Table S1: An overview of different policies and guidelines for riparian buffers in forestry land-use in Canada, Finland and Sweden. In Canada, the province of British Columbia is used in this example because guidelines are set by provinces and territories individually.

	General guidelines at national/provincial level	Forest certification requirements (voluntary)	Local targets (regional or individual land owners) and adjustments by conditions	Reference documents
British Columbia (Canada)	In BC, the Ministry of Forestry present Riparian Management Area guidebook (RMA). RMA objectives are: • To minimize or prevent impacts of forest and range uses on stream channel dynamics, aquatic ecosystems, and water quality of all streams, lakes, and wetlands. • To minimize or prevent impacts of forest and range use on the diversity, productivity, and sustainability of wildlife habitat and vegetation adjacent to streams, lakes, and wetlands with reserve zones, or where high wildlife values are present • To allow for forest and range use that is consistent with 1 and 2 above. To achieve the objectives one should: • Reduce the risk of windthrow • Retain important wildlife attributes (e.g., large trees, coarse woody debris) • Provide shade • Reduce microclimate changes • Maintain bank stability	In BC four certification systems are in place: Sustainable Forestry Initiative (SFI), Canadian Standards Association Forest Certification (CSA), Forest Stewardship Council (FCS) and Environmental Management System (ISO 14001). All certification programs have standards for waters and riparian areas that are in compliance with provincial guidelines and with RMA guidebook. No buffer width prescriptions. FSC and SFI has further specifications on parameters that are important to prevent or provide (e.g., minimizing disruption in flow and sedimentation, maintain stream shading and temperature) but without concrete targets.	Specific rules apply based on stream classification (S1-S6), where fish presence is the most important attribute. In general, non-fish bearing streams (S5-S6): • Do not require riparian reserve (forested buffer) • Require riparian management zone of 20-30 m in which operations are limited (harvesting allowed but no driving of machines) Fish bearing streams (S1-S4): • Fish streams <1.5 m bankfull width (S4) require zero reserve • Streams > 1.5 m width require forested reserve of 20-50 m (depending on stream size) and • Require management zone of 20-100 m (depending on stream size)	BC Ministry of Forestry (2022), Canadian Standard Association (2016), Forest Stewardship Council Canada (2018), Sustainable Forestry Initiative (2022), International Organization for Standardization (2021)

	Buffer width prescribed as 0-50 m based on stream classification (see local targets).		Specific rules set by the province may vary by a region as well as on private and public lands but in general, they must comply with RMA.	
Finland	Riparian streamside habitats in natural or near-natural condition are protected by the Finnish Forest Act. It is prohibited to alter their characteristics features defined as: • Special growing conditions • Microclimate Neither minimum width of the riparian buffer nor measurable targeted values for the listed features are outlined.	Both PEFC and FSC certificates are applied in Finland. • PEFC requires riparian buffer width on 'average 10 meters, but everywhere at least 5 meters' (thinning allowed). • FSC requires riparian buffer must comprise at least 15 m of intact forest.	Individual forest companies follow mainly FSC certificate, whereas PEFC is mainly used by the private forest owners and government. Both certificates are based on international criteria defined by their background communities themselves, which are applied in standards formed at the national level. Additional national recommendations are given to foster the water protection: • Adaptation of buffer width based on local conditions (e.g. slope and soil characteristics). • Protection of riparian nature values (e.g., large individuals of old/dead trees). • Leaving at least 1 m wide unmodified edge at the end of forest ditches.	Program for the Endorsement of Forest Certification Finland (2014), Forest Stewardship Council Sweden (2011).

Sweden	Rules for buffers are defined by the Swedish Forest Agency (in accordance with the Swedish Forest Act that requires 'no damage to water') as 'All forest waters should have well-functioning riparian buffer'. Listed riparian functions to be considered: • Preserve soil biogeochemical processes • Provide large wood • Maintain biodiversity • Provide subsidies to aquatic organisms (deciduous leaves are preferred) • Maintain shading (50-70% of stream length) • Prevent sediment transport Neither minimum width of the riparian buffer nor measurable targeted values for the listed functions (except shading) are outlined.	Both PEFC and FSC in Sweden mandate compliance with the national standards. No further specifications on buffers.	Individual forest companies and private forest owners follow own standards which cannot deviate from national requirements but can provide further details on implementation. Those details can include: • Adaptation of buffer width based on local conditions (e.g., wetness and slope) • Protection of nature values (e.g., large individuals of old/dead trees). • Prevent wind-felling by harvesting large spruce • Increase deciduous cover	Andersson et al. (2013), Program for the Endorsement of Forest Certification Sweden (2017), Forest Stewardship Council Sweden (2020)

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