

Penjawoc Stream Stressors and Recommendations						
Upper Watershed						
Management Objective	Stressor	Evaluation Method- Monitoring/Analysis/ Model	Sources	General Recommendations to address sources	List of BMPs/methods	Priority Sub-watersheds (based on peak cfs/acre?) and sites (see WBRC BMP Retrofit Matrix)
Water Quality Improvement: Reduce pollutant loading from NPS Control Channel Erosion Enhance/protect riparian and floodplain area (Add specific objectives/targets for the watershed-- meet w.q. standards, hydrology targets)	Temperature-Minor	WQ monitoring/Stressor ID	Dams Lack of shading Urban runoff	Stormwater BMPs (infiltrate runoff & increase baseflow) Riparian buffers	Stormwater BMPs (See WBRC report-Retrofit Approaches p.22)	
	Nutrients	WQ monitoring/Stressor ID SWMM Model	Urban runoff (contaminants incl. fertilizers, soil, litter) Erosion (watershed & in stream)	Stormwater BMPs Reduce fertilizer use Control erosion sources Housekeeping (e.g clean up winter sand)		
	Dissolved oxygen	WQ monitoring/Stressor ID	Low/slow flow High nutrients (increase algal growth) High temperature (decrease dissolved oxygen)	Stormwater BMPs Increase flow and rate (Upper) Buffers		
	Conductivity (Minor- follow up sampling 2004)	WQ monitoring/Stressor ID	Contaminants including sand/salt	Stormwater BMPs Reduce sand/salt sources Housekeeping	Floodplain/riparian/in-stream restoration (see Parish Report Analysis & Interpretation-pp 33-37)	Riparian enhancement opportunities (Parish-Existing Conditions Assessment?)
	Toxics (Natural? Low pH & anaerobic conditions may be cause)	WQ monitoring/Stressor ID SWMM Model	Urban runoff Sand/salt	Stormwater BMPs Reduce sand/salt sources Housekeeping		
	Habitat	WQ monitoring/Stressor ID Geomorphology Assessment	Sedimentation Altered hydrology Poor riparian conditions	Stormwater BMPs Improve/establish buffers In-stream restoration	Other categories: Erosion & Sedimentation Control	

	Altered hydrology	WQ monitoring/Stressor ID SWMM Model Hydrocad Model	Urban runoff Channel alterations Disconnection from floodplain	Stormwater BMPs In-stream & channel restoration		Reach PS-7
	Stream Instability	Geomorpology Assessment	Urban runoff Channel alterations Disconnection from floodplain	Stormwater BMPs In-stream & channel restoration		
Middle Watershed						
Management Objective	Stressor	Evaluation Method- Monitoring/Analysis/ Model	Sources	Recommendations-BMPs	List of BMPs/methods	Priority Sub-watersheds (based on peak cfs/acre?) and sites (see WBRC BMP Retrofit Matrix)
Water Quality Improvement: Reduce pollutant loading from NPS Control Channel Erosion Enhance/protect riparian and floodplain area (Add specific objectives/targets for the watershed-- meet w.q. standards, hydrology targets)	Temperature-possible	WQ monitoring/Stressor ID	Dams Lack of shading Urban runoff	Stormwater BMPs (infiltrate runoff & increase baseflow) Riparian buffers	Improve buffer areas-diverse native trees & shrubs Replace galvanized drainage systems with plastic materials Type C underdrain systems into street projects Address 1 and 2 year storm events Re-connect with floodplain	
	Nutrients	WQ monitoring/Stressor ID SWMM Model	Urban runoff (contaminants incl. fertilizers, soil, litter) Erosion (watershed & in stream)	Stormwater BMPs Reduce fertilizer use Control erosion sources Housekeeping (e.g clean up winter sand)		
	Dissolved oxygen	WQ monitoring/Stressor ID	Low/slow flow High nutrients (increase algal growth) High temperature (decrease dissolved oxygen)	Stormwater BMPs Increase flow and rate Buffers		
	Conductivity	WQ monitoring/Stressor ID	Contaminants including sand/salt	Stormwater BMPs Reduce sand/salt sources Housekeeping		

	Toxics	WQ monitoring/Stressor ID SWMM Model	Urban runoff Sand/salt	Stormwater BMPs Reduce sand/salt sources Housekeeping		
	Sediment	WQ monitoring/Stressor ID SWMM Model	Urban runoff Erosion (sources include watershed and stream)	Stormwater BMPs Erosion control practices In-stream restoration		
	Habitat	WQ monitoring/Stressor ID Geomorphology Assessment	Sedimentation Altered hydrology Poor riparian conditions	Stormwater BMPs Improve/establish buffers In-stream restoration		
	Altered hydrology	WQ monitoring/Stressor ID SWMM Model Hydrocad Model	Urban runoff Channel alterations Disconnection from floodplain	Stormwater BMPs In-stream & channel restoration		
	Stream In-stability (includes Meadow Brook)	Geomorphology Assessment	Urban runoff Channel alterations Disconnection from floodplain	Stormwater BMPs In-stream & channel restoration		Reaches PS-3--PS-6
Lower Watershed						
Management Objective	Stressor	Evaluation Method- Monitoring/Analysis/ Model	Sources	Recommendations-BMPs	List of BMPs/methods	Priority Sub-watersheds (based on peak cfs/acre?) and sites (see WBRC BMP Retrofit Matrix)
Water Quality Improvement: Reduce pollutant loading from NPS Control Channel Erosion Enhance/protect riparian and floodplain area (Add specific objectives/targets for the watershed-- meet w.q. standards, hydrology targets)	Temperature	WQ monitoring/Stressor ID	Dams Lack of shading Urban runoff	Stormwater BMPs (infiltrate runoff & increase baseflow) Riparian buffers		
	Nutrients-related to stormflow (less of a problem)	WQ monitoring/Stressor ID SWMM Model	Urban runoff (contaminants incl. fertilizers, soil, litter) Erosion (watershed & in stream)	Stormwater BMPs Reduce fertilizer use Control erosion sources Housekeeping (e.g clean up winter sand)		
	Conductivity	WQ monitoring/Stressor ID	Contaminants including sand/salt	Stormwater BMPs Reduce sand/salt sources Housekeeping		
	Toxics	WQ monitoring/Stressor ID SWMM Model	Urban runoff Sand/salt	Stormwater BMPs Reduce sand/salt sources Housekeeping		

	Sediment (during storm)	WQ monitoring/Stressor ID SWMM Model	Urban runoff Erosion (sources include watershed and stream)	Stormwater BMPs Erosion control practices In-stream restoration		
	Habitat	WQ monitoring/Stressor ID Geomorphology Assessment	Sedimentation Altered hydrology Poor riparian conditions	Stormwater BMPs Improve/establish buffers In-stream restoration		
	Altered hydrology	WQ monitoring/Stressor ID SWMM Model Hydrocad Model	Urban runoff Channel alterations Disconnection from floodplain	Stormwater BMPs In-stream & channel restoration		
	Stream In-stability	Geomorphology Assessment	Urban runoff Channel alterations Disconnection from floodplain	Stormwater BMPs In-stream & channel restoration		Reach PS-2