

NOSE CREEK WATERSHED WATER MANAGEMENT PLAN

Implementation Guide



Final Draft – revised May 9, 2018



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1.0 INTRODUCTION

The Nose Creek Watershed Water Management Plan was updated in 2018 to reflect advancements in policy and evolving practices. The Plan recommends actions to address new challenges and opportunities to ensure it remains relevant as a guiding document for land and resource managers. This supplementary Implementation Guide provides direction to the Nose Creek Watershed Partnership (NCWP) and all stakeholders for the next phase in the watershed management continuum that is focused on implementing the Nose Creek Plan recommendations.

Shared Responsibility

Watershed management is a shared responsibility. Federal, provincial and municipal governments, non-government organizations, and industries represented in the Nose Creek watershed all have varying levels of responsibility for land and water resource management (refer to Section 5.0 in the Nose Creek Plan). The NCWP encourages the implementation of the Nose Creek Plan by all partners and stakeholders to achieve desired watershed outcomes.

The Nose Creek Plan is a living document. The NCWP will periodically review implementation progress and continue the iterative process of watershed management.

2.0 HOW TO USE THE IMPLEMENTATION GUIDE

A series of tables summarize the recommendations by each of the main themes addressed in the Plan (i.e., administration, water quantity and stormwater management, surface water quality, riparian protection, groundwater, and biodiversity). A reference to the Plan recommendation is provided. The tables indicate who has a role or regulatory responsibility for implementing the recommendation, actions to support implementation, and a preliminary priority timeline (described further below).

Priority Timeline

A priority timeline for implementing actions that support Plan recommendations was established through discussion with NCWP and Technical Team members. The timelines are considered preliminary and approximate, and are intended to help to guide the implementation of the Plan and future work planning. Implementation priorities and timelines may change in the future depending on provincial and municipal direction, emerging issues (e.g., new science, catastrophic events), resource availability, and staff changes. However, achieving the desired outcomes for the Nose Creek watershed should remain the overall focus of the Plan implementation.

- Immediate. Action required as soon as practicable
- Short-term, (1-3 year) timeline for implementation (e.g., 2019-2021)
 - Indicates a high priority (H) recommendation; implementation supports current needs
- Medium-term, (4-6 year) timeline for implementation (e.g., 2022- 2024)
 - May be dependent on the prior implementation of a related action, medium priority (M)
- Long-term, (8-10 year) timeline for implementation (e.g., 2025-2027)
 - May be dependent on the prior implementation of a related action
 - May be a low priority (L) for NCWP and/or partners

Action Categories

Actions were assigned to a category or “type” in order to help refine the list of actions in future work plans. An action may be given an approximate high priority timeline, but may be contingent on the prior or concurrent implementation of other actions. The five categories used to group actions were core actions, primary actions, contingent actions, secondary actions, and independent actions (Table 1-1).

Table 1-1. Definitions used to categorize priorities for the Nose Creek Watershed Partnership.

Action Category	Definition
Core	Actions that are considered to be core roles for responsible jurisdiction (e.g., regulatory role), standard practice or the continuation of on-going activities.
Primary	Actions that must be implemented first, prior to implementation of other actions
Contingent	The implementation of the primary action is contingent on the concurrent implementation of another action
Secondary	May only be implemented following the outcome or completion of a primary action
Independent	The NCWP cannot direct the implementation of the action (e.g., action is associated with a regulatory activity or research), but may have an interest in the outcome.

3.0 IMPLEMENTATION TABLES

Table 3-1. Administration.

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Governance	6.1.1 a	Municipalities and AEP	Renew support for Plan goal, objectives, and recommendations by way of Motion for municipalities, and by letter of notice from Alberta Environment and Parks.	H Short-Term	Core
			Municipalities should update policies based on the Plan.		
	6.1.1 b	AEP	Staff should consider the Plan recommendations prior to issuing an approval, preliminary certificate or licence.	H Short-Term	Core
		Municipalities	Staff should consider the recommendations and incorporate them into current and future policy and procedures, and planning and development documents as opportunity arises. Recommendations should be considered prior to making decisions with regard to land use or management practices that may impact water quality and riparian lands.	H Short-Term	
		Municipalities and AEP	A coordinated effort among jurisdictions should be made to address goals and objectives of the Nose Creek Watershed Water Management Plan. Information packages should be created for each Compliance Inspector of AEP or municipal Bylaw Officer within each jurisdiction. Currently, AEP Compliance staff conduct educational sweeps. Municipal Bylaw officers may assist with these sweeps in a coordinated manner. Priority topic areas should be developed in consultation with municipal Bylaw officers.	H Short-Term	
	6.1.1 c	NCWP and Municipalities	Identify a terms of reference for an Inter-municipal Team that specifies: roles, time commitments, and decision making. The Inter-municipal Team may meet annually as part of the NCWPs work planning to review implementation and share progress (successes and barriers).	H Short-Term	Core
			Host a Town Hall, once per year, where the Partnership and Technical Team provide updates and participate in discussion. Politicians and senior staff may be invited to attend. Senior Leadership Teams to be updated annually.		
	6.1.1 d	NCWP	Each NCWP Board member should establish an internal working group to improve communication within each partner organization. Identify a terms of reference for internal working groups that specifies roles, time commitments, and decision making. Following each NCWP meeting, a communication note should be circulated to the working group members.	H Short-Term	Core

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Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Plan review and progress reporting	6.1.1 e	NCWP	Partners should prepare an annual progress report for the NCWP that highlights the main Plan implementation successes and barriers for respective jurisdictions. A meeting should be planned with the goal of sharing progress reports and planning additional work. This meeting may be coordinated with the Inter-Municipal Team meeting (6.1.1 c). The NCWP should develop a summary report that documents progress. The report should be disseminated to colleagues and stakeholders.	H Short-Term	Core
	6.1.1 f				
Stakeholder communication	6.1.1 g	NCWP, Municipalities, Industry (Development, Agriculture)	Identify a terms of reference for external focus groups that specifies: roles, time commitments, and decision making. The focus groups may meet annually as part of the NCWPs work planning to review implementation and share progress (successes and barriers).	H-M Short to Medium-Term	Core
	6.1.1 h	NCWP	Review website content and administration process. Delegate an administrator.	H Short-Term	Core
			Develop factsheets or other resource material for municipal staff and Council to support the implementation of recommendations and decision-making.	M Medium-Term	Primary
Implementation	6.1.1 i	NCWP, All	Review the implementation actions to establish priorities and refine timelines. Criteria to consider when prioritizing actions may include <ul style="list-style-type: none"> actions fill an urgent need actions aligns with current work priorities and direction actions benefit to Nose Creek watershed, and transferability to other watersheds within jurisdiction 	H Short-Term	Core
	6.1.1 j	Municipalities, Calgary Airport Authority	Continue to provide financial and in-kind support to NCWP to support the ongoing implementation of the Nose Creek Plan.		
	6.1.1 k	NCWP	Identify grant programs that align with the Plan goal and objectives.		
	6.1.1 l	Municipalities	Share results of implementation (e.g., reports, maps, general learning).		
Watershed condition reporting	6.1.1 m	NCWP, Municipalities, BRBC	Establish working teams to monitor and report on watershed condition using standardized methods. Compile results at least every five years or to correspond with BRBC environmental condition reporting. Refer to Appendix E for list of indicators.	H-M Short to Medium-Term	Primary

Table 3-2. Water quantity and stormwater management.

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Develop a hydrologic/hydraulic and water quality model	6.2.2 a	NCWP	Coordinate partners, including the Government of Alberta, relevant municipalities, BRBC, academia, the consulting industry, and others, to develop the detailed hydrologic/hydraulic and water quality model for the Nose Creek watershed.	H Short-Term	Primary
			Update the hydrologic and hydraulic analysis of the entire watershed, including high-flow IFNs and permissible release rates for urbanized areas. Update IFNs and flow duration curves accordingly.	M Medium-Term	Secondary
			Compare frequency duration curves for stream gauges in urbanized areas to evaluate if runoff volume control benefits are achieved.		
		Municipalities	Collaborate through the NCWP to develop the detailed hydrologic/hydraulic and water quality model.	M Medium-Term	Secondary
		AEP	Collaborate through the NCWP to develop the detailed hydrologic/hydraulic and water quality model.		
			Provide technical expertise and available reporting data and information (e.g., floodplain model, post-2013 floodplain map) to the NCWP to support the model. The Monitoring and Science Division should participate in the modelling team.		
Design and implement a standardized water monitoring program (Refer to Section 6.3)	6.2.2 b	NCWP	Establish a Sub-Committee to design and implement a water monitoring program (Section 6.3). Coordinate partners, including AEP and municipalities.	H Short-Term	Primary
		AEP	Monitoring and science division to establish gauging stations for long-term streamflow monitoring.	H Short-Term	Secondary
	Provide technical support to the NCWP for performance monitoring (i.e., flow measurement and monitoring program development).		Primary		
	6.3.2 h	Municipalities	Collaborate through the NCWP to implement the water monitoring program (Section 6.3).	H Short-Term	Primary
			Continue and expand on the existing flow and water quality monitoring at Nose and West Nose creeks, including stormwater monitoring.		Secondary
	6.3.2 i	Municipalities	Collaborate through the NCWP to implement the water monitoring program (Section 6.3).	H Short-Term	Primary
Continue and expand on the existing flow and water quality monitoring at Nose and West Nose creeks, including stormwater monitoring.			Secondary		
Additional watershed condition monitoring (streambank erosion, fisheries)	6.2.2 b	NCWP	As part of performance monitoring, work with partners to monitor stream erosion, draft fisheries, invertebrate and other habitat indicator monitoring criteria to determine if goals are being achieved (6.2.3 s, 6.2.3 t; 6.3.2 h, 6.3.2 i).	H Short-Term	Primary
	6.2.3 s		Identify locations at Nose Creek and West Nose Creek where baseline channel morphology can be established, and where future long-term	M Medium-Term	Secondary

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Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
			erosion monitoring can occur. These sites should be monitored annually or bi-annually using a comparison of surveyed cross-sections and possibly longitudinal profiles. Include photo-monitoring as part of the program.		
Water Conservation Objectives (WCOs)	6.2.2 d	AEP	Provide current data regarding water licence, allocation and use information to support the hydrologic analysis of the watershed. (Data currently available online at www.waterlicences.alberta.ca)	H Short-Term	Secondary
		NCWP, AEP	Request AEP support to review, update and report on water license, allocation and use information (supports model development).		Secondary
	6.2.2 e	AEP	Continue to apply the current low-flow WCO when making decisions. The Director considers the WCO in making decisions on applications for licences, preliminary certificates, approvals, or transfers of an allocation of water.	H Short-Term	Core
	6.2.2 f	AEP; NCWP	Review the current low-flow WCO. Apply the Nose Creek watershed model to refine the WCO for Nose Creek, West Nose Creek and McPherson Coulee.	M-L Medium to Long-Term	Secondary
		AEP	Adopt the updated WCO.	L Long-Term	Secondary
	6.2.2 g	Municipalities	Adopt integrated stormwater management strategies outlined in Section 6.2.3. Protect riparian areas according to the recommendations in Section 6.4.	H Short-Term	Core
Maximum Allowable Release Rate	6.2.3 a	AEP	Continue to apply the Maximum Allowable Release Rate. The watershed-wide modelling tool should be used to identify appropriate rates for areas of redevelopment, and to understand peak interactions with timing and volume.	H Short-Term	Core
		Municipalities	Refine the maximum allowable release rates using the hydrologic/hydraulic and water quality watershed model.		M-L Medium to Long-Term
Runoff Volume Control Target	6.2.3 b	NCWP	Advise through written notice to staff and the development industry that the 2017 runoff volume control target has been delayed.	H Short-Term	Primary
		AEP	Evaluate the runoff volume control targets, and strategies to achieve the target, using the future hydrologic/hydraulic and water quality watershed-scale model.	M-L Medium to Long-Term	Secondary
	Municipalities				
	6.2.3 c	AEP	Reconfirm through written notice to staff and the development industry that the 2013 runoff volume control target will continue to be implemented.	H Short-Term	Primary Immediate
Municipalities					
6.2.3 d	AEP; AHS	Advance Alberta's Water Re-use and Stormwater Use Policy.	H	Primary	

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Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category	
Runoff Volume Control Target continued	6.2.3 d		Consider the Nose Creek watershed as a priority area to pilot watershed-scale studies related to wetland integration in new developments (stormwater management) (e.g., Calgary: Cornerstone, High Plains) and stormwater use (e.g., Airdrie: Windsong – irrigation of Municipal Reserve (MR) from storm pond).	Short-Term	Primary	
			Provide periodic updates on progress to the NCWP.		Secondary	
		Municipalities	Review progress on the development of enabling policies and supporting studies annually.		Primary	
			Identify and investigate innovative tools and practices that will achieve targets. Explore small, community-scale treatment for water re-use and stormwater use.		Primary	
		Municipalities, NCWP	Host workshop to explore water re-use and stormwater use options with municipal/provincial staff and industry.		Core	
		Industry (Development)	Consider the necessary infrastructure required to accommodate water re-use and stormwater use for multiple purposes in advance of the 2017 target implementation.		Primary	
		U of A, Alberta Health Services	Complete study 'Evaluating Microbial Risks and Performance Criteria for Safe Management of Stormwater and Rainwater Re-use'		Primary	
		AEP, U of A, Alberta Health Services	Develop performance criteria for water re-use and stormwater use.		Primary	
		NCWP	Contact partners to determine the status and availability of supporting policy, performance criteria and tools that will support the implementation of the 2017 targets.		H Short-Term	Core
			Contact development industry to advise of the status of the implementation date of the 2017 targets.			Core
	6.2.3 e	Municipalities	Assess the number of times relaxations are given to the runoff volume control target. Information regarding relaxation of the target should be shared among partners.	H Short-Term	Primary	
			Evaluate options to eliminate or greatly reduce the number of relaxations that occur.		Secondary	
Redevelopment areas	6.2.3 f	Municipalities	Investigate tools and develop strategies to support retention of open space in redevelopment areas.	H Short-Term	Secondary	
	6.2.3 g	AEP, Municipalities	Evaluate runoff rate and volume control options for redevelopment areas using the watershed-scale hydrologic/hydraulic and water quality model.	M Medium-Term	Secondary	

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Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Redevelopment areas	6.2.3 h		Establish runoff volume control targets for redevelopment areas.		
	6.2.3 i	Municipalities	Evaluate strategies to manage runoff volume in redevelopment areas and improve water quality. <ul style="list-style-type: none"> - Encourage the use of existing tools (e.g., absorptive landscaping, green roofs, soil cells, and cisterns) in redevelopment areas, particularly those limited in space. - Work with industry to identify practical and cost-effective ways to reduce impervious area (runoff volume) in areas proposed for redevelopment. - Community retrofits to existing infrastructure. 	H Short-Term	Concurrent / Primary
	6.2.3 j				
	6.2.3 k				
		Industry	Identify opportunities to apply existing tools in redevelopment areas to reduce impervious surface area (runoff volume) and improve water quality.	H Short-Term	Primary
Internal Drainage Areas	6.2.3 l	AEP	Continue to apply the Internal Drainage Areas Policy.	H Short-Term	Core
		Municipalities			
	6.2.3 m	Municipalities	Continue to use the Alberta Wetland Policy, and other relevant wetland policies and strategies, in stormwater planning.	H Short-Term	Core
Low Impact Development	6.2.3 n	Municipalities	Design standards, construction specifications and maintenance procedures should be developed for LID.	H Short-Term	Primary/ Core
			Municipalities to conduct internal review of existing policies and legislation to identify changes required to implement LID practices.		Primary
			Explore a framework in which to apply LID into new developments and redevelopment areas. Encourage wider adoption of LID practices by considering incentives.	M Medium-Term	Secondary
	6.2.3 p	Amend existing policies, guidelines and procedures to include integrated stormwater management recommendations as minimum standards and allow for more flexibility and better regulatory control by departmental staff. Amendments should take effect for all new developments, and areas proposed for redevelopment, with existing approvals grandfathered.			
		Require incorporation of LID practices into all new developments, where possible.	L Long-Term		
	6.2.3 o	Municipalities	Make rain barrels available at reasonable cost to residents to increase use in the watershed.	H Short-Term	Core
Industry		Implement rain barrels in new developments or areas of redevelopment.	H	Core	

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Low Impact Development		(Development)		Short-term	
	6.2.3 n-p	Industry (Development)	Initiate discussions regarding LID practices among industry members. Take proactive steps to identify strategies that achieve goals.	H Short-Term	Primary
	6.2.3 q	AEP	Update the Stormwater Management Guidelines ¹ to reflect current knowledge and innovations in stormwater management. The update could be staged according to priorities. Consider the following objectives to the update: <ul style="list-style-type: none"> - Reflect current knowledge, innovation, experience and challenges in stormwater management - Align existing policies and guidelines to minimize delays in review process - Provide guidance to allow municipalities to move forward with LID implementation - Develop a municipal policy and procedures manual - Enable municipal decision making for LID provided that there is no significant adverse effect 	M Medium-Term	Secondary
		Municipalities	Assist AEP to prioritize LID practices that require Water Act approval according to benefits and risks.		Secondary
	6.2.3 r	Municipalities	Manuals and guidelines (e.g. the City of Calgary's Stormwater Design Manual) should be updated within all jurisdictions to reflect the newest approach and terminology used for Integrated Stormwater Management (ISM).	M Medium-Term	Secondary
			Continue to initiate and monitor source control pilot projects to evaluate the applicability and effectiveness of different practices in the Nose Creek watershed. Share the results of the pilot projects with NCWP and others.	H Short-Term	Core
		Industry (Development)	Document the occurrence (e.g., number and type) of LID practices in each jurisdiction and provide report to NCWP.	M Medium-Term	Core
			Assist to evaluate LID practices implemented in developments in terms of cost, performance, and maintenance. Make the results of the evaluation available to the NCWP.	M Medium-Term	Primary

¹ Alberta Environmental Protection 1999

Table 3-3. Surface water quality.

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Water quality guidelines and objectives	6.3.2 a	AEP	Efforts put forward to improve water quality conditions in Nose and West Nose creeks should continue through the implementation of recommendations in this Plan, and those outlined in municipal policy and plans, and industry best practice guidelines and codes of practice.	H Short-Term	Core
		NCWP			
		Municipalities			
	6.3.2 b 6.3.2 j	NCWP, Municipalities	Provide technical expertise to identify an appropriate water quality model for the watershed (i.e., capable of merging with other hydrologic and hydraulic models (Refer to 6.2.2 a)).	M-L Medium to Long-Term	Primary
			Coordinate the development of Total Maximum Daily Loads for Nose and West Nose creeks.		Secondary
			Use the results of the water monitoring program to establish TMDLs when sufficient data (e.g., a minimum of five years) has been collected. Use the hydraulic/hydrologic and water quality model to support the TMDLs.	L Long-Term	Secondary
6.3.2 c	NCWP	Update the Nose Creek Plan to include new recreation guidelines that will replace fecal coliform bacteria as the appropriate indicator for risks to public health.	H Short-Term	Independent or Core	
Stormwater quality	6.3.2 d	NCWP	Review the preliminary stormwater quality study completed from 2014-16 and develop a work plan to address priority water quality concerns.	H Short-Term	Primary
			Use the stormwater quality benchmark conditions (Table 5) to compare with future measured stormwater quality.	M Medium-Term	Core
			Request support from municipalities and AEP to explore stormwater guidelines, beyond TSS.	L Long-Term	Secondary
	6.3.2 f 6.3.2 k	Municipal Affairs, Alberta Health	Investigate additional criteria (e.g., nutrients) for storm ponds that could improve the quality of stormwater released to watercourses in the watershed. Currently the only criteria for stormponds are the 1:100 event and an 85% removal of TSS.	H Short-Term	Secondary
	Municipalities	Continue to develop and implement stormwater monitoring programs.	H Short-Term	Primary	
		Identify staff to work with NCWP to establish preliminary stormwater guidelines.	M Medium-Term	Primary	

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Stormwater quality			Share the results of the stormwater monitoring program (Airdrie and Calgary) with the NCWP to consider when exploring stormwater quality guidelines, beyond TSS.		Secondary
			Develop and refine stormwater quality guidelines as new information is available.		
	6.3.2 e	Municipalities	Explore opportunities to apply BMPs in municipal operations to improve stormwater quality.	H Short-Term	Core
			Encourage industry to apply BMPs in new developments or in redeveloped areas.		Core
		Industry	Identify and apply BMPs in new and redeveloped areas to meet the goals of the Nose Creek Plan.		Core
	6.3.2 f	Municipal Affairs, Alberta Health	Provide funding support to municipalities to upgrade old infrastructure where stormwater quality has been compromised.	H Short-Term	Secondary
Municipalities		Identify and prioritize stormwater outfall infrastructure that demonstrate poor water quality for upgrades, and/or retro-fitting.	Primary		
Discharge of treated effluent	6.3.2 g	AEP; Town of Crossfield	Investigate treatment and disposal options for the Town of Crossfield as alternatives to the current lagoon system. Options should aim to reduce the annual phosphorus load to Nose Creek and improve water quality for downstream users.	H Short-Term	Primary
Design and implement a standardized water monitoring program (Refer to 6.2.2 b)	6.3.2 h 6.3.2 i	NCWP	Coordinate the review and update of the Nose Creek Long-Term Water Monitoring Strategy ² , including provision for continuous monitoring at strategic locations in the watershed. <ul style="list-style-type: none"> - Identify sites for long-term stream flow measurement and water quality monitoring (Refer to Appendix K for past site locations). - Evaluate the need to expand the dissolved oxygen and temperature monitoring and frequency to allow for improved analysis. Collect streamflow, dissolved oxygen, pH, conductivity, turbidity, and temperature using data sondes for continuous monitoring. 	H Short-Term	Primary
			Identify the cost of the water monitoring program, as well as grant opportunities that can support the monitoring effort.		
			Coordinate the implementation of the water monitoring program for at least the next ten years.		

² PESL 2009

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
		Municipalities	Provide technical expertise to support the effort to review and update the Nose Creek Long-Term Water Monitoring Strategy. ⁶³		Primary
			Continue and expand on the existing flow and water quality monitoring at Nose and West Nose creeks, including stormwater monitoring.		
Maintain stream channel morphology	6.3.3 a-e	AEP	Store water monitoring data in provincial database that is accessible to the NCWP. Develop a tool that would allow users to download data directly from the database.	H Short-Term	Secondary
	6.3.3 m-n	AEP, Municipalities	Continue to adhere to recommendations to prevent further loss of channel length in Nose and West Nose creeks.	H Short-Term	Core
Control sediment and erosion; maintain soil quality	6.3.3 f	NCWP	Restore channel length when possible. Use appropriate bioengineering techniques during restoration.	M-L Medium to Long-Term	Secondary
		Municipalities	Host a Sediment and Erosion Control workshop for local jurisdictions in the watershed.	M Medium-Term	Core (Workshop topic)
			Continue to implement sediment and erosion control measures at construction sites.	H Short-Term	Core
			Appropriate staff from each jurisdiction should attend a Sediment and Erosion Control course. A course is offered annually by the City of Calgary.	M Medium-Term	Core
			Design a program within each jurisdiction to encourage departments to participate in enforcement of sediment and erosion control (e.g., departments that operate outdoors (Parks or Public Works staff) may identify violations.	M Medium-Term	Secondary
		Landowners	Regular inspection and maintenance of erosion control BMPs should be conducted and all failing systems repaired as required.	H Short-Term	Core
Municipalities ³	Continue to encourage the retention of existing vegetation in developing areas, where possible. Re-vegetate areas that are stripped as soon as possible.	H Short-Term	Core		
	Routine inspections should be made to ensure that vegetation reclamation requirements are respected.				

³ Guiding Legislation and Policy: City of Calgary – MGA, IDP (Calgary/Rocky View County Section 2.6), MDP (Section 2-1.4), Urban Parks Master Plan, LUBs; City of Airdrie – MGA, IDP (Airdrie/Rocky View County Section 2.6), MDP (Section 7H.16, Section 8A.1), LUBs; Town of Crossfield – MGA, MDP, LUBs; Rocky View County – MGA,, IDP (Airdrie/Rocky View County Section 2.6; Calgary/Rocky View County Section 2.6), MDP (Section 8.0 c), LUBs (Section 20.1).

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Control sediment and erosion; maintain soil quality	6.3.3 g 6.3.3 h		A reclamation plan should be submitted by developers at time of application that includes timelines for completion. Inactive project areas subjected to stripping and grading, should be reclaimed as soon as possible. Erosion and sediment control is regulated by a number of federal and provincial acts and regulations. These include the federal Navigable Waters Protection Act and Fisheries Act, and the provincial Environmental Protection and Enhancement Act. Weed control is mandatory under Alberta’s Weed Act.	H Short-Term	Primary Primary Core Core
			Adhere to the most recent Rocky View County fill disposal guidelines (quality of fill material used).		
		Rocky View County	Update/amend the Procedure for Topsoil Declaration. Share the procedures with surrounding municipalities		
		Municipalities	Update/amend procedures for soil disposal to reflect Rocky View County’s requirements to maintain the production quality of agricultural lands in the watershed.		
		Industry (Development)	Follow the Development Permit conditions and Procedure for Topsoil Declaration to maintain the quality of soil requiring disposal.		
		Industry (Agriculture)	Ensure that soil quality disposed on agricultural lands meets requirements.		
Protect escarpments	6.3.3 i 6.3.3 j 6.3.3 k	Municipalities	Continue to assign Environmental Reserve to steep slopes, and to apply steep slope setbacks near water.	H Short-Term	Core
		Industry (Development)	Respect guidelines for protection of escarpments.	H Short-Term	Core
Refine restoration goals and priorities	6.3.3 o	Municipalities	Explore opportunities to restore reaches of Nose Creek and West Nose Creek that were historically channelized. Opportunities may be identified in greenfield developments.	H Short-Term	Secondary
		AEP			
	Industry (Development)				
	6.3.2 l	NCWP	Partnership to further refine restoration goals for Nose Creek, West Nose Creek and their tributaries.	M Medium-Term	Primary Concurrent
			Partnership to refine restoration goals with municipalities, Trout Unlimited Canada, Ducks Unlimited, Alberta Environment and Parks, and others who have similar goals.		
6.3.2 w	Municipalities	Evaluate the success of restoration projects and report results to stakeholders and the public.	L Long-Term	Secondary	
6.3.3 e	Municipalities	Collaborate to identify priorities for restoration, including actively eroding	H-M	Secondary	

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
	6.3.3 m 6.3.3 n		and slumping banks. The priority list should be readily available to respond to project requests for compensation sites, or for stewardship initiatives.	Short to Medium-Term	

Table 3-4. Riparian protection.

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Riparian Health Targets, Thresholds and Assessment	6.4.2 a	Municipalities	Improve riparian condition according to riparian health assessment recommendations. Seek advice from a qualified professional when needed.	H Short-Term	Secondary
		Landowners			
	6.4.2 b	NCWP	Assist municipalities to prioritize and assess riparian condition in the watershed. Consider re-doing the riparian photo-log (PESL 2007) as a cost-effective way of updating riparian condition information.	H Short-Term	Primary
			Identify grant opportunities to fund riparian health assessment work in the watershed.		Primary
		Municipalities	Continue to monitor riparian areas. For jurisdictions without a riparian strategy, a monitoring strategy should be developed to assess riparian condition periodically assessing or re-visiting past sites.		Core/ Secondary
		Landowners	Individual landowners should participate in riparian area awareness initiatives and strive to properly manage riparian areas.		Core
Industry (Development)	Complete a riparian health assessment/inventory in developed areas, or areas of redevelopment, or greenfield sites. Strive to maintain or improve the condition of riparian lands.	Primary			
Mitigation	6.4.3 a	Municipalities	All development plans submitted to jurisdictions must include mitigating factors.	H Short-Term	Core
		Industry (Development)	Industry should take measures to avoid impacts to Nose Creek and West Nose Creek, including streamflow, riparian areas, wetlands, water quality and other elements that are critical to functioning systems. Industry should demonstrate how impacts were mitigated using modeling and other tools.	H Short-Term	Core
			Improved mitigation practices for work conducted within the vicinity of Nose Creek or West Nose Creek should result in better water quality in the long-term. Specific mitigation measures should be included in the detailed design, and account for construction and maintenance activities.	H Short-Term	Core

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Compensation	6.4.3 a	Industry (Development)	Expected effects of the completed development on riparian areas and water quality should be detailed. Protection measures should be applied routinely when working in and around riparian areas and watercourses.		
	6.4.3 b	Municipalities ⁴	Wetland compensation should occur in accordance with Alberta’s Wetland Policy until the Nose Creek watershed wetland inventory is complete and recommendations can be refined.	H Short-term	Core
			All municipalities should have wetland policies in place. Work with AEP on wetland compensation policies. Compensation policy/legislation should be amended to incorporate recommendations.		Primary
			Partnership to create a list of restoration plans/ studies that could be referred to for compensation purposes in consultation with the various jurisdictions, Trout Unlimited Canada and other non-government agencies. (Refer to 6.3.3 m, n)		Secondary
			Initiate restoration projects, including workshops and demonstration sites that can help educate industry and department staff.		Secondary
		Develop common tools/standards for use by all jurisdictions to consider during the application review process.	Secondary		
		AEP ⁵	Compensation, mitigation and restoration are taken into consideration during AEP's review of Water Act applications. All restoration work requires an Approval under the Water Act if it is in a waterbody.		Core
	Develop a riparian policy that incorporates mitigation, compensation and restoration requirements.		Primary		
	Collaborate with the NCWP and municipalities to determine the need for change in mitigation, compensation, and restoration policy, regulation and legislation.		Primary		
	Amend policy and/or legislation to address mitigation, compensation and restoration as required.		Secondary		
Encourage stewardship	6.4.3 c	Municipalities	Continue to promote resident and community participation in stewardship activities.	H Short-Term	Core

⁴ Guiding Legislation and Policy: City of Calgary - Wetland Policy (Wetland Conservation Plan); Parks Master Plans, MDP, LUBs; City of Airdrie - MDP (5B.7)

⁵ Guiding Legislation and Policy: Water Act – Section 36 states that “no person may commence or continue an activity except pursuant to an approval unless it is otherwise authorized under this Act”; *Wetland Restoration Program Water Act Approval Administrative Guide* (Alberta Environment/Ducks Unlimited Canada, May 2005); *Provincial Wetland Restoration/Compensation Guide* (Alberta Environment, November 2005); Alberta Wetland Policy; Water for Life Strategy; Considers NCWMP

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Apply riparian setbacks and develop riparian policy	6.4.4 a	AEP ⁶	Any work within a water body requires an Approval under the Water Act. Wetland retention and compensation are considered in AEP's decisions.	H Short-Term	Core
			Update provincial riparian policy and guidelines to reflect current knowledge and practice.		Secondary
		Municipalities	Apply the NCWP riparian setbacks as per the Plan, or continue to apply current policies and guidelines where they are more stringent.		Primary
		Industry (Development)	Adhere to established riparian setbacks.		Core
	The land owner should consult a qualified environmental specialist to identify riparian setbacks on all site plans submitted to the appropriate jurisdiction for permitting. The site plan should be drawn to scale. A development permit should only be approved after the appropriate delineation of the riparian setback has been conducted.		Core		
			The riparian setback zone should be clearly marked on-site with construction fencing prior to any soil disturbing or construction related activities. The delineation should be maintained throughout the activity period.		Core
6.4.4 b	Municipalities	Work together, through the Inter-municipal Team (Recommendation 6.1.1 c), to align development setbacks applied to riparian lands in the watershed.	M-L Medium to Long-Term	Secondary	
Minimize relaxations of riparian setbacks	6.4.4 c	Municipalities	Enforce the implementation of riparian setbacks in the watershed.	H (Short-Term)	Core
			Awareness and stewardship programs should be created to ensure the riparian setback is visible in the community. The following steps should be taken: <ul style="list-style-type: none"> - Mark setback boundaries with permanent signs that describe allowable uses, - Educate about the benefits and uses of riparian areas with pamphlets, creek walks and meetings with homeowners associations, - Ensure that new owners are fully informed about riparian area limits/uses when property is sold or transferred, and Conduct annual riparian area walks to inspect for encroachment.		Primary or Secondary
		Industry (Development)	Alternative site design scenarios should be considered when exploring the riparian setback implications including density, flexible MR, and conservation development designs vs. conventional development.		Core

⁶ Guiding Legislation and Policy: *Water Act*

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Permitted and restricted activity	6.4.4 d-f	Municipalities	Continue to adhere to permitted and restricted activities in riparian areas outlined in the recommendations.	H Short-Term	Core
Preserve ephemeral and intermittent watercourses	6.4.4 g 6.4.4 h	AEP ⁷	AEP to consider the Nose Creek Watershed Water Management Plan in its decision-making where legislation applies. Review the Water Act to include the protection of natural features.	H Short-Term	Core
			The province should improve the status of ephemeral and intermittent watercourses and clarify regulations around them to better recognize their importance in maintaining water quality and water volumes.		Primary
		NCWP	Create map tools that supports a cursory review of valued watershed components, that includes: <ul style="list-style-type: none"> - Wetlands (location, number, size – Alberta Wetland Policy valuation) - Springs and groundwater recharge areas - areas with significant vegetation, including unique landforms and species - areas susceptible to bank instability and erosion - wildlife corridors The natural capital inventory could be monitored periodically and reported in a State of the Watershed Report to better understand watershed conditions and impacts of cumulative effects.	H Short-Term	Primary
			AEP, NCWP, Municipalities		
		Municipalities	Identify ephemeral and intermittent watercourses early in the planning process (e.g., ASPs should show tributaries and green space). Refer to the ephemeral and intermittent watercourse maps prepared by NCWP and by The City of Calgary (Appendix K) to identify these watercourses during the Environmental Review process and Biophysical Impact Assessment.	H Short-Term	Core
			Update the BIA protocol to include an ephemeral and intermittent watercourse map. Highlight the process to assess these watercourses according to methods described by AMEC Foster Wheeler and Tannas Conservation Services Ltd. (2017, DRAFT).	H Short-Term	Secondary
			Use field ground-truthing to confirm the presence of ephemeral and intermittent streams shown on the map. An accompanying photo reference guide should be developed that clearly shows the characteristics	H-M Short to Medium-Term	Secondary

⁷ Guiding Legislation and Policy: *Environmental Protection and Enhancement Act* – Section 122(1) 7c, 7c, 7e; Water for Life Strategy; Southern Region Strategy.

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category	
Preserve ephemeral and intermittent watercourses	6.4.4 g		of ephemeral and intermittent streams found in the watershed. The map and photo reference guide should be disseminated to the development and agricultural community.			
			Educate developers, rural landowners, and agricultural producers about the value of ephemeral and intermittent streams.	H Short-Term	Secondary	
			Investigate the ALUS (Alternative Landuse Services) program as a mechanism to maintain ephemeral and intermittent streams.	H-M Short to Medium-Term	Secondary	
	6.4.4 h	Landowners	Developers should provide site-specific detailed maps (biophysical assessment) identifying, but not limited to: <ul style="list-style-type: none"> - Watercourses, lakes, other water bodies (e.g. creek/valley corridors, wetlands, ephemeral and intermittent watercourses) - Areas of significant vegetation, including provincially, regionally and locally significant species. - Critical recharge areas - Floodplain mapping (as per AEP) - Areas susceptible to bank instability - Escarpment areas having slope of $\geq 15\%$ 	H Short-Term	Core	
		Industry (Development)	Minimum disturbance practices should apply to new developments and areas proposed for redevelopment.	The developer, with the assistance of qualified environmental specialists, should identify native vegetation communities and appropriate runoff volume release rates for intermittent watercourses in all applications. The Development industry should plan to meet recommendations/targets earlier in the planning process.	H Short-Term	Core/ Primary
			Industry (Agriculture)			
Ephemeral and intermittent watercourses: setbacks and permitted activity	6.4.4 i	Municipalities	As part of the BIA, determine the width of the development setback for ephemeral and intermittent streams. The setback should be a minimum of 10 m, measured from the edge of the flood prone area as indicated by soils and vegetation.	M Medium-Term	Core or Secondary	
	6.4.4 j	Municipalities	Consider the permitted activities within the riparian setback for ephemeral and intermittent watercourses when making decisions.	H Short-Term	Core or Secondary	
Protect wetlands	6.4.5 a	NCWP	Access the Alberta Merged Wetland Inventory data layer and create the detailed wetland inventory map for the watershed.	H Short-Term	Primary	

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Protect wetlands	6.4.5 b	Municipalities	Apply wetland setbacks.		Core/ Secondary
		Industry (Development, Agriculture)	Adhere to established wetland setbacks.		
	6.4.5 c	NCWP, AEP	Host a wetland valuation workshop and invite key technical experts to identify criteria and assign values to wetlands in the watershed. Ensure wetland valuation process is consistent across the watershed.		Secondary
			Apply the Alberta Wetland Policy methodology to assign values to wetlands in the Nose Creek watershed. Generate a map that shows wetland values as a decision support tool for use by municipalities and industry.		
		AEP	Assist NCWP and municipalities to assign values to wetlands in the watershed according to the Alberta Wetland Policy and Alberta Wetland Rapid Evaluation Tool		
		Municipalities	Participate in a wetland valuation workshop to identify high-valued wetlands in the watershed.		
As part of the MDP, provide the valuation of wetlands early in the planning process. Note that the value of wetlands changes. The value of the wetland may need to be re-evaluated closer to the application date.					
Retain wetlands in urbanizing areas	6.4.5 d-i	Municipalities	Develop policy, procedures and strategies to ensure that wetland management integration occurs with urban planning and development, and water resource management.	H Short-Term	Secondary
		AEP ⁸	Any work within a water body requires an Approval under the Water Act. Wetland retention and compensation are considered in AEP's decisions.	H Short-Term	Core
			Review policies for wetland compensation to reduce the loss of wetlands in urban areas. Compensation should reflect the true cost of wetland loss.		Primary
			Review MDPs at an earlier stage so opportunities to retain wetlands are not lost. Consider whether the wetland is provincially "Crown claimable" or if decisions can be deferred to the local authority.		
Consider identifying a new class of wetland (e.g., urban wetlands) that can be integrated in urbanizing areas, and that would be maintained in an altered state (opposed to lost). Develop criteria to evaluate how wetlands	Secondary				

⁸ Guiding Legislation and Policy: *Water Act*, Alberta Wetland Policy

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Retain wetlands in urbanizing areas	6.4.5 d-i	AEP	can be integrated (e.g., interaction with other water (surface water or groundwater), and water quality and hydrologic requirements).		Secondary
			Develop a tool to determine the value (functions) that wetlands should maintain under varying development scenarios. Collaborate with the NCWP, municipalities, development industry to develop the tool. The tool should identify innovative ways to achieve avoidance outlined in Alberta’s Wetland Policy and maintain wetlands.		
			Address the timeliness of the application review process for wetland restoration projects under the Water Act where clear benefits to the watershed were identified.		Core
			Develop a decision matrix that allows for timely review and approval for wetland restoration projects that have clear benefits for biodiversity and ecological health, water quality improvement, hydrologic function and human uses (as per the Alberta Wetland Policy’s wetland value functional groups).	H Short-Term	Secondary
			Review process and decision-making. Determine how municipalities can provide additional guidance to developers for applications that would support a more timely provincial review. Identify the types of projects that are being delayed (e.g., Crown owned lands).		Secondary
			Update provincial riparian and wetland policy and guidelines to reflect current knowledge and practice.	M-L Medium to Long-Term	Secondary
		Municipalities	Develop a tracking system with staff to document decisions regarding wetlands. The system can be used to document wetland loss, track reasons for loss, and identify strategies to address loss.	M-L Medium to Long-Term	Core
NCWP	Collaborate with Land Trust organizations, Ducks Unlimited Canada, Nature Conservancy Canada and others who have an interest in the preservation of wetlands.	H Short-Term	Concurrent		
Guide to wetland integration in urbanizing areas	6.4.5 j	NCWP	Establish a Sub-Committee to develop a guidance document for wetland integration in urbanizing areas.	M Medium-Term	Secondary
		AEP	Participate in a working group provide regulatory/technical and policy advice to a guidance document for wetland integration in urbanizing areas. The technical working group should:		
		Municipalities			
		Industry (Development)			

Abbreviated Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Guide to wetland integration in urbanizing areas	6.4.5 j		<ul style="list-style-type: none"> - Identify strategies to maintain wetlands - Establish criteria needed to maintain wetlands in urban areas (biodiversity, water quality, hydrologic function, and human use) - Satisfy the requirements of the conditions needed to maintain urban wetlands. <p>Use the Nose Creek watershed hydrologic/model (Recommendation 6.2.2 a) to evaluate the role of wetlands in maintaining local hydrology and water quality.</p>	M Medium-Term	Secondary
Riparian restoration	6.4.6 a-e	Municipalities Industry (Golf Course)	Protect, maintain and restore riparian vegetation according to recommendations.	H Short-Term	Core
Agricultural lands	6.4.7 a-i	Municipalities	Continue to encourage all producers in the watershed to participate in the Environmental Farm Plan Program.	H Short-Term	Core
		Industry (Agriculture)	Continue to adhere to AOPA standards, and to implement BMPs to protect riparian areas and wetlands on agricultural lands according to the recommendations.	H Short-Term	Core

Table 3-5. Groundwater.

Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Timeline	Category
Develop a source water protection plan	6.5.2 a	NCWP	Identify priority source water protection areas in the watershed by assessing groundwater vulnerability. Priority should be given to the western and eastern fringe (e.g., the internal drainage areas).	L Long-Term	Primary
			Prepare a Source Water Protection Plan proposal with emphasis on groundwater. Assemble a meeting to discuss source water protection and prepare a Project Proposal with Alberta Health Services, AEP, University of Calgary and BRBC. Identify Partner Lead to assist with the development of the source water protection plan.		Primary
			Develop a watershed groundwater map showing priority source water protection areas (high, medium and low risk areas); groundwater flow pathways, recharge areas, location of springs and discharge areas, and water quality.		Secondary
			Develop a comprehensive source water protection plan using maps and local research. Identify groundwater vulnerability, and specific protection		Secondary

Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Timeline	Category
			and management strategies for high, medium and low risk areas.		
		AEP	Assist the NCWP to develop a groundwater inventory map.		Primary
		AEP	Provide Technical groundwater support to the NCWP to assist with the development of a source water protection plan and identify appropriate tools for protection.		Secondary
Abandoned wells	6.5.2 b	AEP	Review and update groundwater well database to Identify and assess the status of abandoned wells.	L Long-Term	Primary
			To prevent contamination of groundwater, work with municipalities to develop a program to have qualified professionals seal abandoned wells.		Secondary
Education	6.5.2 c	NCWP	Implement a groundwater protection education program: - Factsheets on groundwater protection, signs denoting area's significance to groundwater recharge, base flows, and drinking water	M-L Medium-Long-Term	Secondary
		Municipalities ⁹	Continue with programs to assist rate payers to properly dispose of harmful materials (e.g. pesticides, fertilizers).	H Short-Term	Core
		Landowners	Landowners should apply BMPs for source water protection including properly disposing of harmful materials and proper use of pesticides and fertilizers.	H Short-Term	Core
Research	6.5.2 d-f	NCWP	Continue to work with the University of Calgary to better understand groundwater resources in the watershed.	H Short-Term	Independent
		University of Calgary	Continue to study groundwater in the West Nose Creek watershed. Consider expanding the program to include the entire Nose Creek watershed to address question regarding the role of groundwater in water balance.	M Medium-Term	Core

Table 3-6. Biodiversity.

Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
Fish	6.6.2 a 6.6.2 b	AEP	Using data collected by Bow River Habitat Development, provincial fish biologists should identify the appropriate reaches where the fall/winter RAP applies.	H Short-Term	Primary

⁹ Guiding Legislation and Policy: City of Calgary – MGA, MDP (Section 2-1.2), LUBs ; City of Airdrie – MGA, MDP (Section 8A.1), LUBs

Recommendation	Plan Reference	Responsible Jurisdiction	Actions	Approximate Timeline	Category
	6.6.2 a 6.6.2 b	AEP	Provincial fish biologists should recommend the necessary revisions to the RAP shown on the Code of Practice maps to protect Brown Trout spawning habitat. The provincial Code of Practice maps should be updated accordingly.		Secondary
	6.6.2 c	AEP, Municipalities, Industry (Development)	Adhere to the RAP designated on the Code of Practice maps, and protect riparian areas and associated functions through land use zoning and development setbacks. Maintain stream channel integrity in Brown Trout spawning areas.	H Short-Term	Core
	6.6.2 d	NCWP	Work with Trout Unlimited and Bow River Habitat Development to better understand fish habitat, use and potential in Nose and West Nose creeks.	H Short-Term	Primary
		Trout Unlimited Canada	Support the NCWP by initiating a fishery study at Nose and West Nose Creek to understand habitat use and potential, and identify measures that should be taken to maintain Brown Trout habitat in West Nose Creek.		Core
Wildlife	6.6.2 e	Municipalities	Recognize the importance of riparian areas and wetlands to wildlife. Identify important wildlife areas in biophysical impact assessments and recommend ways to maintain wildlife and habitat with urbanizing areas.	H Short-Term	Core
Aquatic invasive species and Whirling disease	6.6.2 f	NCWP	Survey stormponds within the watershed to determine the occurrence and extent of AIS in stormponds, including invasive plants, fish and other aquatic life.	M Medium-Term	Primary
	6.6.2 g	NCWP; Municipalities	NCWP should host a workshop with appropriate staff from each municipality, to discuss and develop a joint program for the early detection of aquatic invasive species (e.g., flowering rush, purple loosestrife, and pale yellow iris).	M Medium-Term	Core (Workshop Topic)
	6.6.2 h	NCWP	Develop a factsheet regarding AIS in the watershed and make available to municipalities, landowners and residents.	M Medium-Term	Secondary
	6.6.2 i	Municipalities	Be aware of the threat Whirling disease poses to the Bow River fishery. Communicate threat to residents and contractors in newsletters, newspapers and through awarded contracts for work that involves water.	H Short-Term	Core
Invasive plants	6.6.2 j-n	Municipalities ¹⁰	Continue to enforce invasive weed control in the watershed. Seek to engage others in weed control and the spread of non-native species through education and enforcement.	H Short-Term	Core

¹⁰ Guiding Legislation and Policy: Alberta *Weed Control Act*