

APPENDIX A: MITIGATION MEASURES FOR RESTORATION CATEGORIES

Method	Potential Impacts¹	Mitigation
Stormwater Management		
Retrofit Basins	Sinkholes	Will avoid projects on residential properties unless fenced. Soil, groundwater and bedrock tests will be done on a site-by-site basis as part of feasibility evaluation to assess the risk of sinkholes. Frequent construction, e.g., twice per year, and post-construction monitoring will occur to determine if sinkholes are developing and to take immediate remedial action, including stoppage of the project.
Lands Suitable for Infiltration	Sinkholes, mosquitoes, and risk of drowning in standing water.	Will avoid projects on residential properties unless fenced. Soil, groundwater and bedrock tests will be done on a site-by-site basis as part of feasibility evaluation to assess the risk of sinkholes. Frequent construction (e.g., twice yearly) and post-construction monitoring will occur to determine if sinkholes are developing and to take immediate remedial action, including stoppage of the project. Biological controls will be introduced if mosquitoes emerge. The amount of time for standing water will be limited to 24-hours.
Low Impact Development		No specific mitigation required.
Stream Channel Stabilization		
Bioengineered banks	Erosion and sedimentation during implementation and possibly during trout spawning season. Stream encroachments.	Will comply with PADEP ² Chapter 102 regulations on erosion and sedimentation by trapping sediment. To comply with Chapter 105, natural stream design principles of design of project will mitigate encroachment effects. Will not undertake such projects during trout spawning season. Will ensure that vegetation is quickly established on the bank to minimize amount of exposed surfaces before next storms.
J and W Vanes	Erosion and sedimentation during implementation, including trout spawning season. Stream encroachment and less vegetation on banks.	Vanes will be used when the preferred bioengineered methods are unsuitable for the soils and the force received by the banks that are to be stabilized. Will comply with PADEP ² Chapter 102 regulations on erosion and sedimentation by trapping sediment. To comply with Chapter 105, natural stream design principles of design of project will mitigate encroachment effects. Will not undertake such projects during trout spawning season. Some vegetation will re-grow.
Rip Rap	Erosion and sedimentation during implementation, including trout spawning season. Stream encroachment and less vegetation on banks. Increase in temperature of water.	Will comply with PADEP ² Chapter 102 regulations on erosion and sedimentation by trapping sediment. To comply with Chapter 105, natural stream design principles of design of project will mitigate encroachment effects. Will not undertake such projects during trout spawning season. Some vegetation will re-grow over time. Only to be used on tributaries which do not flow during dry weather or as part of a bioengineering project.
Skyhooks	Erosion and sedimentation during implementation and trout spawning season. Stream encroachment and less vegetation on banks.	Will comply with PADEP ² Chapter 102 regulations on erosion and sedimentation by trapping sediment. To comply with Chapter 105, natural stream design principles of design of project will mitigate encroachment effects. Will not undertake such projects during trout spawning season. Some vegetation will re-grow over time.
Boulders for Fish Cover	Erosion and sedimentation during	Will comply with PADEP Chapter 102

Method	Potential Impacts ¹	Mitigation
	placement of boulders and trout spawning season. Increased erosion on unstable adjacent banks.	regulations on erosion and sedimentation by trapping sediment. Would only place boulders where stream flow will not be directed at banks. Will not undertake boulder placement during trout spawning season.
Greenways		
Property Purchases	Invasive plants.	Maintenance needs for each property to be identified and agreement established for maintenance cost and invasive management.
Easements		No mitigation measures required.
Buffers	Stream channel stabilization likely to occur simultaneously with creation of buffer. Potential erosion and sediment generation during construction (see above mitigation). Invasive plants likely to emerge.	Would comply with PADEP Chapter 102 regulations on erosion and sedimentation for adjacent stream channel stabilization. Agreements need to be established for each property for maintenance, invasive plant management, and cost responsibility.
Public Access		
Removing Postings	Loss of vegetation and compaction of soil for highly used areas. Minor amounts of litter left behind by anglers and other users. Erosion on banks used to access streams.	If unacceptable land usage or litter, can allow landowner to return to posting. Will establish agreement with local service group to pickup litter periodically. Will monitor banks and take actions to prevent use or remediate problem.
Access with Parking	Land conversion from natural to recreational areas and parking. Minor amounts of litter left behind by anglers and other users. Erosion on adjacent banks.	Sites will be designed with pervious parking and infiltration of up to and including 2-year storm. Will establish agreement with local service group to pickup litter periodically. Will monitor banks and take actions to prevent use or remediate problem.
Trails	Soil compaction and vegetation loss. Minor amounts of litter left behind by anglers and other users. Erosion on adjacent banks.	Will establish agreement with local service group to pickup litter periodically. Will monitor banks and take actions to prevent use or remediate problem.
Crabby Creek Brook Trout Restoration		
Restoration of Brook Trout in Crabby Creek	Possible strain differences with previous species of brook trout. Pressure on fish population from stream where taken.	Potential strain differences will be avoided by selecting brook trout from nearby stream. Pennsylvania Fish and Boat Commission has already identified stream in contiguous county that contains a sufficient brook trout population.

1. All projects will be subject to archeological and historical surveys to determine if objects of historical significance are present. All projects will be subject to threatened and endangered species surveys and wetlands avoidance.
2. PADEP = Pennsylvania Department of Environmental Protection.