Draft Waubesa Wetlands Study Design -- PRELIMINARY DRAFT NOT FOR DISTRIBUTION

Topic Area		Who	Work Elements	Tools	Existing Info	Guidance
Context/Background						
Summary of currently available information					Committee Charge (DNR Northeast Neighborhood Decision Document) A century of strong science and education in the Waubesa Wetlands -- RAMSAR application (Zedler) Waubesa Wetlands Study Plan - Preliminary Resources Inventory (Kakuska, 2017)	
	Activities	CARPC, UW-WRM, Cal, Joy, others	Compile background info		Searching for the source: Deep Spring (Gower, undated)	
Groundwater						
Evaluate groundwater flow and surface and groundwater interactions between streams, springs, groundwater, and Lake Waubesa using the 2014 Dane County Regional Groundwater Model				Regional Groundwater Model	Preferential flow: Tunnel City (Swanson, 2006) Waubesa Wetlands Study Plan - Preliminary Resources Inventory (Kakuska, 2017)	Dane County Groundwater Protection Planning Framework, CARPC
	Activities	CARPC WGNHS/USGS WGNHS/USGS	Conduct model simulations of both existing and future conditions Conduct model simulations using telescoped and coupled Ground and Surface Water Model (needed?) Expanded groundwater monitoring			
Surface Water						
Evaluate nutrient loadings, including nitrogen and phosphorus in both particulate and dissolved forms in streams, springs, groundwater, and Lake Waubesa Utilize updated rainfall data from NOAA Atlas 14 and include considerations for changing climatic conditions				Diatoms as indicators	RRC volunteer monitoring data McGaw study Terravessa stormwater study Seasonal shifts in upstream phosphorus Yahara Lakes (Lathrop, 2016)	
	Activities	DNR/RRC RRC, USGS, WRM Fitchburg CARPC, LWRD, Fitchburg UW	Diatom monitoring in Swan and Murphy Creeks Expanded surface water quality monitoring in Swan and Murphy Creeks Stormwater facilities performance audit Identify "Hotspots" both urban and rural Explore Lines of Evidence to address the effects of development and agriculture on the WWs			
Biologic Resources						
Assess the health of the watershed's wetland biological communities and how changes in surface and groundwater quantity, quality, and flow may affect them				Floristic Quality Assessment	Historic wetland vegetation map and planned update DNR HBI/MIBI/IBI data Current fen research (David Bart and Quentin Carpenter) Strategic Watershed restoration and protection plan for WWs (Zedler, 2006)	Expanded buffers such as for "Core Habitat," SEWRPC, CARPC
	Activities	DNR DNR UW UW/DNR DNR/TNC Wetland Specialist/Consultant	Wetland vegetation map update Conduct a Floristic Quality Assessment Fen research design and application Soil nutrient processes/markers and wetland quality Wetlands Ecological Limits of Hydrologic Alteration (biologic response) Develop a wetland protection/restoraton plan using existing or augmented information			

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Scenario Analyses						
Groundwater Modeling - Evaluate current and potential future municipal water supply well placement				Regional Groundwater Model	Waubesa Wetlands Study Plan - Preliminary Resources Inventory (Kakuska, 2017)	Ecologic Limits of Hydrologic Alteration (ELOHA) for Dane County Streams, Diebel, 2014
Runoff Modeling - Evaluate current and potential stormwater impacts from existing and future development/agricultural land uses (both quantity and quality) as well as the impacts of climate change				SLAMM, HECRAS, others? SNAP Plus, RUSLE2, Wisconsin P Index, others? Fitchburg's stormwater requirements (adequate?) More recent volume and water quality controls (adequate?)		Ecologic Limits of Hydrologic Alteration (ELOHA) for Dane County Streams, Diebel, 2014 Minnesota's wetland stormwater standards Improved volume control standards in Dane County Literature review on BMPs, conservation design, green infrastructure, nutrient management, reduced salt and pesticide use
	Activities	CARPC L&WRD DNR/Consultant?	Stormwater modeling scenarios/analyses Agricultural runoff modeling scenarios/analyses Develop a voluntary TMDL specific to the WWs			
Recommendations						
Provide recommendations for source water protection for areas that feed the perched fen located in the southwest portion of Lake Waubesa				Regional Grounwater Model	Waubesa Wetlands Study Plan - Preliminary Resources Inventory (Kakuska, 2017) Dane County Groundwater Protection Planning Framework, CARPC	
Provide recommendations for management actions to mitigate the cone of depression resulting from current and future municipal well pumping					Literature review on BMPs, conservation design, green infrastructure, nutrient management, reduced salt and pesticide use	
Provide recommendatons for more environmentally friendly urban development and agricultural production activities						
	Activities	CARPC/TAC/UW-WRM	Prepare final report			
Ongoing Adaptive Management Planning/Implementation						
Develop and implement a "living/breathing' Watershed Adaptive Management Plan to incorporate into and inform local and regional comprehensive plans and programs, as well as more focused development plans and designs						Literature review on Adaptive Management
	Activities	CARPC/TAC/UW-WRM Fitchburg, Dane Co. Fitchburg, CARPC, Dane Co. Fitchburg	Develop a watershed Adaptive Management Plan that captures, compiles, and promotes everything above along with community outreach and buy-in Enhanced enforcement of existing standards and requirements Identifying pollution "hotspots" and retrofitting existing development Establish a Watershed District			