

## **APPENDIX E: RECOMMENDATIONS TABLE**

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# QUASSAICK CREEK WATERSHED - MANAGEMENT RECOMMENDATIONS

See final page of table for key to acronyms and symbols

Green cells in the first column indicate recommendations that are elaborated upon in Chapter 4 of the Watershed Plan.

Recommendation	Goals					Target Sub-Watershed	Project Partners	Potential Cost	Implementation Timing	Project Considerations					Priority Action
	Protect Water Quality and Source Water, Manage Quantity	Enhance Natural Processes	Inter-municipal Implementation	Promote Watershed Awareness	Create a Resilient Watershed					Site Access	Regulatory	Infrastructure	Social Acceptance	Ongoing Resource Needs	

*Objective 1: Develop a more comprehensive understanding of surface water and groundwater quality and quantity, including sources of impairments, throughout watershed.*

1-1	Establish a program for ongoing monitoring of various stream water quality parameters	X	X		X	X	All	OCWA (professional sites), QCWA (volunteer sites), NYSDEC (state sites), schools	\$	1+	●	○	○	○	●	★
1-2	Work with existing MS4s to inventory and address illicit discharges	X	X	X	X	X	All	MS4s, QCWA	\$	1+	●	●	○	●	○	★
1-3	Identify a mechanism to remove Orange Lake from 303d List and/or recognize water quality improvements	X			X		Orange Lake	NYSDEC	\$-\$\$	6+	○	●	○	●	○	★
1-4	Develop system for monitoring and tracking groundwater quality	X			X		All	OCWA	\$-\$\$	2-5	●	●	○	○	●	
1-5	Collect and monitor water quality data at reservoirs and lakes	X			X		All	municipalities, OCWA, QCWA	\$	1+	●	○	○	○	●	

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*Objective 2: Promote water quality protection measures and watershed-friendly policies throughout the watershed*

2-1	Identify and protect priority lands, wetlands, riparian buffers and other natural areas within reservoir watersheds.	X	X	X	X	X	Chadwick Lake, Washington Lake, Silver Stream Reservoir	OCLT, municipalities	\$\$-\$\$\$	1+	●	●	○	●	●	★
2-2	Track monitoring results of closed landfills in Washington Lake watershed	X		X			Washington Lake	QCWA, Air National Guard, Town of New Windsor	\$	1+	●	○	○	○	●	★
2-3	Develop/maintain intermunicipal agreements on source water protection	X		X	X		Chadwick Lake, Washington Lake, Silver Stream Reservoir	OCPD, UCPD, municipalities	\$	2-5	○	●	○	●	●	★
2-4	Develop a watershed protection guide that can be adopted by municipalities	X		X	X	X	All	OCPD, UCPD, municipalities	\$	2-5	○	●	●	●	●	
2-5	Develop model codes for water resource protection and climate change resilience	X			X	X	All	OCPD, UCPD, municipalities	\$	2-5	○	●	●	●	○	★

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2-6	X		X	X	X	All	OCPD, UCPD, municipalities	\$	2-5	○	●	●	●	○	★
2-7	X	X	X	X	X	All	OCPD, UCPD, municipalities	\$	2-5	○	●	●	●	○	★
2-8				X		Lower Quassaick Creek	City of Newburgh	\$	2-5	○	●	●	●	○	★
2-9	X			X	X	All	water and sewer service providers	\$	2-5	○	●	○	●	●	

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2-10	Promote water conservation measures for all water users, both municipal customers and those on private wells	X			X		All	OCPD, UCPD, municipalities	\$	2-5	○	○	●	●	●		
<i>Objective 3: Improve stormwater management, where appropriate, in order to reduce point and non-point source loadings</i>																	
3-1	Implement stormwater retrofits at identified sites and other appropriate locations	X		X	X	X	All	SWCD, QCWA	\$\$-\$\$\$	1+	●	●	●	○	●		
3-2	Incentivize stormwater management	X				X	All	municipalities	\$	2-5	○	○	○	○	●		
3-3	Continue to promote appropriate use of green infrastructure	X	X	X	X	X	All	OCPD, UCPD, SWCD, DEC's HREP, CCE, municipalities	\$\$	1+	●	○	●	○	●		
3-4	Reduce CSO events	X	X			X	Lower Quassaick	City of Newburgh	\$\$-\$\$\$	2+	○	●	●	○	●		
3-5	Increase maintenance of stormwater infrastructure, possibly through outreach and training of municipal officials, contractors, and landowners	X				X	X	All	municipalities	\$\$	6+	●	○	●	●	●	

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3-6	Update local codes to require regular inspections and reporting on stormwater infrastructure	X				X	All	municipalities	\$	2-5	○	●	○	●	●	
3-7	Prioritize regular cleanout of catch basins at Orange Lake	X	X			X	Orange Lake	Town of Newburgh	\$	1+	○	○	○	○	○	★
<b>Objective 4. Protect, enhance and restore critical habitat for fish and wildlife</b>																
4-1	Restore and protect riparian and wetland habitats	X	X	X	X	X	All	SWCD, QCWA, NOAA municipalities	\$-\$\$\$	1+	●	●	●	●	○	★
4-2	Protect critical open spaces and biological areas		X		X	X	All	OCLT, NOAA, municipalities	\$-\$\$\$	1+	●	●	○	○	●	★
4-3	Continue monitoring eel and river herring populations in lower Quassaick Creek		X	X	X		Lower Quassaick	DEC, QCWA, NOAA, schools	\$	1+	●	●	○	○	●	★
<b>Objective 5. Reduce negative effects of hydraulic constrictions, including those created by bridges and culverts</b>																

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5-1	Inventory hydraulic constrictions and document impacts, both positive and negative		X			X	All	QCWA, DEC's HREP, NOAA	\$	6+	●	○	●	●	○	
5-2	Resolve hydraulic constrictions, where appropriate, to reduce ponding and flooding		X			X	All	municipalities	\$\$	6+	●	●	●	●	●	
<b>Objective 6. Address impacts of problematic dams through repair, removal or other mitigation</b>																
6-1	Address streambank erosion and other downstream impacts of breached spillway at Winona Lake		X			X	Bushfield Creek, Middle Quassaick	Winona Lake Homeowners Assoc	\$\$\$	2-5	●	●	●	●	●	★
6-2	Address concerns at Holden Dam section of the Lower Quassaick Creek		X				Lower Quassaick	Dam owner, City of Newburgh	\$\$\$	6+	●	●	●	●	●	
6-3	Inventory dams; Identify candidates for removal, repair, fish/eel ladders, etc		X			X	All	QCWA, DEC's HREP, OCPD, NOAA	\$	2-5	●	○	○	●	○	
6-4	Remove/repair dams, where appropriate		X			X	All	QCWA, DEC's HREP, OCPD	\$\$\$	6+	●	●	●	●	●	
6-5	Maintain adequate stream flows below impoundments (dams)		X				All	municipalities	\$\$	6+	●	●	●	●	●	



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<i>Objective 7. Develop a mechanism for ongoing collaboration and maximize funding opportunities to advance Plan implementation</i>																
7-1	Establish intermunicipal watershed group to implement this Plan			X			N/A	all partners	\$	1+	○	○	○	●	●	★
7-2	Develop workplans and progress memos to track implementation of this Plan			X			N/A	all partners	\$	1+	○	○	○	●	●	★
7-3	Identify funding opportunities to implement this Plan			X			N/A	all partners	\$	1+	○	○	○	○	●	★
7-4	Implement stormwater maintenance districts			X			All	municipalities	\$	2-5	○	●	○	●	●	★
<i>Objective 8. Enhance awareness of and public access to the Creek and other waterbodies of the Watershed</i>																
8-1	Promote community involvement and education on changes in water resources and protecting water supply	X		X	X	X	All	all partners	\$	2-5	●	○	○	●	●	★
8-2	Conduct regular stream and lake clean-ups	X	X	X	X	X	All	QCWA	\$	1+	●	○	○	●	●	★
8-3	Develop outreach and education program that is revisited on an annual basis	X		X	X		All	all partners	\$	1+	○	○	○	●	●	★

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8-4	Increase public access to waterbodies, particularly in under-served areas				X		All	Counties, OCLT, municipalities+l63	\$\$	1	●	●	○	●	●	★
<i>Objective 9. Encourage watershed stakeholders to act in ways that are conducive to watershed protection</i>																
9-1	Promote municipal board awareness of existing regulations	X		X	X		All	OCPD, UCPD, municipal planning federations, municipalities	\$	1+	○	●	○	●	○	★
9-2	Create checklist and/or maps of sensitive areas for municipal boards	X		X	X	X	All	OCPD, UCPD, municipal planning federations, municipalities	\$	2-5	●	○	○	●	○	
9-3	Inform and engage public on pollution-reducing behaviors (including tips for homeowners, impact of pet waste)	X	X		X		All	OCPD, UCPD, municipal planning federations, municipalities	\$	2-5	○	●	○	●	●	★
9-4	Highlight stormwater retrofits and other BMP demonstration sites, as well as their impacts (e.g. before/after, cost/benefit)	X	X		X		All	SWCD	\$	2-5	●	●	●	○	●	★

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9--5	Increase public awareness of potential climate change impacts on drinking water supplies	X			X	X	Chadwick Lake, Washington Lake, Silver Stream Reservoir	OCDOH, DEC's HREP, OCWA	\$	6+	○	○	○	●	●	★
9--6	Develop program to encourage septic maintenance	X			X		Chadwick Lake, Bushfield Creek	OCDOH, OCWA	\$	2-5	●	○	○	●	●	★
9--7	Develop a septic pump-out program for Orange Lake	X			X		Orange Lake	Orange Lake Civic Assoc.	\$	2-5	●	○	○	●	●	★
<b>Objective 10. Appropriately manage water-related cultural resources, including historic and archaeological sites</b>																
10-1	Develop Cultural Resource Management plan for Watershed				X		All	Historical Society of Newburgh Bay and the Highlands, municipalities	\$\$	6+	●	●	●	●	○	
10-2	Develop interpretive and educational plan for significant cultural resource sites, where appropriate				X		All	Historical Society of Newburgh Bay and the Highlands, municipalities	\$	2-5	●	○	○	●	●	
10-3	Perform focused archaeological survey of Lower Quassaick Creek				X		Lower Quassaick	City of Newburgh, Town of New Windsor, SHPO, Historical Society of Newburgh Bay and the Highlands	\$\$	6+	●	●	●	●	○	

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<i>Objective 11. Identify opportunities for renewable energy sources, creative partnerships and pairing watershed management w/economic development</i>																
11-1	Explore potential for Micro-hydro power on existing dams				X		All	dam owners	\$-\$\$	2-5	●	●	●	●	●	
11-2	Utilize and revitalize watershed resources as focal areas for compatible commercial, residential, and/or community service uses.				X		All	developers, municipalities	\$	1+		●	●			
<i>Objective 12. Identify areas, facilities, and infrastructure that are vulnerable to sea level rise and flooding</i>																
12-1	Assess vulnerability of transportation systems to the combination of increased flows and rising sea levels (e.g. River Road bridge and adjacent RR bridge and tracks)				X	X	Lower Quassaick	City of Newburgh, NYSDOT	\$	2-5	●	○	●	○	○	
12-2	Assess vulnerability of wastewater systems to storm surges and flooding	X			X	X	All	municipalities	\$	2-5	●	○	●	○	○	

## KEY TO ACRONYMS AND SYMBOLS

Acronyms found in this chart are defined as follows: CCE = Cornell Cooperative Extension; HREP = Hudson River Estuary Program; MS4 = Municipal Separate Storm Sewer Systems; NOAA = National Oceanic and Atmospheric Administration; (NYS)DEC = (New York State) Department of Environmental Conservation; NYSDOT = New York State Department of Transportation; OCDOH = Orange County Department of Health; OCLT = Orange County Land Trust; OCPD = Orange County Planning Department; OCWA = Orange County Water Authority; QCWA = Quassaick Creek Watershed Alliance; SHPO = State Historic Preservation Office; SWCD = Soil and Water Conservation District; UCPD = Ulster County Planning Department

- Symbol indicates that the recommendation is relevant to this project consideration
- Symbol indicates that the recommendation is not relevant to this project consideration
- ★ Symbol indicates that the recommendation is a Priority Action for this Plan
- X Symbol indicates that the recommendation furthers this watershed goal
- \$-\$\$\$ Symbol indicates the cost of implementing the recommendation. \$ means the cost is expected to be under \$50,000; \$\$ means the cost should be between \$50,000 and \$250,000; and \$\$\$ means that the cost is expected to be greater than \$250,000.
- 1+, 2-5 6+ Number indicates when this recommendation should be implemented. 1+ means the recommendation should be implemented in Year 1; 2-5 indicates the recommendation should be implemented in Year 2 to Year 5, and 6+ means that the recommendation should be implemented in Year 6 or afterwards.

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