reduce pollutant(s) through treatment						
		Reduce pollutant(s) through flow/volume management						
post development/storm water retrofit		Issue permit(s) and/or modify permit limit(s)						
		Implement erosion controls						
		Implement sediment controls						
	Reduce pollutant(s) through treatment							

Restoration Categories	Specific Restoration Actions	Rock Creek-Sandusky River (04100011 11)				
		Rock Creek (11 01)	Morrison Creek (11 02)	Willow Creek-Sandusky River (11 03)	Sugar Creek (11 04)	Spicer Creek-Sandusky River (11 05)
	Reduce pollutant(s) through flow/volume management					
	Reduce volume to CSOs					

Table L-8. Recommended implementation actions in *Muskellunge Creek-Sandusky River* (HUC 04100011 13)

Restoration Categories		Specific Restoration Actions	Muskellunge Creek-Sandusky River (04100011 13)		
			Muskellunge Creek (13 01)	Indian Creek-Sandusky River (13 02)	Mouth Sandusky River (13 03)
Bank & Riparian Restoration	constructed	Restore streambank using bio-engineering			
		Restore streambank by recontouring or regrading			
	planted	Plant grasses in riparian areas			x
		Plant prairie grasses in riparian areas			x
		Remove/treat invasive species			
	Plant trees or shrubs in riparian areas			x	
Stream Restoration		Restore flood plain			x
		Restore stream channel			
		Install in-stream habitat structures			
		Install grade structures			
		Construct 2-stage channel			x
		Restore natural flow			x
Wetland Restoration		Reconnect wetland to stream			
		Reconstruct & restore wetlands			
		Plant wetland species			
Conservation Easements		Acquire conservation easements			
Dam Modification or Removal		Remove dams			
		Modify dams			
		Remove associated dam support structures			
		Install fish passage and/or habitat structures			
		Restore natural flow			
Levee or Dike Modification or Removal		Remove levees			
		Breach or modify levees			
		Remove dikes			
		Modify dikes			
		Restore natural flood plain function			
Home Sewage Planning and Improvement		Develop HSTS plan			
		Inspect HSTS			
		Repair or replace traditional HSTS			
		Repair or replace alternative HSTS			
Education and Outreach		Host meetings, workshops, and/or other events			
		Distribute educational materials			

Restoration Categories		Specific Restoration Actions	Muskellunge Creek-Sandusky River (04100011 13)		
			Muskellunge Creek (13 01)	Indian Creek- Sandusky River (13 02)	Mouth Sandusky River (13 03)
Agricultural Best Management Practices	farmland	Plant cover/manure crops	X		X
		Implement conservation tillage practices			
		Implement grass/legume rotations			
		Convert to permanent hayland			
		Install grassed waterways			
		Install vegetated buffer areas/strips			X
		Install location-specific conservation buffer			
		Install / restore wetlands			
	nutrients / agro- chemicals	Conduct soil testing	X		X
		Install nitrogen reduction practices	X		X
		Develop nutrient management plans	X		X
	drainage	Install sinkhole stabilization structures			
		Install controlled drainage system	X		X
		Implement drainage water management	X		X
		Construct overwide ditch			X
		Construct 2-stage channel			X
	livestock	Implement prescribed & conservation grazing practices			
		Install livestock exclusion fencing			
		Install livestock crossings			
		Install alternative water supplies			
		Install livestock access lanes			
	manure	Implement manure management practices			
		Construct animal waste storage structures			
		Implement manure transfer practices			
		Install grass manure spreading strips			
	misc. infrastructure and mgt	Install chemical mixing pads			
		Install heavy use feeding pads			
Install erosion & sediment control structures					
Install roof water management practices					
Install milkhouse waste treatment practices					
Develop whole farm management plans					
Storm Water Best Management Practices	planning	Develop/implement local ordinances/resolutions			
		Develop local comprehensive land use plans			
	construction practices	Implement erosion controls			
		Implement sediment controls			

Restoration Categories		Specific Restoration Actions	Muskellunge Creek-Sandusky River (04100011 13)		
			Muskellunge Creek (13 01)	Indian Creek-Sandusky River (13 02)	Mouth Sandusky River (13 03)
	post construction practices	Implement non-sediment controls			
		Reduce pollutant(s) through treatment			
		Reduce pollutant(s) through flow/volume management			
	post development/storm water retrofit	Implement erosion controls			
		Implement sediment controls			
		Implement non-sediment controls			
		Reduce pollutant(s) through treatment			
	Reduce pollutant(s) through flow/volume management				
Regulatory Point Source Controls (includes Storm Water, Sanitary, and Industrial)	planning	Develop long-term control plan (CSOs)			
		Develop/implement local ordinances/resolutions			
		Develop water quality management/208 plans			
	collection and new treatment	Install sewer systems in communities			x
		Implement long-term control plan (CSOs)			
		Eliminate SSOs/CSOs/by-passes			
	enhanced treatment	Issue permit(s) and/or modify permit limit(s)			
		Improve quality of effluent			
	monitoring	Establish ambient monitoring program			
		Increase effluent monitoring			
	alternatives	Establish water quality trading			
	construction practices	Issue permit(s) and/or modify permit limit(s)			
		Implement erosion controls			
		Implement sediment controls			
		Implement non-sediment controls			
	post construction practices	Issue permit(s) and/or modify permit limit(s)			
		Reduce pollutant(s) through treatment			
		Reduce pollutant(s) through flow/volume management			
	post development/storm water retrofit	Issue permit(s) and/or modify permit limit(s)			
		Implement erosion controls			
Implement sediment controls					
Implement non-sediment controls					
Reduce pollutant(s) through treatment					
Reduce pollutant(s) through flow/volume management					
	Reduce volume to CSOs				

Table L-9. Recommended implementation actions in *Muddy Creek-Frontal Sandusky Bay* (HUC 04100011 14)

Restoration Categories		Specific Restoration Actions	Muddy Creek-Frontal Sandusky Bay (04100011 14)				
			Gries Ditch (14 01)	Town of Helena-Muddy Creek (14 02)	Little Muddy Creek (14 03)	Town of Lindsey-Muddy Creek (14 04)	North Side Sandusky Bay Frontal (14 05)
Bank & Riparian Restoration	constructed	Restore streambank using bio-engineering					
		Restore streambank by recontouring or regrading					
	planted	Plant grasses in riparian areas			X		
		Plant prairie grasses in riparian areas			X		
		Remove/treat invasive species					
	Plant trees or shrubs in riparian areas			X			
Stream Restoration		Restore flood plain			X	X	
		Restore stream channel					
		Install in-stream habitat structures					
		Install grade structures					
		Construct 2-stage channel			X	X	
	Restore natural flow			X	X		
Wetland Restoration		Reconnect wetland to stream					
		Reconstruct & restore wetlands					
		Plant wetland species					
Conservation Easements		Acquire conservation easements					
Dam Modification or Removal		Remove dams					
		Modify dams					
		Remove associated dam support structures					
		Install fish passage and/or habitat structures					
		Restore natural flow					
Levee or Dike Modification or Removal		Remove levees					
		Breach or modify levees					
		Remove dikes					
		Modify dikes					
		Restore natural flood plain function					
Home Sewage Planning and Improvement		Develop HSTS plan					
		Inspect HSTS					
		Repair or replace traditional HSTS					
		Repair or replace alternative HSTS					
Education and Outreach		Host meetings, workshops, and/or other events					

Restoration Categories		Specific Restoration Actions	Muddy Creek-Frontal Sandusky Bay (04100011 14)				
			Gries Ditch (14 01)	Town of Helena-Muddy Creek (14 02)	Little Muddy Creek (14 03)	Town of Lindsey-Muddy Creek (14 04)	North Side Sandusky Bay Frontal (14 05)
		Distribute educational materials					
Agricultural Best Management Practices	farmland	Plant cover/manure crops			x		
		Implement conservation tillage practices					
		Implement grass/legume rotations					
		Convert to permanent hayland					
		Install grassed waterways					
		Install vegetated buffer areas/strips					
		Install location-specific conservation buffer					
		Install / restore wetlands					
	nutrients / agro-chemicals	Conduct soil testing			x		
		Install nitrogen reduction practices			x		
		Develop nutrient management plans			x		
	drainage	Install sinkhole stabilization structures					
		Install controlled drainage system			x		
		Implement drainage water management			x		
		Construct overwide ditch					
		Construct 2-stage channel			x	x	
	livestock	Implement prescribed & conservation grazing practices					
		Install livestock exclusion fencing					
		Install livestock crossings					
		Install alternative water supplies					
		Install livestock access lanes					
	manure	Implement manure management practices					
		Construct animal waste storage structures					
		Implement manure transfer practices					
		Install grass manure spreading strips					
	misc. infrastructure and mgt	Install chemical mixing pads					
Install heavy use feeding pads							
Install erosion & sediment control structures							
Install roof water management practices							
Install milkhouse waste treatment practices							
Develop whole farm management plans							
Storm Water	planning	Develop/implement local ordinances/resolutions					

Restoration Categories		Specific Restoration Actions	Muddy Creek-Frontal Sandusky Bay (04100011 14)				
			Gries Ditch (14 01)	Town of Helena-Muddy Creek (14 02)	Little Muddy Creek (14 03)	Town of Lindsey-Muddy Creek (14 04)	North Side Sandusky Bay Frontal (14 05)
Best Management Practices		Develop local comprehensive land use plans					
	construction practices	Implement erosion controls					
		Implement sediment controls					
		Implement non-sediment controls					
	post construction practices	Reduce pollutant(s) through treatment					
		Reduce pollutant(s) through flow/volume management					
	post development/storm water retrofit	Implement erosion controls					
		Implement sediment controls					
		Implement non-sediment controls					
		Reduce pollutant(s) through treatment					
		Reduce pollutant(s) through flow/volume management					
	Regulatory Point Source Controls (includes Storm Water, Sanitary, and Industrial)	planning	Develop long-term control plan (CSOs)				
Develop/implement local ordinances/resolutions							
Develop water quality management/208 plans							
collection and new treatment		Install sewer systems in communities					
		Implement long-term control plan (CSOs)					
		Eliminate SSOs/CSOs/by-passes					
enhanced treatment		Issue permit(s) and/or modify permit limit(s)					
		Improve quality of effluent					
monitoring		Establish ambient monitoring program					
		Increase effluent monitoring					
alternatives		Establish water quality trading					
construction practices		Issue permit(s) and/or modify permit limit(s)					
		Implement erosion controls					
		Implement sediment controls					
		Implement non-sediment controls					
post construction practices		Issue permit(s) and/or modify permit limit(s)					
		Reduce pollutant(s) through treatment					
		Reduce pollutant(s) through flow/volume management					
post development/storm water retrofit		Issue permit(s) and/or modify permit limit(s)					
		Implement erosion controls					
	Implement sediment controls						
	Implement non-sediment controls						
	Reduce pollutant(s) through treatment						
	Reduce pollutant(s) through flow/volume management						

Restoration Categories		Specific Restoration Actions	Muddy Creek-Frontal Sandusky Bay (04100011 14)				
			Gries Ditch (14 01)	Town of Helena-Muddy Creek (14 02)	Little Muddy Creek (14 03)	Town of Lindsey-Muddy Creek (14 04)	North Side Sandusky Bay Frontal (14 05)
		Reduce volume to CSOs					