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Final Report

Summary of Targeted Materials for Extended Producer Responsibility in The North



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Waste Management Task Group Canadian Council of Ministers of the Environment

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Executive Summary

In 2009 the Canadian Council of Ministers of the Environment (CCME) approved the Canada-Wide Action Plan for Extended Producer Responsibility (CAP EPR). CAP EPR recognized that the three territorial jurisdictions faced significant implementation challenges due to "unique circumstances of geography, population and infrastructure" and recognized that the remote regions of the provinces faced implementation challenges similar to those of the territories.

Following on CCME's 2014 Progress Report on CAP EPR, CCME launched a project aimed at "identifying opportunities and sharing best practices for implementing EPR in northern and remote regions." To this end, CCME convened a workshop in spring 2015 with producer responsibility organizations (PROs) and stewardship organizations to consider ways of advancing EPR and stewardship in the territories and remote parts of the provinces. In preparation for the workshop, CCME engaged sonnevera international corp. to compile a baseline information report on materials flows and waste management systems for specified product categories (electronics, tires, lubricating oil, paint, consumer batteries, aerosols, and fluorescent lights) in the regions of interest.

The three northern territories (Yukon (YT), Northwest Territories (NT), Nunavut (NU)) are the primary focus of the study, with a secondary focus on "remote regions" in northern parts of British Columbia (BC), Alberta (AB), Saskatchewan (SK), Manitoba (MB), Ontario (ON), Québec (QC), and Newfoundland and Labrador (NL). Identification of remote provincial communities was based on the definition of lack of year-round road access.

This scope incorporated populations totaling just under 69,000 in remote provincial communities; and 117,000 in the three territories.

A summary of relevant information compiled for the territories and remote provincial regions are summarized in the tables below:

Territory	Demographics / Transportation	Retail Sales Network	Waste Management	EPR / Stewardship Materials
ΥT	 Population – 36,700 23% aboriginal 2 communities with population over 1000 Year-round highway system connects all communities except Old Crow (ice road every 3 years) International airport – Whitehorse Regional airports – Dawson City, Old Crow 	 Old Crow (most remote) has Northern Store On-line shopping common Out of territory shopping – BC, AB Retail outlets: Electronics – 22 Tires – 17 Lubricating Oil – 30 Paint – 11 Major retailers also supply batteries and fluorescent lamps. 	 27 public disposal sites 8 landfills plus local transfer stations 2/3 of facilities segregate target materials Recycling processed in Whitehorse Yukon government responsible for waste management infrastructure in aboriginal communities HHW collection events (Yukon government oversees and supports). 	 Beverage Container Regulation – 25 bottle depots operated by community groups and private businesses Special Waste Regulations – hazardous waste Designated Materials Regulation – tires Developing electronics stewardship program Whitehorse has fee-based program for residential electronics shipped to Alberta for recycling 60% of used lubricating oil recovered for use as fuel remainder shipped south for recycling

Territory	Demographics / Transportation	Retail Sales Network	Waste Management	EPR / Stewardship Materials
NT	 Population – 43,623 52% aboriginal 6 communities with population over 1000 nearly 25% of the population lives in communities with limited or no road access Multi-modal transportation system Year round and seasonal road system - some communities with no road access International airport – Yellowknife 27 government-operated community airports Seasonal river and marine transportation system Railway from Edmonton to Hay River Hay River transportation hub linking rail, highway and river systems 	 Northern and remote communities rely on the Arctic Co-op and Northwest Company stores On-line shopping common Out-of-territory shopping Retail outlets: Electronics – 27 Tires – 14 Lubricating oil / batteries – 21 Paint – 18 	 33 landfills 2/3 segregate target material Local governments responsible for managing solid waste facilities Department of Municipal and Community Affairs (MACA) provides support services Event-based HHW program, supported by government 	 Beverage Container Regulations Used Oil and Waste Fuel Management Regulations widespread use of used oil burners Electronics Recycling Regulations being prepared building on existing beverage container depots and one-day collection events in smaller communities

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Territory	Demographics / Transportation	Retail Sales Network	Waste Management	EPR / Stewardship Materials
NU	 Population – 36,585 81% Inuit 11 communities with population over 1000 Canada's largest jurisdiction in terms of land area and smallest in terms of population All communities (except Baker Lake) are coastal No road system Seasonal marine transport system Year-round air transportation Dry-Cargo Re-supply Program (annual sealift) supplies most non-perishable household goods 	 8 outlets in Iqaluit sell electronic devices; 2 sell automotive products Other products sold throughout the territory at Arctic Co-ops, Northern Stores, and independents Specialized online shopping services Out-of-territory purchases delivered on sealift 	 Landfill in each community Segregation occurs at most sites – materials stockpiled City of Iqaluit responsible for managing solid waste 24 hamlet governments responsible for day-to-day operations NT gov't responsible for infrastructure, technical and financial support 	 Lead acid batteries, used lubricating oil, other HW, and tires are commonly segregated, but not typically removed for recycling or treatment Iqaluit plans to segregate and backhaul target materials

Province (Remote Region)	Transportation	Retail Sales Network	Waste Management	EPR / Stewardship Materials
NL	 Most of Labrador is remote Communities on north and east coasts of Labrador rely on air and water transport North coast communities rely on seasonal sealift 	 Most communities have at least one grocery and/or general merchandise store 	 Common disposal sites – quarry or unlined landfill 2002 provincial solid waste strategy aims to regionalize solid waste services, modernize disposal technologies and close unlined disposal sites Location and community specific approaches being developed 	 EPR programs required to service all areas of the province, recognizing local generation and transportation ReGeneration provides paint collection services to remote Labrador communities through local partnerships Electronic Products Recycling Association (EPRA) rolling out depots up the north coast
QC	 Remote communities in Nunavik and eastern region of the Gulf of St. Lawrence Modes of transportation and community resupply in Nunavik mirror those of Nunavut 	 All northern communities have a local Co-op Store 10 communities have a Northern Store 	 Kativik Regional Government (KRG) responsible for municipal infrastructure development and planning Developing a solid waste management strategy for the region 	 Designated stewards obligated to service all northern and remote communities Stockpiles of lubricating oil have been accumulating for decades SOGHU establishing used oil depots EPRA expected to pilot collection points in the north Five PROs (SOGHU, ReGeneration, EPRA, Éco- Peinture, and Call2Recycle Canada) working together to deliver EPR services in Nunavik

Province (Remote Region)	Transportation	Retail Sales Network	Waste Management	EPR / Stewardship Materials
ON	 29 remote First Nations communities in far north Movement of goods by winter road and air transport Coastal communities use barge and shipping systems 	 Online shopping common practice 17 communities have a Northern Store and/or Band Store 	 Landfills located on reserve property or provincial Crown land Many sites have reached, or exceeded, their capacity Aboriginal Affairs and Northern Development Canada (AANDC) assisting communities with clean-up and development of new facilities 	 Stockpiles of tires, batteries and used lubricating oil common Existing EPR programs do not extend into the Far North region Limited local capacity to access the existing infrastructure and services
MB	 28 remote MB communities identified without year-round road access Goods transported by winter road system, air transport, and in some cases, boat 	 Most communities have a Northern Store or an independent store Larger communities have additional retail services 	 Communities have their own landfill or share with adjacent communities Little to no segregation of materials AANDC helping First Nations communities upgrade their disposal facilities, and improve operational practices, such as waste segregation Recycling and Waste Reduction Discussion Paper identified northern and remote communities as a key priority 	 EPR Programs required by regulation to provide province-wide services Solid Waste Action Team (SWAT) aims to address waste management issues and challenges in remote Manitoba communities includes AANDC, Government of Manitoba, an ENGO, and representatives of PROs PROs collaborating in the development of an approach to servicing remote MB communities

Province (Remote Region)	Transportation	Retail Sales Network	Waste Management	EPR / Stewardship Materials
SK	 7 communities including First Nations reserves and nearby hamlets in the remote Athabasca Region Rely on air transport, winter roads, and in one case, summer barge 	 Northern Stores, band stores, additional retail outlets 	 Each of the First Nations communities has a waste disposal facility, either on reserve or on provincial land Little waste diversion 	 Existing EPR and stewardship programs have not been extended to remote far north communities PROs starting to collaborate on an approach for remote communities
AB	 2 remote communities – Fort Chipewyan and Fox Lake located in the far north region of the province Fort Chipewyan accessed by air and winter roads, and a river barge system that operates during the summer Fox Lake accessible by river barge in the summer and ice bridge during the winter 	 Fort Chipewyan – Northern Store Fox Lake – Northern Store and convenience store 	 The Regional Municipality of Wood Buffalo (RMWB) manages solid waste in the community of Fort Chipewyan new, engineered landfill constructed in 2010 	 RMWB accepts tires, paint, electronics, automotive batteries and HHW in Fort Chipewyan intention to transport to Fort McMurray via the ice road Fox Lake is not a registered collection site for any of the Alberta stewardship programs
BC	 Most remote communities are First Nations located in coastal areas Private boat, water taxi and float plane primary modes of transportation Scheduled freight service for many a commercial fuel resupply barge 	Vary widely by community	 AANDC has been upgrading disposal facilities on reserves across BC Most unregulated landfill sites have been closed In water-based communities, waste is transported by barge to an approved disposal facility Segregation and storage of target materials common 	 AANDC working with the BC PROs to acquire regular removal of regulated EPR products from remote communities sharing transportation infrastructure and associated costs EPR Eco-Depot established at the Bella Bella waste transfer station

There are varying states and degrees of EPR / stewardship program implementation in remote regions of the provinces. NL and QC provide examples of complete or nearly complete implementation of at least one EPR program in remote regions, and developments are underway for others. MB and BC provide examples of pilot initiatives, while no developments were evident in ON and SK. The AB experience suggests operational challenges with transporting EPR and stewardship materials from remote places.

Remote Regions EPR Implementation Best Practices

Best practices in the implementation of EPR / stewardship in remote regions were found for NL, QC, MB and BC, including programs in Coastal Labrador, programs in Coastal Nunavik (QC), EPR Pilot Project in St. Theresa Point (MB), and an EPR Pilot Project in Bella Bella, BC.

Highlights from these best practices included the following elements:

- PROs are required by regulation to service all northern and remote communities.
- PROs are allowed to modify collection systems to reflect lower waste generation rates and seasonal transportation systems.
- Partnerships have been established with local groups and/or businesses for the collection and consolidation of designated materials.
- Regional authorities actively facilitate local implementation of provincial EPR / stewardship programs.
- Pilot projects are incorporated into implementation, allowing for improvisation in the development of a model that is relevant to the local circumstances.
- A collaborative approach is taken by PROs to help minimize costs and address logistical challenges.
- Strong community support exists for the project.
- Central locations serve as a "hub" facility, allowing for remote communities can to transfer materials for consolidation and transport.

Lessons Learned

The research provided evidence of successful initiatives and important developments across the country, and led to a number of lessons learned in implementing programs in remote communities:

- Factors such as distance to market, limited modes of transportation and small populations shape the distribution channels and consumer purchasing practices apparent in northern and remote communities.
- Purchasing practices that are common in remote communities include on-line shopping, and travel to regional or national centres for major purchases and resupply.
- A successful project requires a willing community and a local champion who will coordinate the project on the ground for the community.
- Remote communities may be willing, but lack the financial, technical and/or operational capacity to initiate or pursue available EPR / stewardship opportunities. Facilitation may be necessary to foster partnerships between aboriginal communities and PROs.
- AANDC is a key stakeholder in the extension of EPR / stewardship initiatives to extremely
 remote communities AANDC wants to facilitate and support such developments, and may
 offer financial resources.
- Given the fragmented jurisdictional responsibilities for solid waste management and EPR implementation, in remote communities, the coordination of governmental and PRO activities may be helpful.

- Collaborative efforts among PROs provide means for sharing costs, solving logistical problems specific to extreme conditions, and facilitating partnerships with communities.
- Operationally, given how remote communities can be spread out over long distances, the idea of a "hub" based collection model is worthy of consideration. Permanent depots may be established in certain extremely remote locations, and neighbouring communities are reimbursed for the costs of transporting their materials to this depot.
- In communities where HHW and recyclable materials are dispersed at a waste facility (i.e., limited segregation/historic stockpiles) and/or stockpiled at various locations around the community, financial support may be needed to assist the community in consolidating such materials in preparation for an EPR program.

Estimated Quantities of Materials

Quantities generated and disposed were estimated for electronics, tires, used lubricating oil, batteries, paint, and fluorescent lamps. The general approach to developing quantities was to collect available data for provinces and territories across Canada, and convert available data to kg/capita/year generated or disposed. The calculated per-capita rates were adjusted for known territorial differences for certain materials, and applied to population counts for the study area to estimate total quantities. The resulting estimates are intended to provide approximations for planning purposes, based on assumptions and ranges of contributing values. These quantities are rough estimates, and would require more refining considering local factors to increase the level of precision.

The resulting estimates of quantities of material available for collection are summarized in the table below:

Jurisdiction	Electronics	Tires	Used Oil (I)	Antifreeze	Oil Filters	Oil Containers	Lead Acid Batteries (LABs)	Fluorescent Lamps	Paint	Consumer Batteries
Territories – E	Territories – Entire Population									
NT	266	484	479,600	52	31	14	174	15	48	16
NU	223	406	402,600	44	26	12	146	12	40	13
YT	223	405	401,500	44	26	12	146	12	40	13
TOTAL	712	1,295	1,283,700	140	83	38	467	39	128	42
Provinces – R	Provinces – Remote Communities Only									
AB	17	30	29,997	3.3	1.9	0.9	11	0.9	3.0	1.0
BC	20	37	36,509	4.0	2.4	1.1	13	1.1	3.7	1.2
MB	130	236	234,245	26	15	6.8	85	7.2	23	7.7
NL	24	43	42,471	4.6	2.7	1.2	15	1.3	4.2	1.4
ON	119	217	214,599	23	14	6.2	78	6.6	22	7.0
QC	95	173	171,666	19	11	5.0	62	5.3	17	5.6
SK	15	27	26,675	2.9	1.7	0.8	9.7	0.8	2.7	0.9
TOTAL	419	763	756,162	83	49	22	275	23	76	25

Estimates of Material Available for Collection (tonnes unless specified)

Résumé

En 2009, le Conseil canadien des ministres de l'environnement (CCME) a approuvé le Plan d'action pancanadien pour la responsabilité élargie des producteurs (PAPREP). Le PAPREP reconnaissait que la mise en œuvre des programmes de REP présentait des défis de taille pour les trois territoires « vu les singularités de la géographie, de la démographie et des infrastructures » territoriales et que les régions provinciales éloignées se mesuraient à des défis de mise en œuvre similaires à ceux des territoires.

En réponse au rapport d'étape 2014 du CCME sur le PAPREP, le CCME a lancé un projet destiné à « identifier des possibilités et [à] mettre en commun de bonnes pratiques pour mettre en œuvre des programmes de REP dans les régions nordiques et éloignées ». À cette fin, le CCME a organisé, au printemps 2015, un atelier avec des éco-organismes dans le but d'examiner des solutions pour faire progresser les programmes de REP et de gérance dans les territoires et les régions provinciales éloignées. En prévision de l'atelier, le CCME a engagé sonnevera international corp. pour préparer un rapport contenant de l'information de base sur les flux de matières et les systèmes de gestion des matières résiduelles pour des catégories de produits déterminés (matériel électronique, pneus, huile de lubrification, peinture, piles domestiques, aérosols et lampes fluorescentes) dans les régions d'intérêt.

L'étude porte principalement sur les trois territoires nordiques (Yukon [Yn], Territoires du Nord-Ouest [T.N.-O.], Nunavut [Nun.]) et, dans une moindre mesure, sur les « régions éloignées » situées dans le nord de la Colombie-Britannique (C.-B.), de l'Alberta (Alb.), de la Saskatchewan (Sask.), du Manitoba (Man.), de l'Ontario (Ont.), du Québec (QC) et de Terre-Neuve-et-Labrador (T.-N.-L.). Dans le cadre de la présente étude, les collectivités provinciales « éloignées » sont celles qui ne sont pas accessibles par route toute l'année.

Le champ de l'étude couvrait des populations d'un peu moins de 69 000 personnes dans les collectivités provinciales éloignées et de 117 000 personnes dans les trois territoires.

Les tableaux ci-après présentent un résumé de l'information pertinente colligée pour les territoires et les régions provinciales éloignées.



Territoire	Démographie / transports	Réseau de vente au détail	Gestion des matières résiduelles	Matières ou produits visés par des programmes de REP ou de gérance
Υn	 Population – 36 700 population à 23 % autochtone 2 collectivités ont une population de plus de 1000 Un réseau routier accessible à l'année relie toutes les collectivités, à l'exception d'Old Crow (route de glace tous les trois ans) Aéroport international – Whitehorse Aéroports régionaux – Dawson City, Old Crow 	 Old Crow (collectivité la plus éloignée) a un magasin Northern Le magasinage en ligne est courant Magasinage hors du territoire – CB., Alberta Points de vente au détail : matériel électronique – 22 pneus – 17 huile de lubrification – 30 peinture – 11 les grands détaillants vendent également des accumulateurs et des lampes fluorescentes 	 27 lieux publics d'élimination des matières résiduelles 8 lieux d'enfouissement auxquels s'ajoutent des stations locales de transfert 2/3 des installations trient les matières cibles Du recyclage est fait à Whitehorse Le gouvernement du Yukon est responsable des infrastructures de gestion des matières résiduelles dans les collectivités autochtones Activités de collecte des résidus domestiques dangereux (RDD) (le gouvernement du Yukon supervise et soutient ces activités) 	 Règlement sur les contenants de boissons – 25 dépôts de bouteilles tenus par des groupes communautaires et des entreprises privées Règlement sur les déchets spéciaux– résidus dangereux Règlement sur les matières désignées – pneus Programme de gérance du matériel électronique en cours d'élaboration Whitehorse a un programme basé sur une redevance pour le matériel électronique résidentiel matériel electronique désignéte en Alberta pour recyclage 60% de l'huile de lubrification usée est récupérée pour être utilisée comme combustible le reste est envoyé dans le sud pour recyclage

Territoire	Démographie / transports	Réseau de vente au détail	Gestion des matières résiduelles	Matières ou produits visés par des programmes de REP ou de gérance
T.NO.	 Population – 43 623 population à 52 % autochtone 6 collectivités ont une population de plus de 1000 près de 25% de la population vit dans des collectivités qui sont peu ou pas accessibles par route. Réseau de transport multimodal Réseau routier saisonnier ou accessible à l'année – certaines collectivités ne sont pas accessibles par route Aéroport international – Yellowknife 27 aéroports communautaires exploités par le gouvernement Réseau saisonnier de transport fluvial et maritime Voie ferrée d'Edmonton à Hay River Hay River est la plaque tournante des réseaux de transport flerviaire, routier et fluvial 	 Les collectivités nordiques et éloignées s'approvisionnent dans des coopératives (Arctic Co-operatives) et les magasins de la North West Company Le magasinage en ligne est courant Magasinage hors du territoire Points de vente au détail : matériel électronique – 27 pneus – 14 huile de lubrification / accumulateurs – 21 peinture – 18 	 33 lieux d'enfouissement 2/3 des installations trient les matières cibles Les administrations locales sont responsables de la gestion des installations destinées aux résidus solides Le ministère des Affaires municipales et communautaires fournit des services de soutien Programme axé sur des activités ponctuelles pour les RDD 	 Règlement sur les contenants de boissons Règlement sur la gestion des huiles usées et des combustibles résiduaires utilisation répandue de brûleurs à huiles usées Règlement sur le recyclage du matériel électronique en préparation s'appuie sur les dépôts de bouteilles et les activités de collecte d'une journée qui existent dans les petites collectivités



Territoire	Démographie / transports	Réseau de vente au détail	Gestion des matières résiduelles	Matières ou produits visés par des programmes de REP ou de gérance
Nunavut	 Population – 36 585 population à 81 % inuite 11 collectivités ont une population de plus de 1000 Il s'agit du plus grand territoire administratif du Canada sur le plan superficie et du plus petit sur le plan population Toutes les collectivités (sauf Baker Lake) sont côtières Aucun réseau routier Réseau de transport maritime saisonnier Transport aérien à l'année Le Dry-Cargo Re-supply Program (ravitaillement annuel par bateau) assure la majeure partie de l'approvisionnement en produits ménagers non périssables 	 8 points de vente offrent des appareils électroniques à lqaluit; 2 offrent des produits automobiles Divers produits sont vendus à la grandeur du territoire dans les Arctic Co-operatives, les magasins Northern et d'autres commerces indépendants Services spécialisés de magasinage en ligne Les achats hors territoire sont livrés par bateau 	 Lieu d'enfouissement dans chaque collectivité Un tri est fait dans la plupart des lieux d'enfouissement – les matières sont stockées La Ville d'Iqaluit est responsable de la gestion des résidus solides 24 administrations locales (hameaux) sont responsables des opérations quotidiennes Le gouvernement des T.NO est responsable du soutien aux infrastructures ainsi que du soutien technique et financier. 	 Les accumulateurs au plombacide, l'huile de lubrification usée, divers résidus dangereux et les pneus font couramment l'objet d'un tri, mais ne sont généralement pas ramassés pour être recyclés ou traités Iqaluit projette de trier et de retourner les matières et produits cibles

Province (région éloignée)	Transports	Réseau de vente au détail	Gestion des matières résiduelles	Matières ou produits visés par des programmes de REP ou de gérance
TNL.	 La majeure partie du Labrador se trouve en région éloignée Les collectivités situées sur les côtes nord et est du Labrador dépendent du transport aérien et maritime Les collectivités situées sur la côte nord dépendent d'un ravitaillement saisonnier par bateau 	 La plupart des collectivités ont au moins une épicerie ou un magasin général 	 Lieux d'élimination courants – carrière ou lieu d'enfouissement sans recouvrement La stratégie provinciale de 2002 pour les résidus solides vise à régionaliser les services relatifs aux résidus solides, à moderniser les techniques d'élimination et à fermer les lieux d'élimination sans recouvrement des approches adaptées au lieu et à la collectivité sont en cours d'élaboration 	 La province a besoin de programmes de REP qui desservent toutes les régions sur son territoire et qui tiennent compte de la production locale de matières résiduelles et du transport ReGénération offre des services de collecte de la peinture aux collectivités éloignées du Labrador grâce à des partenariats locaux L'Association pour le recyclage des produits électroniques (ARPE) est à mettre en place des dépôts sur la côte nord

Province (région éloignée)	Transports	Réseau de vente au détail	Gestion des matières résiduelles	Matières ou produits visés par des programmes de REP ou de gérance
QC	 Des collectivités éloignées au Nunavik et dans la partie est du golfe du Saint-Laurent Les modes de transport et de réapprovisionnement des collectivités du Nunavik correspondent à ceux des collectivités du Nunavut 	 Toutes les collectivités nordiques ont une coopérative locale 10 collectivités ont un magasin Northern 	 L'administration régionale Kativik (ARK) est responsable de l'aménagement et de la planification des infrastructures municipales une stratégie de gestion des résidus solides est en préparation 	 Les gestionnaires désignés sont tenus de desservir toutes les collectivités nordiques et éloignées Des stocks d'huile de lubrification usée s'accumulent depuis des dizaines d'années La SOGHU met en place des dépôts d'huiles usées L'ARPE est censée mettre à l'essai des points de collecte dans le nord de la province Cinq éco-organismes (SOGHU, ReGénération, ARPE, Éco-Peinture et Appel à recycler Canada) unissent leurs efforts pour offrir des services de REP au Nunavik

Province (région éloignée)	Transports	Réseau de vente au détail	Gestion des matières résiduelles	Matières ou produits visés par des programmes de REP ou de gérance
Ont.	 29 collectivités autochtones éloignées dans le grand nord de la province Le transport de marchandises se fait sur des routes d'hiver et par avion Les collectivités côtières utilisent des réseaux de transport par barge et par bateau 	 Le magasinage en ligne est courant 17 collectivités ont un magasin Northern et/ou un commerce de bande 	 Les lieux d'enfouissement sont situés sur des réserves ou des terres provinciales un grand nombre d'entre eux ont atteint voire dépassé leur capacité Affaires autochtones et Développement du Nord Canada (AADNC) aide les collectivités dans leurs activités de nettoyage et l'aménagement de nouvelles installations 	 Les tas de pneus et d'accumulateurs, de même que les stocks d'huile de lubrification usée, sont chose commune Les programmes de REP en vigueur ne couvrent pas le grand nord de la province La capacité des collectivités locales d'accéder aux infrastructures et aux services existants est limitée

Province (région éloignée)	Transports	Réseau de vente au détail	Gestion des matières résiduelles	Matières ou produits visés par des programmes de REP ou de gérance
Manitoba	 28 collectivités éloignées ne sont pas accessibles par route à l'année au Manitoba Le transport des marchandises se fait par un réseau routier d'hiver, par avion et, dans certains cas, par bateau 	 La plupart des collectivités ont un magasin Northern ou un commerce indépendant Les grandes collectivités ont accès à des services additionnels de vente au détail 	 Les collectivités ont leur propre lieu d'enfouissement ou en partagent un avec les collectivités adjacentes tri des matières limité ou inexistant AADNC aide les Premières Nations à moderniser leurs installations d'élimination et à améliorer leurs pratiques d'exploitation telles que le tri des matières résiduelles Un document de travail sur le recyclage et la réduction des matières résiduelles classe les collectivités nordiques et éloignées parmi les priorités de premier plan 	 En vertu de la réglementation, les programmes de REP sont tenus d'offrir des services à la grandeur de la province La Solid Waste Action Team (SWAT) s'occupe des questions et problèmes de gestion des matières résiduelles dans les collectivités éloignées du Manitoba composée d'AADNC, du gouvernement du Manitoba, d'une ONGE et de représentants d'éco- organismes Des éco-organismes collaborent à l'élaboration d'une approche qui permettra de desservir les collectivités éloignées du Manitoba
Sask.	 7 collectivités, y compris les réserves de Premières Nations et les hameaux avoisinants dans la région éloignée de l'Athabasca Dépendent du transport aérien, des routes d'hiver et, dans un cas, du transport par barge (en été) 	 Magasins Northern, commerces tenus par des bandes, points de vente additionnels 	 Les collectivités des Premières Nations ont chacune leur lieu d'élimination, situé dans la réserve ou en territoire provincial peu d'activités de détournement des matières résiduelles 	 Les programmes de REP et de gérance existants ne couvrent pas les collectivités éloignées du grand nord de la province Les éco-organismes commencent à collaborer à une approche pour les collectivités éloignées

Province (région éloignée)	Transports	Réseau de vente au détail	Gestion des matières résiduelles	Matières ou produits visés par des programmes de REP ou de gérance
Alberta	 2 collectivités éloignées – Fort Chipewyan et Fox Lake situées dans le grand nord de la province Fort Chipewyan est accessible par avion et par des routes d'hiver, de même que par un réseau de barges qui fonctionne l'été Fox Lake est accessible par barge l'été et par un pont de glace l'hiver 	 Fort Chipewyan – magasin Northern Fox Lake – magasin Northern et dépanneur 	 La Regional Municipality of Wood Buffalo (RMWB) assure la gestion des résidus solides dans la collectivité de Fort Chipewyan nouveau lieu d'enfouissement sanitaire construit en 2010 	 La RMWB accepte les pneus, la peinture, le matériel électronique, les accumulateurs d'automobiles et les RDD à Fort Chipewyan a l'intention de transporter ces matières résiduelles à Fort McMurray par la route de glace Fox Lake n'est inscrit comme lieu de collecte dans aucun des programmes de gérance de l'Alberta
СВ.	 La plupart des collectivités éloignées sont des collectivités des Premières Nations situées en régions côtières Embarcation privée, bateau- taxi et aéroplane sont les principaux modes de transport Les barges commerciales destinées au réapprovisionnement en carburant sont souvent le seul service régulier de transport de marchandises 	 Varie beaucoup d'une collectivité à l'autre 	 AADNC a modernisé les installations d'élimination dans les réserves partout en CB. la plupart des lieux d'enfouissement non réglementés ont été fermés Dans les collectivités qui dépendent de l'eau, les matières résiduelles sont transportées par barge jusqu'à un lieu d'élimination autorisé Le tri et le stockage des matières cibles sont courants 	 AADNC travaille avec les éco-organismes de la CB. pour instaurer, dans les collectivités éloignées, le ramassage régulier des produits assujettis par règlement à des programmes de REP partage des coûts associés au transport et aux infrastructures et des coûts connexes Il existe un écocentre pour les matières et produits ciblés par la REP à la station de transfert des matières résiduelles de Bella Bella

L'état de la mise en œuvre des programmes de REP ou de gérance en régions éloignées varie d'une province à l'autre. T.-N.-L et le Québec fournissent des exemples de mise en œuvre complète ou presque complète d'au moins un programme de REP en régions éloignées et travaillent actuellement à l'élaboration d'autres programmes. Le Manitoba et la C.-B. fournissent des exemples de projets pilotes, tandis que l'Ontario et la Saskatchewan ne montrent aucun signe d'avancement sur ce plan. L'expérience albertaine donne à penser que le transport de matières ciblées par des programmes de REP et de gérance à partir de régions éloignées occasionne des problèmes opérationnels.

Mise en œuvre des programmes de REP en régions éloignées : bonnes pratiques

Nous avons identifié de bonnes pratiques pour la mise en œuvre des programmes de REP ou de gérance en régions éloignées dans les provinces de T.-N.-L, du Québec, du Manitoba et de la C.-B., incluant des programmes sur la côte du Labrador, des programmes sur les côtes du Nunavik (QC), un projet pilote de REP à St. Theresa Point (Man.) et un projet pilote de REP à Bella Bella (C.-B.).

Parmi les principaux éléments de ces bonnes pratiques, mentionnons les suivants :

- En vertu de la réglementation, les éco-organismes sont tenus de desservir toutes les collectivités nordiques et éloignées.
- Les éco-organismes sont autorisés à modifier les systèmes de collecte en fonction des faibles taux de production de matières résiduelles et des réseaux de transport saisonniers.
- Des partenariats ont été établis avec des entreprises et/ou des groupes locaux pour assurer la collecte et le groupage des matières et produits désignés.
- Les autorités régionales favorisent activement la mise en oeuvre locale des programmes provinciaux de REP/gérance.
- Les projets pilotes sont intégrés aux activités de mise en oeuvre, ce qui permet d'improviser dans la conception d'un modèle adapté aux réalités locales.
- Les éco-organismes adoptent une approche de collaboration pour contribuer à réduire les coûts et à régler les problèmes logistiques.
- Les collectivités appuient fortement le projet.
- Des endroits centraux servent de « pivots », ce qui permet aux collectivités éloignées d'y transférer les matières pour groupage et transport.

Leçons apprises

Cette étude a montré l'existence d'initiatives fructueuses et d'importants progrès partout au pays et a permis de tirer des leçons de la mise en œuvre des programmes en régions éloignées :

- Divers facteurs (p. ex. éloignement du marché, modes de transport limités et faible population) déterminent les canaux de distribution et les pratiques d'achat des consommateurs dans les collectivités nordiques et éloignées.
- Les pratiques d'achat courantes dans les collectivités éloignées comprennent le magasinage en ligne et le déplacement vers des centres régionaux ou nationaux pour les gros achats et le réapprovisionnement.
- Pour réussir, un projet a besoin d'une collectivité bien disposée et d'un responsable local qui coordonnera le projet sur le terrain pour la collectivité.
- Les collectivités éloignées peuvent être bien disposées, mais ne pas posséder les ressources financières, techniques et/ou opérationnelles requises pour saisir ou poursuivre les possibilités de REP/gérance existantes. Il est parfois nécessaire de recourir à des mesures de facilitation pour favoriser l'établissement de partenariats entre les collectivités autochtones et les éco-organismes.

- AADNC joue un rôle essentiel dans l'intégration des collectivités extrêmement éloignées aux initiatives de REP/gérance – AADNC veut favoriser et soutenir ce genre de progrès et pourrait offrir des ressources financières à cet effet.
- Les responsabilités des gouvernements à l'égard de la gestion des résidus solides et de la mise en œuvre des programmes de REP étant fragmentées, il serait peut-être bon de coordonner les activités des gouvernements et des éco-organismes dans les collectivités éloignées.
- Des efforts de collaboration entre éco-organismes peuvent permettre de partager les coûts, de résoudre les problèmes logistiques propres aux conditions extrêmes et de favoriser les partenariats entre collectivités.
- Sur le plan opérationnel, sachant combien les collectivités éloignées peuvent être disséminées sur de grandes distances, l'idée d'un modèle de collecte basé sur un « endroit pivot » mérite d'être prise en considération. Des dépôts permanents pourraient être aménagés dans certains endroits extrêmement éloignés, et les collectivités avoisinantes qui vont porter leurs matières à ces dépôts seraient remboursées pour leurs frais de transport.
- Dans les collectivités où les RDD et les matières recyclables sont disséminées dans une installation destinée aux matières résiduelles (tri limité/vieux stocks) et/ou stockés à différents endroits près de la collectivité, un soutien financier pourrait être nécessaire pour aider la collectivité à grouper ces matières en prévision d'un programme de REP.

Quantités estimatives de matières ou de produits

Les quantités générées et éliminées ont été estimées pour le matériel électronique, les pneus, l'huile de lubrification usée, les piles, les accumulateurs, la peinture et les lampes fluorescentes. La façon générale de procéder pour déterminer les quantités était de recueillir les données disponibles auprès des provinces et territoires du Canada et de convertir ces données en kg/personne/année générés ou éliminés. Les taux par personne calculés ont ensuite été rajustés en fonction de différences territoriales connues pour certaines matières, puis appliqués aux chiffres de population des régions à l'étude pour estimer les quantités totales. Les estimations obtenues visent à fournir, sur la base d'hypothèses et de fourchettes de valeurs contributives, des approximations à des fins de planification. Ces quantités sont donc des estimations approximatives; pour en accroître la précision, il faudrait les rajuster en fonction de facteurs locaux.

Les estimations des quantités de matières et de produits disponibles pour la collecte sont résumées dans le tableau ci-dessous.

Estimations des matières et produits disponibles pour la collecte

Instance	Matériel électronique	Pneus	Huile usée (I)	Antigel	Filtres à huile	Contenants à huile	Accumu- lateurs au plomb- acide	Lampes fluorescentes	Pein- ture	Piles domestiques
Territoires – population entière										
T.NO.	266	484	479 600	52	31	14	174	15	48	16
Nun.	223	406	402 600	44	26	12	146	12	40	13
Yn	223	405	401 500	44	26	12	146	12	40	13
TOTAL	712	1 295	1 283 700	140	83	38	467	39	128	42

(en tonnes, sauf indication contraire)



Instance	Matériel électronique	Pneus	Huile usée (I)	Antigel	Filtres à huile	Contenants à huile	Accumu- lateurs au plomb- acide	Lampes fluorescentes	Pein- ture	Piles domestiques
Provinces -	Provinces – collectivités éloignées seulement									
Alb.	17	30	29 997	3,3	1,9	0,9	11	0,9	3,0	1,0
СВ.	20	37	36 509	4,0	2,4	1,1	13	1,1	3,7	1,2
Man.	130	236	234 245	26	15	6,8	85	7,2	23	7,7
TNL.	24	43	42 471	4,6	2,7	1,2	15	1,3	4,2	1,4
Ont.	119	217	214 599	23	14	6,2	78	6,6	22	7,0
QC	95	173	171 666	19	11	5,0	62	5,3	17	5,6
Sask.	15	27	26 675	2,9	1,7	0,8	9.7	0,8	2,7	0,9
TOTAL	419	763	756 162	83	49	22	275	23	76	25

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1 Introduction

In 2009 the Canadian Council of Ministers of the Environment (CCME) approved the Canada-Wide Action Plan for Extended Producer Responsibility (CAP EPR). Under CAP EPR, CCME's member governments committed to developing EPR legislation for a range of product categories following a two-phase schedule (2015/2017). At the same time, CAP EPR recognized that the three territorial jurisdictions faced significant implementation challenges due to "unique circumstances of geography, population and infrastructure." Given the challenges, CCME acknowledged that an EPR approach might not be viable for all product categories, leaving the Northwest Territories (NT), Nunavut (NU), and the Yukon (YT) to determine what was most appropriate for their jurisdictions under the circumstances. CAP EPR also recognized that the remote regions of the provinces faced implementation challenges similar to those of the territories.

CCME's 2014 Progress Report on CAP EPR shows that there are beverage container stewardship programs in all three territories, a tire stewardship program in YT, and voluntary EPR programs for cell phones (NT, YT), pharmaceuticals (YT) and syringes (YT, NU). NT and YT are developing stewardship programs for electronics, while not ruling out transition to EPR. A Canada-wide overview of current and planned diversion programs to address the Phase 1 materials listed in CCME's CAP EPR is shown in Appendix A.

Following on the 2014 Progress Report, CCME launched a project aimed at "identifying opportunities and sharing best practices for implementing EPR in northern and remote regions." To this end, CCME convened a workshop in spring 2015 with producer responsibility organizations (PROs) and stewardship organizations to consider ways of advancing EPR and stewardship in the territories and remote parts of the provinces. In preparation for the workshop, CCME engaged sonnevera international corp. to compile a baseline information report on materials flows and waste management systems for specified product categories in the regions of interest.

This baseline study presents the results of this research, based on the following objectives:

- Estimate and describe material flows and waste management systems for specified product categories in specified regions
- Identify information gaps

The study scope includes the following product categories and products: electronics, tires, lubricating oil, and selected subcategories of Household Hazardous Waste (HHW) (specifically paint, consumer batteries, and fluorescent lights). These materials were chosen as a starting point for discussions regarding EPR and waste management in the north, as they have well-established programs in place in most provinces with well-supported networks, and years of experience and industry involvement on which to build. However, they are not meant to be an exhaustive list of the materials that could be of focus of future programs.

This report provides a snapshot of the current transportation networks and retail systems and rough estimates of the quantities of materials available for recycling. It is intended only as background for discussion and more research may be needed to refine these findings.

2 Populations / Identification of Remote Communities

For the purpose of this report, the definition of remote communities in the provinces has been limited to those with a lack of year-round road access. These types of communities face significant challenges relating to the movement of materials and generally have limited access to provincial programs. Identification of remote provincial communities was done using a number of sources, most importantly the Canada Post fly-in service list, which identifies communities with limited ground or water access. It is important to note that the identification of remote communities was not exhaustive, and the criteria used do not necessarily capture all communities that could be considered remote. There are many less-remote communities with year-round road access that experience similar challenges, limitations and opportunities that would benefit from future discussions. The focus on the selected communities allowed for the discernment of broad patterns of transportation and product distribution in the most remote regions, patterns of waste management, and indications of EPR related services gaps, issues and accomplishments.

A complete list of remote communities in the provinces is shown in Appendix B, and summarized on the map below, with populations shown in Table 1.



Figure 1: Remote Communities in the Provinces

Province	Population in remote communities
AB	2,727
BC	3,319
MB	21,295
NL	3,861
ON	19,509
QC	15,606
SK	2,425
Total	68,742

Table 1: Provincial Population in Remote Communities

(Source: Statistics Canada 2011 and AANDC 2014)

Territory	Population (as of July 1, 2014)
NT	43,600
NU	36,600
ΥT	36,500
Total	116,700

Table 2: Total Population in the Territories

(Source: Statistics Canada 2014)

3 Distribution / Transportation & Waste Management System Descriptions

3.1 Yukon Territory

3.1.1 Population and Community Demographics

The estimated population of the Yukon for 2014 is 36,700 (Yukon Bureau of Statistics 2014a); the population grew by 11.6% since 2006, making it the fastest growing jurisdiction in Canada (Statistics Canada 2011). Aboriginal peoples represent 23% of the population, with First Nations people comprising 85% of the aboriginal population, and Metis and Inuit comprising 11% and 2% respectively (Yukon Bureau of Statistics 2014b).

Of 28 communities in the Yukon (Arktis 2012), only six have populations greater than 500 persons, as shown in Table 3, with the City of Whitehorse home to nearly 70% of the territorial population.

	2011 Census							
Community	Population	Percent of Total Population	Total Private Dwellings					
Whitehorse	23,276	68.7%	9649					
Dawson City	1,319	3.9%	727					
Watson Lake	802	2.4%	417					
Marsh Lake	610	1.8%	438					
Haines Junction	593	1.7%	301					
Carmacks	503	1.5%	246					
Total Listed	27,103	80%	11,778					
Yukon Total	33,897		16,259					

Table 3: Communities with Population Greater than 500 in the Yukon Territory

(Source: Statistics Canada 2011)

3.1.2 Transportation System

The Yukon has a year-round highway system that connects all permanent communities in the territory except Old Crow (Figure 2).



(Source: Yukon Highways and Public Works 2008)

Figure 2: Yukon Highways & Public Works Map

The Yukon is connected by highway to British Columbia, Alberta, Alaska and the Northwest Territories (Figure 3), with the highest volume of traffic on the Highway 1 / Highway 97 corridor, which connects Watson Lake to Dawson Creek, BC, and from there to Vancouver and Edmonton. The interprovincial highway system is the major means by which freight for community resupply and industrial activities arrives into the territory (Prolog 2011).



(Source: Yukon Department of Tourism and Culture 2008)

Figure 3: Yukon Road Access / Interprovincial Highway Map

There is an international airport in Whitehorse, and federally certified regional airports receiving scheduled flights in Dawson City and Old Crow. The Watson Lake regional airport is also federally certified but does not receive scheduled flights. There are also a number of community airports and airstrips (Yukon Highways 2014).

The Yukon is not connected to the Canadian commercial rail system. A tourism-oriented passenger rail service (Whitepass and Yukon Route) operates between Skagway, Alaska, and Whitehorse, YT.

3.1.3 Retail Distribution Channels

Broadly speaking, factors such as distance to market, limited modes of transportation and small populations shape the distribution channels and consumer purchasing practices apparent in northern and remote communities. Of the three territories, the Yukon is the least affected by these factors insofar as all except one of its communities are connected to the highway system. The community of Old Crow in the far north is only accessible by air and by an ice road constructed once every three years. As a small (pop. 245), isolated community, Old Crow, like similar communities in the Northwest Territories, Nunavut and remote regions of the provinces, relies on a Northern Store for in-store retail purchases (there is not an Arctic Co-op in Old Crow). Other purchasing practices that are common in remote communities include on-line shopping, and travel to regional or national centres for major purchases and resupply.

Anecdotal reports suggest that on-line, and out of territory, shopping are common practices in the Yukon. Yukon Environment estimates an even split between BC and Alberta as shopping destinations; however, this information is not substantiated in any quantified research. With respect to retail outlets in other parts of the territory, a search of the online "YellowPages," as well as of community business listings, was conducted to develop an estimate of the number and range of outlets and services for electronics, tires, lubricating oil, lead acid batteries, paint, fluorescent lights and consumer batteries. The searches conducted for this study are not exhaustive, and the results only present general indicators. The results show that the number and range of retail distribution outlets broadly reflects the distribution of population by community.

3.1.3.1 Electronics

Searches conducted for the electronics category resulted in 22 outlets, including major and independent retailers, phone and telecom, and information technology (IT) sales. Major chains include The Source, Walmart, Staples, Sony, Shoppers Drug Mart, Canadian Tire, Extra Foods and Northwest Tel. All of these are located in Whitehorse. There also appears to be an outlet for The Source in Watson Lake and an independent computer store in Dawson City. The Northern Store in Old Crow is included in this list.

3.1.3.2 Automotive

Searches for tires, lubricating oil and lead acid batteries have some overlapping distribution networks, with many of the same results.

- Tires 17 vendors were identified in the territory, taking into consideration major chains (e.g., Canadian Tire, Walmart, Kal Tire, Fountain Tire) and independent shops in Whitehorse, as well as automotive repair shops in Dawson City, Watson Lake, Haines Junction and Carmacks. There are a number of automotive repair shops in Whitehorse that are not included in this estimate.
- Lubricating Oil / Filters there are at least 30 lubricating oil vendors, taking into consideration major retailers like Canadian Tire and Walmart, oil change specialists (e.g., EnviroLube) and various auto repair and auto parts stores in Whitehorse, as well as in the communities of Dawson City, Watson Lake, Carmacks and Faro. These estimates do not include gas stations.
- Lead Acid Batteries Batteries are sold through major retailers like Canadian Tire and Walmart, as well as through auto parts dealers (e.g., NAPA, Territorial Auto Parts) and auto repair shops.

3.1.3.3 Paint

Searches for retail vendors of paints and coatings resulted in 11 outlets, including major retailers (e.g., Canadian Tire, Walmart, Home Hardware), decorating stores and independent hardware and building supply stores. There do not appear to be any brand-based retail outlets in the territory. The majority of retail vendors are located in Whitehorse, however Dawson City, Watson Lake and Faro have hardware and/or building supply stores.

3.1.3.4 Fluorescent Bulbs and Consumer Batteries

Principal outlets for fluorescent bulbs are assumed to include major retailers (e.g., Walmart and Canadian Tire), hardware stores (e.g., Home Hardware), and grocery chains and stores. Consumer batteries are assumed to be distributed through a wide range of channels, including major retailers, hardware stores, electronics stores, grocery stores and convenience stores.

3.1.4 Waste Management

3.1.4.1 Overview of Municipal Solid Waste Management System

The Yukon *Solid Waste Regulations* (O.I.C. 2000/11) establish requirements and standards for "public waste disposal facilities" and "commercial dumps" in the territory. Of 27 public disposal sites, eight are municipally owned and operated. The other 19 facilities, shown in Figure 4, are located in unincorporated communities; they are operated by the Yukon government (Yukon Community Services 2013). Many of these facilities are situated in First Nations or Inuit communities. The Yukon government is the most

senior level of administration responsible for waste management infrastructure in aboriginal communities as a result of the federal devolution process.



(Source: Yukon Community Services, 2013)

Figure 4: Yukon Solid Waste Facilities in Unincorporated Communities

As shown in Table 4 and Table 5, eight solid waste facilities in the Yukon have active landfills, three combine transfer facilities with limited on-site disposal of wastes such as construction material, and the rest operate as transfer stations (Arktis 2012; Yukon 2013). Ten facilities have attendants in place, the rest are unstaffed. Some of the municipal facilities charge tipping fees; no tipping fees are charged at the unincorporated community facilities. Waste (unsorted and sorted) collected at Yukon government transfer stations is shipped to the City of Whitehorse landfill, where tipping fees are charged (Yukon 2013). Recyclables collected at these facilities are shipped to P&M Recycling in Whitehorse for processing.

	Carmacks	Dawson City	Faro	Haines Junction	Мауо	Teslin	Watson Lake	Whitehorse	
Type of facility	Landfill	Landfill	Landfill	Landfill	Landfill	Transfer / Landfill	Landfill	Landfill	
Volume (t)	343	2,550	350	850	365	510	1,600	22,500	
Tipping fees	No	No	No	n/d	Yes – self reported	Yes	Commercial	Yes	
Attendant	No	Yes	No	Yes	No	Yes	Yes	Yes	
Household Pickup	No	No	Yes	No	No	No	Yes	Yes	
Waste Types									
- Special Waste	Limited	Limited	Yes	Yes	No	No Yes		Yes	
- Cars	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	
- Appliances, metals	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
- Recycling	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

Table 4: Solid Waste Facility Characteristics – Municipal Facilities

(Source: Yukon Community Services. 2013. Our Towns Our Futures: Solid Waste Working Group Findings Report)

Table 5: Solid Waste Facility Characteristics – Unincorporated Community Facilities

	Beaver Creek	Destruction Bay*	Braeburn	Carcross	Mt. Lorne	Pelly Crossing**	Johnson's Landing	Marsh Lake	Old Crow	Ross River	Tagish	Upper Liard	Deep Creek
Type of facility	T/L	Transfer	Transfer	Transfer	Transfer	Transfer	Transfer	Transfer	Landfill	T/L	Transfer	Transfer	Transfer
Volume (t)	n/d	121	18	156	82	109	18	188	n/d	n/d	83	52	157
Tipping fees	No	No	No	No	No	No	No	No	No	No	No	No	No
Attendant	No	No	No	Yes	Yes	No	No	Yes	No	No	Yes	No	Yes
Waste Types													
- Special Waste	Yes	Yes (DBay)	Yes	Yes	Yes	Yes (Pelly)	No	Yes	Yes	Yes	Yes	No	Yes
- Cars	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Appliances, metals	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Recycling	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* Column refers to Destruction Bay (DBay), Silver City, Canyon Creek, Champagne.

** Column refers to Pelly Crossing, Keno City, Stewart Crossing

(Source: Adapted from Yukon Community Services. 2013. Our Towns Our Futures: Solid Waste Working Group Findings Report)

Table 4 and Table 5 indicate that "special wastes" are managed separately at most facilities – they may be collected at HHW events, and/or collected year round (e.g., lead acid batteries). Based on a survey of waste management facilities in the territory, Arktis (2012) concluded that that about two-thirds of Yukon facilities segregate lead acid batteries, two-thirds segregate used lubricating oil, one-third segregate electronic wastes, and two-thirds segregated tires. A few also segregate fluorescent bulbs.

The territorial beverage container recycling program, mandated under the *Beverage Container Regulation* (O.I.C. 1992/136), relies on a network of approximately 25 bottle depots operated by community groups and private businesses. In many cases, these depots also function as community recycling facilities, either as the main site or in conjunction with drop-off facilities at disposal sites. Such depots typically collect non-refundable packaging and paper; they may also host HHW events, and/or accept certain types of wastes year round, such as electronics, batteries and fluorescent bulbs. For example, the Village of Mayo maintains a staffed bottle depot, recycling centre and free store that accepts lead acid batteries. The Conservation Klondike Society (KRC) operates a bottle depot and recycling centre in downtown Dawson City. KRC also runs a recycling depot and hosts HHW events at the Dawson City landfill. In the City of Whitehorse, Raven Recycling Society and P&M Recycling (a private business) operate bottle depots; until recently both accepted recyclables from residents and businesses (Raven recently ceased taking non-refundable paper and packaging materials for financial reasons). The two packaging and paper processors in the territory are Raven Recycling and R&M Recycling, both located in Whitehorse.

3.1.4.2 Collection and Management of Stewardship Materials

3.1.4.2.1 Special and Hazardous Waste

Under the Yukon *Environment Act RSY 2002, c.76* (as amended), used lubricating oil, vehicle batteries, fluorescent lights, paint and rechargeable batteries are among the types of wastes deemed "hazardous" and subject to the *Special Waste Regulations* (O.I.C. 195/47). Residential generators of special waste (i.e., HHW) are exempt from the storage and transportation permitting requirements of the *Special Waste Regulation*, but they are required to dispose of their HHW at an approved facility.

There are a few hazardous waste management companies in Whitehorse, such as KBL Environmental and General Waste Management. These companies prepare and transport commercial, institutional and industrial wastes to recycling and treatment facilities out of territory, and they may also receive waste from private citizens. KBL operates a transfer station at the Whitehorse landfill, and accepts (for a charge) hazardous waste from residents as well as from the ICI and mining sectors.

• Household Hazardous Waste Program

Government of the Yukon oversees and supports a HHW collection events program in the territory. Communities are responsible for scheduling event days, promoting the event, and arranging contracts with qualified transporters. The department provides event-day technical oversight and financial support for advertising. These events are held twice each year in the City of Whitehorse, and annually or every two years in other places. The City events are held at the landfill. Accepted materials include, but are limited to: used lubricating oil, vehicle batteries, fluorescent bulbs, paints and solvents, and rechargeable batteries.

Annual Special Waste Collection Program

Government of the Yukon conducts an annual special waste collection day for businesses and organizations. The department pays to transport wastes such as used lubricating oil, anti-freeze, solvents and lead acid batteries out of the territory, while the waste generators are responsible for the treatment and disposal costs.

Lubricating Oil

Used lubricating oil is either burned in permitted furnaces for building heating purposes, or shipped south for recycling. The territorial government provides a permitting program to allow waste lubricating oil generators to use uncontaminated oil for heating purposes (Yukon Environment 2011). It is estimated that more than 60% of used lubricating oil generated in the territory is recovered for use as fuel in such permitted furnaces (Yukon Environment 2005).
One hazardous waste management company consolidates small quantities of used lubricating oil received from various sources for shipment to Edmonton for recycling.

Lead Acid Batteries

In the lead acid battery manufacturing industry there is strong demand for the lead recovered from used batteries. As a result, the industry has established a reverse distribution system aimed at collecting used batteries from commercial vendors, as well as from other sources. This system includes a financial mechanism wherein a \$15 fee is added to the core charge for a new battery. This structure provides an incentive for companies like Canadian Tire and NAPA Auto Parts to participate. The Canadian Battery Association (CBA) is the organizational body representing the manufacturers in Canada. Canadian Tire in Whitehorse is listed as a Canadian Battery Association recycling centre for truck and vehicle batteries.

The positive value for lead acid batteries drives a private collection market in the Yukon. For example, Urbanmine Recyclers operates a licensed battery transfer facility in Whitehorse, buys batteries from commercial generators, scrap dealers and the public, and will arrange for pick-up and transportation to its facility. Hazardous waste management companies like KBL Environmental and General Waste Management also handle batteries, including those generated by large and small retailers, and auto shops.

The City of Whitehorse landfill receives batteries free of charge from residential customers, although quantities received are reported to be small. P&M Recycling, which holds the recycling contract at the landfill, manages this waste stream. Raven Recycling and P&M also receive batteries from the public; Raven reported that it buys from scrap dealers and sells to a major local broker. Batteries are shipped to Edmonton or to Vancouver.

Arktis (2012) concluded that that about two-thirds of Yukon solid waste facilities segregate lead acid batteries. Scrap dealers are reported to collect from at least some of them.

Consumer Batteries

The North American Call2Recycle program lists four locations in Whitehorse as depots for rechargeable, alkaline batteries and single use batteries, as well as cellphones. No other locations in Yukon are listed on the Call2Recycle directory.

Fluorescent Lights

Fluorescent lights generated in the residential sector may be collected at HHW events. At least one community, Watson Lake Recycling Depot, has a crusher, and processes bulbs year round. Companies like KBL Environmental handle fluorescent lights from the ICI sector.

Electronics

- The Territorial government is in the process of developing a stewardship program for electronics.
- Currently, residential generators in Whitehorse have access to a fee-based program for electronics operated at the city landfill, as well as a fee-based Computers for Schools program run by Raven Recycling. The City of Whitehorse landfill accepts electronics such as computers, TVs, printers, scanners, audio-visual equipment, phones and cell phones. Fees range from \$1 (handheld devices) to \$40 for large CRTs and copiers. Raven Recycling charges a \$5 fee for these types of items.
- The City has recently established a covered area for receipt and storage of electronic equipment. A third-party contractor operates the program and ships the materials to recyclers in Alberta.
- With respect to other communities in the Yukon, Arktis (2012) suggests that in some places electronics are segregated at the landfill, but it is unclear whether materials collected are sent for recycling. For example, the Watson Lake Recycling Depot accepts a range of electronics on an ongoing basis.
- ICI generators use the services of companies like KBL Environmental, which ships to recyclers in Alberta.

Tires

- The Yukon government operates a used tire management program, authorized under the *Designated Material Regulation* (O.I.C. 2003/184). A \$5 charge is applied to all new motorized vehicle tires sold in the territory with an inner diameter of 24.5" or less. Retailers are required to register with Yukon Environment to sell tires, collect the surcharge from consumers and remit it to the Yukon Recycling Fund every three months. The Department of Community Services manages the used tire collection and transportation system. A permitted "depot" system has been established for the collection of tires, and it includes most registered retailers as well as community waste disposal facilities, such as the Whitehorse landfill. Using contracted haulers, Community Services ships tires to facilities in Alberta.
- In most communities, large tires are collected at landfills and stockpiled indefinitely. The Whitehorse landfill charges a \$40 tipping fee for oversize tires. One hundred (100) large tires were received in 2014.
- The City of Whitehorse is reported to have a large stockpile of tires, which has accumulated over a number of years because the quantity received annually exceeds the quantity shipped out. More than 27,000 tires were received at the landfill in 2014.

3.2 Northwest Territories (NT)

3.2.1 Population and Community Demographics

The NT Bureau of Statistics population estimate for 2014 is 43,623 (NT Bureau of Statistics 2014a), virtually unchanged since the 2006 Census (Statistics Canada 2011). Aboriginal peoples represented 52% of the population, comprised of 63% First Nations people, while Inuit and Metis peoples comprised 20% and 15% respectively.

There are 33 communities defined as local governments in NT. Of these, 12 are First Nations designated authorities, 11 are hamlets, and the remainder includes the City of Yellowknife as well as five towns, three chartered communities and a village (Bureau of Statistics 2014b). Based on 2011 Census data, twenty of these communities have populations under 500 persons, seven have populations between 500 and 1,000, and six of these communities have populations greater than 1,000 persons. As shown in Table 6, the City of Yellowknife is home to 46% of the territorial population.

Community	2011 Census		
	Population	Percent of Total Population	Total Private Dwellings
Yellowknife	19,234	46.4%	6,938
Hay River	3,606	8.7%	1,405
Inuvik	3,463	8.4%	1,297
Fort Smith	2,093	5.0%	776
Behchokò	1,926	4.5%	458
Fort Simpson	1,238	3.0%	485
Total Listed	31,560	76%	11,359
NT Total	41,462		14,700

Table 6: Communities with Population Greater than 1000 in NT

(Source: Statistics Canada 2011)

3.2.2 Transportation System

The Northwest Territories has a land area of more than 1.1 million square kilometers (Statistics Canada 2011), including inhabited and uninhabited islands in the Arctic archipelago (see Figure 5). The Mackenzie River is the defining geographic feature of the mainland portion of the territory, arising in Great Slave Lake and draining into the Beaufort Sea in the vicinity of Aklavik and Inuvik. Broadly speaking, communities are dispersed around the lake, along the Mackenzie, and along some of its tributaries. Given the challenges posed by this geography, as well as extreme weather, great distances and a small, distributed population, a multi-modal transportation system has evolved to facilitate mobility, community resupply, and industrial activity.



Figure 5: NT Geography

Most of the territory's communities are connected to a year round and seasonal road system stemming from the Mackenzie Highway (Hwy 1), which commences at the NT / Alberta border and extends along the river to Wrigley (Figure 6). The Mackenzie Highway links NT to the Alberta road network. A number of communities in the northern mainland (e.g., Fort McPherson and Inuvik) are not on the Mackenzie road system. Instead, they are connected via the Dempster Highway (Hwy 8), which proceeds from the NT / Yukon border south toward Dawson City. In the North Slave Region, communities such as Whatì and Gametì are connected by winter road to the Yellowknife Highway (Hwy 3).¹ Some communities in NT have no road access (e.g., Paulatuk (pop. 313), Sachs Harbour (112), Ulukhaktok (402)).

¹ The North Slave Region is one of six administrative regions in the territory. It includes the communities of Behchokò, Wekweèti, Whatì and Gametì.





(Source: Northwest Territories Transportation 2014)

Figure 6: NT Highways Map

The installment of a permanent bridge to Yellowknife in 2012 significantly improved the road-based transportation system; however, many communities continue to have limited road access. The system is comprised of paved and gravel highways, and winter roads. Winter access roads are open from approximately mid-December to late March, depending on conditions and location. As shown on Figure 6, there are four river crossings on the highway system, two on the Mackenzie Highway (Hwy 1) en route to Wrigley, and two on the Dempster Highway (Hwy 8) en route to Inuvik. The river crossings are supported by ferry service in the summer and ice bridge in the winter. During the spring, when the river ice breaks up, the crossing service may be unavailable for several weeks (NT Transportation, Highways).

Limitations in the road system are compensated for, in part, by reliance on an air transport system for mobility and community resupply (Yukon 2008). There are 27 government operated community airports, most of which have scheduled (daily, weekly, etc.) air service (NT Transportation, Airport Information). The Yellowknife airport is certified for international flights.

A river and marine transportation system provides community resupply, bulk fuel supply, industrial support and backhaul to communities along the Mackenzie River and in the high Arctic. The system

is seasonal, functioning between June and October on the river and between August and September in the Arctic (NTCL 2015). The hub of the system is Hay River on the south side of Great Slave Lake. The barge and shipping companies that operate on the river are privately owned (Yukon 2008), the largest being Northern Transportation Company Limited (NTCL), an Inuit and Inuvialuit owned business (Transport Canada 2010). NTCL uses a fleet of tugs and dual-purpose barges to transport bulk petroleum products and dry cargo to communities and resource exploration sites on the Mackenzie and in the Western Arctic (Transport Canada 2010). Figure 7 illustrates the extent of the NTCL annual sealift.



(Source: Northern Transportation Company Limited 2015)

Figure 7: NTCL Western Sealift

A CN owned railway extends from Edmonton to Hay River, providing NT with an important means of bulk resupply. As the railhead ends in Hay River, the town is the major transportation hub in the territory, linking rail, highway and river systems to each other.

The 2008 *Northern Connections* (Yukon 2008) transportation study estimated that 50% of NT's bulk supplies arrived at the border by rail. This assumption may have changed since the installation of the permanent bridge to Yellowknife in 2012. The 2011 *Northern Transportation Systems Assessment* (Prolog 2011) contains information on inbound freight for the entire northern system. Table 7 presents their estimates on inbound freight for the Western Sealift, the Mackenzie River, and NT highways.

Northern Transportation System	Community Resupply General	Resource Projects General	Bulk Fuel Resupply	Total Inbound Tonnes
Western Sealift	3,700	3,800	59,000	66,500
Mackenzie River	8,900	3,900	26,200	39,000
NT Highways	163,000	48,000	300,000	511,000

Table 7: Inbound Freight, Marine and Highway Systems 2009 Data (Tonnes)

(Source: Prolog 2011)

3.2.3 Retail Distribution Channels

Nearly 25% of the population lives in communities with limited or no road access, and they rely on air transport and seasonal shipping for much, and in some cases, all of their resupply needs. The rest of the population does not face these extreme conditions but nonetheless the territory as a whole is affected by factors such as long distance to market and small population, which shape distribution channels and consumer purchasing practices.

For in-store retail distribution, many northern and remote communities rely on the Arctic Co-op and Northwest Company retail systems. The Northwest Co. operates the Northern Store and Northmart chains. These Co-op and Northwest Co. stores supply groceries and general merchandise, including electronics and entertainment systems, home decoration and hardware, and transportation related goods and supplies (notably ATVs, snowmobiles, boats and pre-owned automobiles). In the NT, there are eight Arctic Co-ops and 19 Northwest Co. stores (Arctic Co-Op 2007; Northwest Co. n/d). All of the communities in the most northern region of NT, referred to administratively as the Inuvik Region, have either a Co-op or a Northwest Co. store, and two have both (Fort McPherson and Ulukhaktok).² As well, each of the communities on the winter road system extending north from Wrigley, where the Mackenzie Highway ends (Sahtu Region), have at least one of these stores.³ There are also Co-ops and Northwest Co. stores (ten in total) in various communities in the south end of the territory, including two Northmarts in Hay River and an Arctic Co-op in Yellowknife.

Local aboriginal organizations may also operate general stores and other services in remote communities. For example, the Tlicho Investment Corporation operates general stores in Gametì and Whatì (Tlicho 2014).

With respect to the in-territory retail system, a search of the online "YellowPages," as well as of community business listings, was conducted to develop an estimate of the number and range of outlets and services for tires, lubricating oil, lead acid batteries, paint, fluorescent lights and consumer batteries. A Dessau study conducted for the Government of the Northwest Territories in 2012 provided information about electronics retailers. The results of these searches show that the number and range of retail distribution outlets broadly reflects the distribution of population by community and remoteness.

3.2.3.1 Electronics

Dessau (2012) identified 27 retailers in the territory, with a total of at least 52 retail outlets. Of these, the Arctic Co-op and the Northwest Co. operate in eight and 18 communities respectively, and Ice Wireless operates in two. Not included in these estimates are independent general stores operated by aboriginal organizations. The largest number of retailers are located in Yellowknife, and include major chains such

² The Inuvik Region includes the communities of Aklavik, Fort McPherson, Inuvik, Paulatuk, Sachs Harbour, Tsiigehtchic, Tuktoyaktuk, and Ulukhaktok.

³ The Sahtu Region includes the communities of Colville Lake, Deline, Fort Good Hope, Norman Wells, and Tulita.

as The Source, Walmart, Staples, Shoppers Drug Mart, Sears, Canadian Tire, Extra Foods, and The Brick.

3.2.3.2 Automotive

Searches for tires, lubricating oil and lead acid batteries have some overlapping distribution networks, and do not include Arctic Co-ops, Northern Stores, aboriginal community stores, gas bars, and independent hardware / general merchandise stores.

- Tires 14 tire dealers and other likely vendors were identified in the Yellowknife and Hay River area, including major retailers such as Canadian Tire, Walmart, Kal Tire, and Tirecraft, car dealers, services like Bumper-to-Bumper and NAPA Auto Parts, and independent auto repair shops. In other areas, seven possible tire dealers were identified, listed primarily as auto repair and towing services. Co-ops and Northern Stores are unlikely to supply automobile tires, but do supply other kinds of tires (e.g., ATV).
- Lubricating Oil 21 potential vendors were identified in the territory, including one specialized oil change shop (Jiffy Lube), as well as major retailers, auto dealers, and independent auto repair shops.
- Automotive Batteries 21 potential vendors were identified, including one specialized battery company (Midnight Sun Energy), as well as major retailers, auto dealers, and independent auto repair shops.

3.2.3.3 Paint

Searches for retail vendors of paints and coatings resulted in 18 outlets, including major retailers (e.g., Canadian Tire, Walmart, Home Hardware), decorating stores and independent hardware and building supply stores. There do not appear to be any brand-based retail outlets in the territory. Communities such as Hay River, Inuvik, Fort Smith and Norman Wells have hardware and building supply stores like Home Hardware. The estimate for paint vendors does not include Arctic Co-ops, Northern Stores and aboriginal community stores.

3.2.3.4 Fluorescent Bulbs and Consumer Batteries

Outlets for fluorescent bulbs are assumed to include major retailers (e.g., Walmart and Canadian Tire), hardware stores (e.g., Home Hardware), and grocery chains and stores. Consumer batteries are distributed through a wide range of channels, including major retailers, hardware stores, electronics stores, grocery stores and convenience stores.

3.2.3.5 Out of Territory and Online Purchasing

Out of territory and on-line shopping are reportedly common practices in NT. For out of territory purchases, anecdotal information suggests that residents typically travel to locations like Edmonton to shop, while online shopping is available via internet retailers (e.g., Amazon, BestBuy, FutureShop). However, data confirming the extent of online and out of territory shopping is unavailable. Residents in remote NT communities may have access to the kinds of private sector, professional online shopping services that are available to residents of Nunavut to purchase and ship personal orders of fresh and dry goods via air, and fill orders for the annual sealift. However, information regarding such services in the NT region was not readily available.

3.2.4 Waste Management

3.2.4.1 Overview of Municipal Solid Waste Management System

There are 33 active landfills in NT communities (Arktis 2012). Local governments are responsible for managing their solid waste facilities, while the Department of Municipal and Community Affairs (MACA) provides support services such as operator training. Guidelines have been developed to assist local governments with the planning, design and operation of their facilities (Kent et al. 2003). Arktis (2012)

estimated that about two-thirds of these sites segregated lead acid batteries, used lubricating oil, and tires, and about one-third segregated electronics, with paint and fluorescent bulbs also segregated in some cases. Arktis did not determine whether segregated wastes were subsequently removed for recycling or special waste treatment.

NT ENR operates a territory-wide beverage container recycling program under the authority of the *Waste Reduction and Recovery Act 2003,c.29* and the associated *Beverage Container Regulations* (R-067-2005). The program is structured around a refundable deposit and a non-refundable handling fee, with a recycling system infrastructure consisting of 29 depots and three regional processing centres. Twenty-three (23) of the depots are permanent sites, operated under license by private businesses, schools and community groups, while six (6) depots are defined as temporary, satellite facilities. Depot operators receive monthly financial assistance to help offset operational costs (NT ENR 2014). Processing centers are located in Yellowknife, Hay River and Inuvik (Figure 8). The modes and routes for transporting recovered containers to market depend on location. In the Inuvik Region, containers are shipped to Inuvik by barge from the high Arctic or by winter road from communities in the delta. Consolidated loads are transported from the Inuvik processing centre via the Dempster Highway to markets in the south. In the Sahtu Region, containers are shipped to the Hay River processing centre primarily via barge in summer and access road in winter (in the case of Deline, containers are backhauled by air). The winter road system is used in the North Slave Region.

The beverage container recycling program is important in that it represents a successful territory-wide program that services all regions.





Figure 8: NT Beverage Container Program Depots and Processing Centres

3.2.4.2 Collection and Management of Stewardship Materials

3.2.4.2.1 Special and Hazardous Waste

The generation, storage, transportation and treatment of hazardous waste is administered under the *Environmental Protection Act 1988,c.E-7* (EPA). The *EPA* provides NT ENR with the authority to prevent or stop the discharge of contaminants to the environment, and impose remedies (Arktis 2011). Regulations are established for the management of used lubricating oil, and for spill containment and reporting, with official requirements for generator registration, permitting, manifesting and reporting.

There is one government-licensed hazardous waste management company in Yellowknife – KBL Environmental – that operates a staffed transfer station where ICI and residential customers can dispose hazardous waste (HW) and HHW for a fee. KBL receives, prepares and transports hazardous waste generated in all sectors, from residential to heavy industrial. Aside from waste oil burners, there are no HW treatment and disposal facilities in the territory; HW is shipped primarily to facilities in Alberta.

For the majority of other communities in NT, there is no permanent private or public facility of this sort. Hazardous waste inventories of ten disposal sites in the Inuvik and Sahtu regions showed that communities in these regions typically store their hazardous wastes at their waste management facilities. Practices vary in terms of whether these wastes are segregated from general waste, organized by type, inventoried and/or whether there is signage. Drummed and pailed wastes (undefined) and lead acid batteries were among the types of wastes inventoried (KBL 2013a; KBL 2013b).

Household Hazardous Waste Program

Government of Northwest Territories Department of Environment and Natural Resources (NT ENR) supports and promotes a small, event-based HHW collection program. Regular events are held in Yellowknife, Hay River and Fort Smith; in all other communities events are scheduled on an ad hoc basis. Individual communities are required to organize these events, and are responsible for transportation and treatment costs and associated logistical arrangements. NT ENR provides event-day technical assistance to ensure that materials are appropriately sorted, packed and documented. Promotional material prepared by NT ENR indicates that a wide range of HHW materials may be accepted at an event, including but not limited to paint, used lubricating oil, lead acid and consumer batteries and fluorescent bulbs (NT ENR 2010).

Paint

Commercial generators of waste paints and coating (e.g., contractors) use KBL for waste paint management. Private citizens in Yellowknife can dispose of paint at a City HHW event, at the City landfill for a special waste fee, or at the KBL transfer station. The City pays KBL to consolidate paint collected at the landfill from residents.

Used Lubricating Oil

Used lubricating oil is one of the most common types of HW generated in NT. Used lubricating oil management is subject to the *EPA* and the *Used Oil and Waste Fuel Management Regulations* (R-064-2003), which establishes requirements for blending or burning used lubricating oil.

There is widespread use of used oil burners in the territory, with 42 furnaces reportedly registered by the ICI sector and 4 registered by diamond mines. Used lubricating oil burned annually (on average) in registered burners is 900,000 litres in ICI furnaces and an additional 1 million litres at mines. In addition to the used lubricating oil burned in the NT, ENR estimates an additional 500,000 to 900,000 litres of used lubricating oil leaves the NT annually (based on unpublished data from hazardous waste transportation tracking).

KBL Environmental consolidates used lubricating oil received from commercial customers and ships it to recycling facilities in Edmonton. The City of Yellowknife landfill receives used lubricating oil from residential customers, in turn selling it to KBL.

Lead Acid Batteries

Strong demand for the lead in used batteries drives a manufacturer's reverse distribution system aimed at collecting used batteries from commercial vendors. Canadian Tire in Yellowknife accepts end of life car batteries from the public for free, and pays battery customers \$20 for old batteries. KBL Environmental is contracted to handle lead acid batteries for Walmart.

The City of Yellowknife accepts lead acid batteries from residential and commercial generators for a fee, with commercial generators limited to two batteries per month. The City stores the batteries until there is a sufficient quantity to ship to market in Edmonton.

Local contractors in the Inuvik area collect lead acid batteries from the Inuvik landfill (KBL 2013a). Hazardous waste inventories for the Inuvik and Sahtu regions showed significantly lower quantities at sites in the Inuvik Region, where batteries are reported on an individual basis, than in Sahtu, where batteries are reported based on the number of pallets. Further research would be required to identify the factors associated with these differences, and to determine whether a market is functioning in the area around Inuvik.

Consumer Batteries

The North American Call2Recycle program lists two locations in Yellowknife as depots for rechargeable, alkaline batteries and single use batteries, as well as cellphones (Staples and Home Electronics). No other locations in NT are listed on the Call2Recycle directory.

• Fluorescent Lights

Fluorescent lights generated in the residential sector may be collected in HHW events. The City of Yellowknife landfill has a bulb crusher, with KBL handling the residual material from this process. KBL Environmental also receives fluorescent bulbs from the ICI sector.

Electronics

- NT ENR is preparing *Electronics Recycling Regulations* under the authority of the *Waste Reduction and Recovery Act.* The intent is to finalize the regulation in the spring of 2015 and launch a stewardship program for electronics in the fall of the same year. The regulation will cover computers, display devices, printers and peripherals in Phase 1, followed in Phase 2 by audiovisual equipment, phones and answering machines and small appliances. Environmental handling fees will be collected to cover the costs of the program, with the fees collected from suppliers at the point of sale and remitted to ENR, who will manage the recycling program. Permanent collection depots will be established in the ten largest communities, with the intent to rely on the beverage container depots for this function. One-day collection events, scheduled at least every two years, will be held in smaller communities. Recovered electronics will be shipped to Alberta for recycling.
- In 2013, NT ENR launched a pilot collection program to assess the feasibility of a depot based collection system. These depots were located in Norman Wells, Fort McPherson, Fort Providence and Fort Smith (NT ENR 2014a).
- The Government of NT collects electronics generated internally and ships them to Edmonton for recycling.
- The City of Yellowknife has been collecting electronics for a fee at the landfill for two years. The City palletizes items and ships them to Alberta, with a reported 53.7 tonnes of e-waste material shipped in 2013 (Golder 2014). Based on a population of about 20,000, and a discard rate of 2.7 kg/capita/year, Yellowknife could potentially discard 120 tonnes of electronics per year. Based on this information, the reported stockpile shipped represents about 22% of one year's worth of annual e-waste discards.
- Hay River also segregates electronics and ships them to recycling markets
- KBL Environmental receives electronic equipment from the commercial sector, and ships to recyclers in the Edmonton region.
- Golder Associates (2014) undertook an inventory of electronic waste stockpiled at landfills in preparation for the proposed electronics stewardship program. They found that some communities are actively segregating electronics at their landfills, though they are not actively sending them for recycling (i.e., Dettah, Enterprise, Fort Simpson, and Fort Smith). Nine other communities were listed as accepting electronics at the landfill but not actively segregating them from general waste.

Tires

- There is at present no territory-wide program for tires. As a result, most communities stockpile tires at their landfills. A tire shredding pilot project was undertaken in 2014 to aid in the management of historic stockpiles. Funded by NT ENR, three communities participated in the project: Yellowknife, Hay River and Fort Smith, with following stockpile estimates: Yellowknife 20,000 to 25,000 tires; Hay River 75,000 to 100,000 tires; Fort Smith 10,000 to 15,000 tires. Yellowknife plans to use the shred as road base at the landfill.
- The City of Yellowknife accepts tires at the landfill for a \$15 fee from residential and commercial generators.

3.3 Nunavut

3.3.1 Population and Community Demographics

Nunavut had an estimated population of 36,585 persons in 2014 (NU Bureau of Statistics, 2014a). Eighty-one percent (81%) of the population identifies as Inuit (NU Bureau of Statistics, 2014b).

There are 25 communities in Nunavut, including one city and 24 hamlets. The City of Iqaluit is governed by an elected mayor and council and municipal services are funded through taxation, while the hamlets have elected mayors and councils that work in partnership with the territorial government to establish infrastructure and deliver municipal services. The majority of communities (14 of 25) have populations under 1,000 persons, while eight have populations ranging from 1,000 to 2,000, and three have populations greater than 2,000 (Table 8).

Table 8: Communities with Population Greater Than 1,000 Persons – Nunavut

	2011 Census			
Community	Population	Percent of Total Population	Total Private Dwellings	
Iqaluit	6,699	21.0%	2,930	
Arviat	2,318	7.3%	558	
Rankin Inlet	2,266	7.1%	708	
Baker Lake	1,872	5.9%	629	
Cambridge Bay	1,608	5.0%	573	
Pond Inlet	1,549	4.9%	389	
Igloolik	1,454	4.6%	387	
Kugluktuk	1,450	4.5%	448	
Pangnirtung	1,425	4.5%	456	
Cape Dorset	1,363	4.3%	409	
Gjoa Haven	1,279	4.0%	286	
Total Listed	23,283	73%	7,773	
Nunavut Total	31,906		10,077	

(Source: Statistics Canada 2011)

3.3.2 Transportation System

Nunavut has a land area of nearly 1.9 million square kilometers, making it Canada's largest jurisdiction in terms of land area and smallest in terms of population (Statistics Canada 2011). Nunavut's landmass includes the northeast part of the Canadian mainland, and most of the Canadian Arctic archipelago, bordering the Northwest Territories to the west, and Manitoba to the south, on the west side of Hudson Bay, with its geographic regions shown in Figure 9. There are neither road nor rail networks connecting Nunavut to the rest of Canada, and there are no roads connecting communities within the territory. All of Nunavut's communities except Baker Lake are coastal and thereby accessible via marine transportation during the ice-free season. Baker Lake drains into Hudson Bay via the Thelon River, which serves as a marine transportation corridor. Given these conditions, residents in the territory rely on a seasonal marine transport system and year round air transportation.



Figure 9: Regions of Nunavut

The territorial government operates the Dry-Cargo Re-supply Program (the annual sealift), which supplies most non-perishable household goods, construction materials, vehicles and equipment into the region (exp Services 2014). Bulk fuel is shipped in separately via fuel barge. The Nunavut Department of Community and Government Services (CGS) manages the Dry-Cargo Program, including coordinating the sealift schedule and overseeing contracts with three shipping companies providing the service:

- Northern Transportation Company Ltd (NTCL), which primarily serves the western communities in the Kitikmeot region (western sealift) from Hay River, NT and Delta, BC.
- Nunavut Eastern Arctic Shipping (NEAS), which serves the communities in the eastern Arctic (Kivalliq and Qikiqtaaluk regions) from Montreal and Churchill, MB.
- Nunavut Sealing and Supply (NSSI), which also serves the eastern Arctic communities from Montreal and Churchill, MB.

The annual sealift typically operates between late June and October, with the number and frequency of sailings varying per company. The frequency of stops at each community varies; most receive two to four sealifts per season. Backhaul is available on the return routes, allowing for intercommunity transport as well as transport to ports of origin. Figure 10 shows the annual sealift routes (Nunavut Transportation 2008).



(Source: Nunavut Department of Economic Development and Transportation 2008)

Figure 10: Annual Sealift

Air transport is a critical component of the Nunavut transportation system both for mobility and community resupply. With respect to mobility, Iqaluit has the highest air passenger trips per capita of major Canadian cities (Statistics Canada 2010). Each community has an airport and these are connected through regional hubs at Iqaluit, Rankin Inlet and Cambridge Bay. Iqaluit is certified as an international airport, managed by the Department of Economic Development and Transportation whose Nunavut Airports Division manages the other 24 airports (Nunavut Transportation, no date).

3.3.3 Retail Distribution Channels

The entire population of Nunavut depends on seasonal shipping and air transport for all of their resupply needs. These factors, combined with long distance to market and small population, shape the distribution channels and consumer purchasing practices in the territory.

For in-store retail distribution, communities in Nunavut primarily rely on the Arctic Co-operatives and Northwest Company retail systems. Arctic Co-ops is an association of independent, member-owned stores. These Arctic Co-ops and Northwest Co. stores supply groceries and general merchandise, including electronics and entertainment systems, home decoration and hardware, and transportation-related goods and supplies (notably ATVs, snowmobiles, boats and pre-owned automobiles). In Nunavut, there are Arctic Co-ops in 23 communities and Northwest Co. stores in 21 communities (Arctic Co-ops 2007; Northwest Co. no date), see Figure 11 and Figure 12. These companies use air transport year-round to resupply stores with perishable goods and other products for which air cargo is feasible. The dry-goods sealift is used for all other products and materials.



- 1. Fort Good Hope Co-op Ltd. Ft. Good Hope, NT
- 2. Great Bear Co-op Assoc. Ltd. Deline, NT
- 3. Grise Fiord Inuit Co-op Ltd. Grise Fiord, NU
- 4. Hall Beach Co-op Assoc. Ltd. Hall Beach, NU
- 5. Holman Co-op Ltd. Holman, NT
- 6. Igloolik Co-op Ltd. Igloolik, NU
- 7. Ikahuk Co-op Assoc. Ltd. Sachs Harbour, NT
- 8. Ikaluktutiak Co-op Ltd. Cambridge Bay, NU
- 9. Issatik Co-op Ltd. Whale Cove, NU
- 10. Kapami Co-op Assoc. Ltd. Colville Lake, NT
- 11. Katudgevik Co-op Assoc. Ltd. Coral Harbour, NU

- 12. Kimik Co-op Ltd. Kimmirut, NU
- 13. Kissarvik Co-op Assoc. Ltd. Rankin Inlet, NU
- 14. Koomiut Co-op Assoc. Ltd. Kugaaruk, NU
- 15. Kugluktuk Co-op Ltd. Kugluktuk, NU
- 16. Mitiq Co-op Assoc. Ltd. Sanikiluaq, NU
- 17. Naujat Co-op Ltd. Repulse Bay, NU
- Padlei Co-op Assoc. Ltd. Arviat, NU
- 19. Paleajook Eskimo Co-op Ltd. Taloyoak, NU
- 20. Pangnirtung Eskimo Co-op Ltd. Pangnirtung, NU
- 21. Pitsiulak Co-op Assoc. Ltd. Chesterfield Inlet, NU
- Qikiqtaq Co-op Assoc. Ltd. Gjoa Haven, NU (Source: Arctic Co-ops 2007)

- 23. Sanavik Co-op Assoc. Ltd. Baker Lake, NU
- 24. Lutsel K'e Co-op Ltd. Lutsel K'e, NT
- 25. Taqqut Co-op Ltd. Arctic Bay, NU
- 26. Tetlit Service Co-op Ltd. Fort McPherson, NT
- 27. Tununiq Sauniq Co-op Ltd. Pond Inlet, NU
- 28. Tudjaat Co-op Ltd. Resolute Bay, NU
- 29. Tulugak Co-op Society Ltd. Qikiqtarjuaq, NU
- 30. West Baffin Eskimo Co-op Ltd. Cape Dorset, NU
- 31. Yellowknife Direct Charge Co-op Ltd. Yellowknife, NT

Figure 11: Arctic Co-operatives Locations



(Source: Northwest Company web image)

Figure 12: Northwest Company Store Locations

While the Arctic Co-ops and Northwest Company stores are the main retail outlets across Nunavut, a search of the online "YellowPages," as well as of business listings for a few communities, was undertaken to develop an estimate of the number and range of outlets and services for electronics, tires, lubricating oil, lead acid batteries, paint, fluorescent lights and consumer batteries. It was found that the information available through these sources was limited; the results therefore serve to provide an overview of additional retail channels.

3.3.3.1 Electronics

There are at least eight stores and services listed in Iqaluit that likely sell electronic devices. These include The Source and Arctic Home Furnishings. Business listing available for other communities indicate that electronics equipment might be distributed through internet and telecom services (e.g., independent internet services and Northwest Tel), and possibly through independent hardware/general merchandise stores found in some communities.

3.3.3.2 Automotive

For tires, batteries and lubricating oil, searches revealed two auto parts stores (including a NAPA store) and a few auto repair shops in Iqaluit, as well as an ATV sales and parts vendor, and a major car and truck rental service. Auto repair and small engine repair, equipment rental and maintenance services also appear to be available in some communities. These results do not include gas bars, and independent hardware / general merchandise stores.

3.3.3.3 Paint, Consumer Batteries, Fluorescent Bulbs

In addition to Arctic Co-ops and Northern Stores, searches indicated that these types of product are sold through independent hardware/general merchandise stores, and at convenience stores (batteries and bulbs).

3.3.3.4 Online and Out of Territory

Data on the volume of goods acquired through on-line and out-of-territory purchases is not available, but anecdotal reports indicate that these are prevalent practices. Specialized on-line shopping services, such as The Online Grocer and The Northern Shopper, fill and ship to Nunavut personal orders for groceries and perishable goods on a one-day turn around. Retailers such as Amazon, Costco and Sears are reported to ship free of charge to Nunavut postal codes. Companies such as The Northern Shopper and the Northern Company also provide an online personal ordering service for the annual sealift (i.e., they will purchase goods on order, pack them in a sea can and ensure delivery). In addition to online sales, anecdotal information suggests that a common practice is to fly to Ottawa or Montreal once per year in order to purchase dry goods, household goods and equipment, and prepare them for shipment during the annual sealift.

3.3.4 Waste Management

3.3.4.1 Overview of Municipal Solid Waste Management System

In Nunavut, the City of Iqaluit is responsible for managing solid waste generated in its jurisdiction, including the provision of infrastructure and the operation of programs and services. In the other 24 communities, the hamlet governments are responsible for day-to-day operations (exp Services 2014), while the Nunavut Department of Community and Government Services (CGS) is responsible for infrastructure, as well as the provision of technical and financial support for the hamlets' day-to-day operations.

Each community in Nunavut has an active landfill and provides a garbage collection service. All communities are required to post signage and provide for the segregation of tires, hazardous wastes, and white goods. In practice, some level of segregation occurs at most facilities, most commonly including end-of-life vehicles, bulky metals such as appliances, vehicle batteries, used lubricating oil / waste fuel, and wood waste with about one third of facilities stockpiling tires and no communities segregating electronics (Arktis 2012; exp Services 2014).

The City of Iqaluit landfill is reported to provide for the segregation of metal, tires and household hazardous wastes, including waste lubricating oil, paint and batteries (Iqaluit 2011). Following adoption of a new solid waste management program, in 2014 the City started promoting on-site segregation of wood waste and bulky metals (end-of-life vehicles (ELVs), appliances, and construction-related metal) (Iqaluit 2014). It has also started curbside collection of cardboard on an alternating twice-weekly schedule with regular garbage collection (Iqaluit 2014). Cardboard and wood waste materials are designated for on-site burning. In the long term, the City plans to segregate and backhaul HHW, tires and electronics, among other items, to recycling and treatment facilities in the south (Iqaluit 2013).

While lead acid batteries, used lubricating oil, other HW, and tires are commonly segregated at disposal sites in the territory, they are not typically removed for recycling or treatment. Local processing options or markets are not available, requiring materials to be backhauled to southern Canada for treatment. Figure 13 illustrates backhaul routes and processing destinations for household hazardous wastes. The technical viability of backhauling wastes from Nunavut to southern markets is evidenced in various initiatives and projects. Notably, the Arctic Co-ops run a territory-wide aluminum can recycling program, using their stores as collection points and their shipping infrastructure for backhaul to recycling markets. The City of Iqaluit is reported to have arranged for the backhaul of a large load of scrap metal, tires and lead acid batteries in 2010 (Northern News 2010). A federally funded pilot project focused on extracting end-of-life vehicles was implemented in the hamlets of Arviat and Gjoa Haven in the summer of 2014 (Summerhill 2014).



(Source: exp Services 2012)

Figure 13: Backhaul Routes to HHW Processing Facilities

There is at least one local hazardous waste company facilitating backhaul of hazardous waste generated in the commercial and institutional sectors. Qikiqtaaluk Environmental operates a licensed transfer station in Iqaluit and receives hazardous waste, for a fee, from individuals, commercial operations, and the City. The company also consolidates and backhauls lead acid batteries and backhauls waste lubricating oil that is too contaminated to burn. They have also invested in a fluorescent bulb crusher and ship out the residual material.

While backhaul is technically feasible, and Nunavut communities and businesses want to recycle, they face high barriers in terms of implementation. A primary challenge in this respect is the cost of backhaul. Added to this are the costs associated with handling, storing and transporting hazardous waste. A range of other challenges exists, including changing policies and practices around abandoning hazardous materials at public facilities, cleaning up historic stockpiles, and developing day-to-day operational practices that improve segregation and storage at disposal sites. These issues and challenges are well-documented (Arktis 2010, 2011, 2012; exp Services 2012) and strategies have been implemented to begin addressing them (i.e., exp Services 2012; exp Services 2014).

3.4 Waste Composition Studies in Canada's North

Relatively recent composition studies completed in the north provide insight into the makeup of the waste disposed in landfills in the Yukon Territory, Northwest Territories and Nunavut. Specifically:

- A 2007 solid waste composition study done for the City of Yellowknife (Gartner Lee 2007)
- A 2009/10 two-season solid waste composition study done for the City of Whitehorse and surrounding communities (Maura Walker and Associates 2011)
- The 2014 Nunavut Solid Waste Management Plan (exp Services 2014) provides summary waste composition data based on waste audits conducted in Iqaluit, Arviat and Pangnirtung.

Typically, waste composition studies are conducted to assess the effectiveness of current waste management policies and programs, as well as to identify opportunities for diversion of materials based on waste amounts or toxicity. As a result, the data provided in these composition studies does not reflect the specific waste streams of interest to this project. In addition, categories and methodologies differ between studies, making direct comparisons difficult. Waste composition studies reflect waste disposal at a certain point in time, and as such do not account for historical activities, and are not readily comparable. However, each study provides some data of interest.

A summary of the various composition study data is provided in Table 9, with target materials highlighted in red. The waste composition study findings presented in this table are for information purposes only. They were not used in the waste generation or disposal calculations developed for this study. Also note that composition data is based on weight rather than volume, and considers waste disposed, not generated. As shown, the rubber category, which includes tires, represents less than 0.5% of the sampled waste. The electronic waste category, representing products that are powered through a plug or battery, including audio-visual products, computers and computer-related products and appliances, represented from 0.3% of the waste stream (Nunavut) to 3.2% in Whitehorse. The household hazardous waste (HHW) category represents a broad range of products that are toxic in nature, including paints, solvents, fuels, batteries, and lubricating oil and filters. The percentage of waste disposed represented by HHW ranged from a low of 0.5% (Yellowknife) to a high of 1.6% (Whitehorse).

Material	Whitehorse	Yukon Communities (outside Whitehorse)	Yellowknife	Nunavut
Paper	13.7%	12.7%	34.5%	19.4%
Glass	1.3%	2.4%	2.4%	1.4%
Metals	6.7%	6.4%	0.9%	5.3%
Plastic	9.1%	12.2%	12.4%	8.4%
Organics (incl. compostable paper, e.g., tissues and towelling)	17.4%	38.7%	28.7%	32.5%
Composite	9.3%	8.6%	1.8%	
Wood Waste	15.2%	4.7%	2.9%	1.6%
Inert Materials	2.3%	3.0%	0.8%	
Gypsum Wallboard	6.2%	0.5%		
Textiles	2.8%	2.9%	3.2%	
Rubber	0.4%	0.2%	0.1%	
Carpet and Underlay	2.1%	0.9%		
Electronic Waste	3.2%	1.1%		0.3%
Personal Hygiene	2.5%	3.8%	5.1%	
Hazardous Waste	1.6%	1.3%	0.5%	0.9%
Biomedical Waste	0.4%	0.0%		
Pet Waste	1.2%	0.2%		
Fines	0.3%	0.2%	0.5%	
Fiberglas Insulation	0.6%	0.0%		
Other	3.7%	0.2%	6.2%	30.2%
Totals	100.0%	100.0%	100.0%	100.0%

Table 9: Summary of Composition Study Data

The Yukon study provides more detailed data on each of the waste material categories; the data that is most relevant to this study is provided in Table 10. Please note that this level of data should not be considered statistically relevant, but is provided here to show the level of work undertaken during these composition studies and to provide a rough indication of the relative proportion of products within each category.

Table 10: Yukon Waste Composition Results

	Whitehorse	Outside WH
Tires	0.2%	0.0%
Electronic waste (powered by cords or batteries)	3.2%	1.1%
Audio-visual (TVs, stereos, DVD players)	0.7%	0.0%
CPUs and computer-related items	1.2%	0.1%
Other (toaster, blender, curling iron, battery charger)	1.4%	1.1%

	Whitehorse	Outside WH
Hazardous Waste	1.6%	1.3%
Paint	0.4%	0.1%
Paint containers (empty or dry)	0.1%	0.1%
Motor oil filters	0.1%	0.3%
Motor oil containers	0.2%	0.0%
Batteries – alkaline	0.1%	0.1%
Batteries – rechargeable	0.0%	0.0%
Other	0.7%	0.7%

4 Summary of Targeted Materials for EPR in Remote Regions of Provinces

4.1 Newfoundland and Labrador

4.1.1 Location

Most of Labrador is described as "extremely remote" according to the "Remoteness Classes Index" developed by the Newfoundland and Labrador (NL) Statistics Agency (2015). Of the communities that fall within that classification, some have year-round road access, and some do not. Those without year-round road access comprise the focus of this project; they rely primarily on air and water transport for postal service, regional mobility and community resupply. These communities are situated on the north and east coasts of Labrador (Figure 14).



Figure 14: Labrador Rural Areas

4.1.2 Population

Remote communities in Labrador include Nain, Hopedale, Makkovik, Postville and Rigolet, which are members of an Inuit Nunangat self-governed region known as Nunatsiavut (Nunatsiavut 2015). Nain – the governmental seat – is the largest, with a population of 1,188 persons; Hopedale is the smallest, with a population of 206 (Statistics Canada 2011). Natuashish (pop. 931), located between Nain and Hopedale, is an Innu community that is not part of Nunatsiavut. The small remote communities of Black Tickle, Norman Bay, and Williams Harbour, located on the east cost, are associated with the coastal fisheries economy (Smart Labrador 2010).

4.1.3 Transportation and Distribution

With the exception of Norman Bay, each community has an airstrip, and all have a ferry terminal, serviced by separate local ferry services for the north coast and east coast areas. On the north coast, a seasonal passenger and light freight service operates on a weekly schedule, connecting these remote communities to Happy Valley / Goose Bay, and the Trans-Labrador Highway (Hwy 500). A weekend service connects Black Tickle to Cartwright and Happy Valley / Goose Bay (Nunatsiavut Marine 2011). On the east coast, Norman Bay and Williams Harbour are connected to the Highway 510 network via a ferry service to the ports of Charlottetown (NL) and Port Hope Simpson. Highway 510 links Happy Valley / Goose Bay to the east and south coasts, and from thence to the island of Newfoundland via a ferry service at Blanc Sablon, QC. In addition to air, ferry and road networks, residents of these remote communities make extensive use of snowmobiles during the long winter season (Town of Makkovik 2013; Steel 2011).

North coast communities rely heavily on a seasonal freight service, which originates in Lewisport, Newfoundland, for resupply of dry goods, equipment and construction materials. Most communities have at least one grocery and/or general merchandise store, such as the Northern Store (Nain and Riggolet) and Big Land Grocery in Makkovic and Hopedale. Happy Valley / Goose Bay (pop. 7,552) is a retail shopping centre for the region.

4.1.4 Overview of Waste System and Flows

Municipal solid waste (MSW) management in Labrador is defined by the 2002 provincial solid waste strategy (NL Department of Environment 2002). The strategy aims to regionalize solid waste services, modernize disposal technologies and close unlined disposal sites. The strategy takes into consideration the fact that many coastal Labrador communities are too remote or isolated to be incorporated into a regional system. Location and community-specific approaches are being developed for these places. Implementation of the strategy is an interdepartmental responsibility shared by the Department of Environment and Conservation, NL Services, the Multi-Material Stewardship Board (MMSB), and the Department of Municipal and Intergovernmental Affairs (MIGA).

A one-time residential waste audit undertaken in Makkovic in 2010 provided evidence to suggest that the total amount of waste generated, at 175 kg/person/year (390 kg/household/year), was lower in remote Labrador communities compared to other places in NL (Steel 2011).⁴ Steel (2011) identified a number of factors contributing to the lower generation rate, including backyard burning of household waste, frugal habits, and limited availability of packaged goods (Steel 2011). Paper (26%), organics (23%), plastics (10%) metals (6.5%), glass (< 1%), HHW (0.3%) and residual materials (34%) were found in the waste stream. The HHW category was comprised of batteries and lubricating oil, with lubricating oil being the more prevalent material. No electronic equipment or small appliances were found.

⁴ The Statistics Canada Waste Management Industry survey estimated the Canadian average residential disposal rate to be 271 kg/person/year (Statistics Canada 2010a).

The approach to waste management in these remote communities is primarily discharge to a disposal site situated in a quarry or an unlined landfill (Steel 2011). As was documented in a series of sustainability workshops held in Nunatsiavut communities in 2012, residents were concerned about the state of their disposal facilities, as well as the lack of options for recycling and proper management of HHW (Goldhar, C. et al. 2012). The situation has evolved considerably since then under the impetus of the provincial waste management strategy and the evolution of product stewardship and EPR programs.

MMSB operates the province-wide tire and beverage container stewardship programs. As there is little use of passenger vehicles in remote coastal Labrador communities, the tire program has not been extended to these places, while the beverage container program has been implemented in communities up the coast to Nain. For this program, MMSB partners with a local group in each community for the collection and consolidation of containers into a sea can that MMSB provides. The sea cans are picked-up on an as-needed basis during the shipping season and transported to Happy Valley / Goose Bay for processing at a bottle depot.

Province-wide EPR programs have been implemented for paint (2012) and electronics (2013), and the current return-to-retail program for used lubricating oil will be transitioned to an EPR program for lubricating oil and glycol (in remote regions, used lubricating oil may be diverted to waste oil furnaces as a heating source). EPR programs are required to service all areas of the province, including the north coast of Labrador, and respective north coast communities are listed in approved stewardship plans. However, it is expected that the collection system will be modified to reflect lower waste generation rates and the seasonal transportation system. In essence, the frequency of collection will depend on the rate at which sea cans are filled up, and the timing of the ferry service. Coordination between EPR / stewardship programs is also expected, for cost saving purposes, as well as for community convenience.

As of January 2015, ReGeneration has collection sites in Happy Valley / Goose Bay, Nain, Makkovic, Postville, Black Tickle and Cartwright, where they have made arrangements with local organizations or retailers to host a depot. ReGeneration provides these depots with two to three tub skids per year, paying them for storage handling. It then pays a transporter to collect the skids and haul them to a consolidation facility, from where paint is sent on for processing in Nova Scotia.

The Electronic Products Recycling Association (EPRA) program came into effect in 2013. As of January 2015, there was an EPRA depot in Happy Valley / Goose Bay, with roll-out of EPRA depots up the north coast expected starting in the spring of 2015.

4.2 Québec

4.2.1 Location

Remote communities were identified in the northern half of the Nord-du-Québec administrative region, in which 14 coastal communities on Hudson Bay, Hudson Strait, and Ungava Bay have no road access to southern Québec and no intercommunity road network (Figure 15). This remote region is referred to as Nunavik.



(Source: Transports Québec 2010)

Figure 15: Remote Communities in Nunavik, Québec

Remote communities were also identified in the eastern region of the Gulf of St. Lawrence. Remote communities in this area include Port Menier on the L'Île d'Anticosti, and nine communities on the Lower North Shore (Basse-Côte-Nord) that are not connected to a road network. Figure 16 illustrates the location of the Lower North Shore communities.

It is important to note that the criteria used in this study to define remote communities do not necessarily capture all places that could be considered remote, such as the Cree communities in the James Bay sub-region of northern Québec.



(Source: Tourism Lower North Shore 2015)

Figure 16: Lower North Shore Communities, Gulf of St. Lawrence

4.2.2 Population

Nunavik is an Inuit Nunangat semi-autonomous region administered by the Kativik Regional Government (KRG), consisting of 14 coastal communities with populations ranging in size from 195 to 2,375 persons (Statistics Canada 2011). The KRG seat of government is located in Kuujjuaq on Ungava Bay.

On the Gulf of St. Lawrence, nine communities on the Lower North Shore from Kegasa to St. Augustine lack road access. They range in size from 150 to 1,016 persons. The community of La Romaine consists of an Innu reserve called Unamen Shipu as well as a French speaking population. The village of Pakua Shipi is also an Innu community (but not a reserve).

Port Menier on the L'Île d'Anticosti has a population of 240 persons.

Subsequent discussion focuses on the primary remote communities in the Nord-du-Québec region.

4.2.3 Transportation and Distribution

Modes of transportation and community resupply in Nunavik mirror those of Nunavut. Residents use snowmobiles, ATVs and motor boats extensively for hunting, fishing and local travel (KRG. No date). Every community has an airstrip and a water access ramp for barge and boats. Kuujjuaq has a major airport, and Air Inuit flies from many communities to Montreal on a daily or every other day basis. Seasonal sealift out of Montreal is the principal means by which dry goods, equipment and construction materials are brought into the region. Two shipping companies, Nunavut Eastern Arctic Shipping (NEAS) and Nunavut Sealink and Supply (NSSI), provide this service. The 14 communities have established the Co-operative Federation of Northern Québec and each has an associated co-op store that sells groceries and general merchandise. Ten of 14 communities also have a Northern Store.

4.2.4 Overview of Waste System and Flows

The Province of Québec has a tire stewardship program, operated by Recyc-Québec, and a number of products relevant to this study have been designated for EPR: electronics, paint (and paint containers), fluorescent tubes and bulbs, used lubricating oil and glycol (plus filters and containers), and batteries (excluding lead acid batteries). The major PROs operating EPR programs for these products include the Electronic Products Recycling Association (EPRA), Éco-Peinture (paint), La Société de gestion des huiles usages (SOGHU – Used Oil Management Association), ReGeneration (RecycFluo program for fluorescent tubes and bulbs) and Call2Recycle Canada (Call to Recycle program).

According to the Québec *Regulation Respecting The Recovery And Reclamation Of Products By Enterprises*, since 2014, current designated stewards are obligated to service all northern and remote communities with appropriate recovery equipment and to provide minimally for an annual pick-up of products in view of their reclamation (unless products can be reclaimed on-site).

The Kativik Regional Government (KRG) is responsible for municipal infrastructure development and planning, and the support of the communities, each of which has a disposal site. KRG is developing a solid waste management strategy for the region with the intent of increasing the diversion of recyclable materials and hazardous wastes, and improving operational practices (George 2012; Rogers 2014). Some wastes relevant to this study are already being diverted, and, through the KRG's evolving waste strategy and PROs' regulatory obligations, initiatives are underway for other wastes of interest.

Recyc-Québec has been collecting tires in Nunavik since 2005, with the program structured to accept tires typically generated in the region – tires from ATVs, loaders and trucks (mining tires are not included in the program). The communities, with the assistance of KRG, undertake the operational tasks associated with loading containers and coordinating shipping, with their efforts financed through a rebate paid by Recyc-Québec.

For lead acid batteries KRG has established a relationship with Newalta (initiated in 2005), which operates a smelter in Laval, Québec. The communities pay to backhaul batteries to Montreal, where they are reimbursed on a market basis.

Used lubricating oil is reported to be a significant issue in the region, with stockpiles of drummed lubricating oil, often mixed with anti-freeze and other contaminants, accumulating for decades. While there is very little use of passenger vehicles in the region, there is extensive use of vehicles in municipal fleets. Burning used oil in furnaces for heating purposes is not a developed practice in the region because of contamination issues.

Given this overall situation, in 2014, a used lubricating oil collector for SOGHU set up a depot in the main community of Kuujjuaq and SOGHU plans to establish depots in three other communities. SOGHU supplies the containment system and covers the costs of shipping and processing. SOGHU will also collect used lubricating oil from the historic stockpiles, provided that it is uncontaminated. KRG remains responsible for the costs of managing lubricating oil contaminated with other substances.

The KRG has commenced a partnership with EPRA on a pilot project aimed at sending discarded electronics to markets in the south. A plan, expected to commence in early 2015, will see EPRA pilot collection points in three communities (Rogers 2014).

Five PROs have started to work together on an approach to delivering EPR services in Nunavik. These organizations include SOGHU, ReGeneration, EPRA, Éco-Peinture, and Call2Recycle Canada.

4.3 Ontario

4.3.1 Location

A large number of remote communities are located in a region of Ontario administratively defined as the "Far North" (Figure 17). These include 29 communities that do not have year round road access and rely on a winter ice road system and air transport. The Town of Moosonee is also in the Far North region and does not have year round road access, but is connected to the transportation network via a rail link.



(Source: Ontario Ministry of Natural Resources 2014)

Figure 17: Remote Communities in Ontario's Far North Region

4.3.2 Population

All 29 communities are First Nations. The majority are associated with one of six tribal councils: Shibogama, Mushkegowuk, Windigo, Keewaytinook Okimakanak, Matawa, and the Independent First Nations Association (IFNA). Most of these communities have fewer than 1,000 residents; the largest are in the range of 2,500 persons (Statistics Canada 2011; AANDC 2014).

4.3.3 Transportation and Distribution

For most communities, personal mobility and movement of goods into and out of the region is by means of the winter road system and air transport. Coastal communities have access to barge and shipping systems operating in James Bay and Hudson Bay. Seventeen of 29 communities have a Northern Store, while others have a band-operated store and some communities have both. Common origins for dry goods and major purchases include Dryden, Souix Lookout, Thunder Bay and Timmins. Online shopping is also reported to be a significant practice.

4.3.4 Overview of Waste System and Flows

The Province of Ontario has EPR programs for used tires, waste electrical and electronic equipment (WEEE; includes cell phones), and certain kinds of municipal or hazardous wastes (MHSW) – notably, paint, single use batteries, empty lubricating oil containers and oil filters. The programs are operated by industry funding organizations (IFOs), except in cases where an Industry Stewardship Plan has been approved (ISP). Currently, the WEEE program is operated by Ontario Electronic Stewardship (OES) and Ontario Tire Stewardship (OTS) is responsible for the tire program. Stewardship Ontario runs the MHSW program, referred to as the Orange Drop program. Recent approval of ReGeneration's ISP for paint implies that ReGeneration will take over management of that material in the near future. Used lubricating oil, lead acid batteries and fluorescent bulbs are not managed under EPR or stewardship programs in Ontario.

Every community in the region has a disposal site that is located either on reserve property or provincial Crown land. Many of these sites have reached, or exceeded, their capacity. Tire piles, auto-hulk "graveyards," white goods and scrap metals stockpiles are not uncommon. Depending on the community, lead acid batteries may or may not be segregated from general waste, and the level of organization varies from containment on pallets to scattered placement in the vicinity of the disposal site. Hazardous waste, and potentially recyclable materials, may also be stockpiled in other locations in the community, notably at community works yards. Used lubricating oil from diesel generators is also drummed and stockpiled. Aboriginal Affairs and Northern Development Canada (AANDC) is assisting communities with the clean up of these disposal sites, and the development of new facilities as needed. Among the concepts being considered is the use of waste oil burners for heating purposes.

Municipal and private sector collection points for the MHSW, tire, and electronics programs are located in communities such as Sioux Lookout, Red Lake, Dryden and Thunder Bay. However, the existing EPR programs do not extend into the Far North region. Although at least some of the First Nations are aware of Ontario's EPR programs they have not had the capacity to access the existing infrastructure and services. The communities face considerable challenges associated with backhaul out of their region. All wastes must be transported on the winter road system, which requires that wastes must be consolidated, packaged and ready to load before the road opens up, and a truck and trailer must be available for the short period that the road is accessible. As the communities are small and isolated, the technical, financial and labour resources required to do this are not readily marshalled. There have been few community-driven recycling initiatives as a result, even though the available information suggests there is local interest, as well as support from AANDC.

4.4 Manitoba

4.4.1 Location

Communities that may be considered remote are distributed across the central east (upper Lake Winnipeg) and northern regions of Manitoba. For the purposes of this project, the focus is on communities that do not have year round road access and that are identified on the Canada Post air delivery list. These communities rely on a winter road system and air transport for postal service, regional mobility and community resupply. Twenty-three communities meeting this definition were identified during the research phase of the project; they include First Nations reserves and nearby Metis and non-First Nations Community Councils. First Nations locations are shown in Figure 18 (circled in red). Information subsequently provided by Manitoba Conservation and Water Stewardship indicates that five additional Community Councils meet these criteria.

It is important to note that the criteria used in this study to define remote communities do not necessarily capture all places that could be considered remote. In particular, Manitoba Conservation and Water Stewardship identifies rail access-only Community Councils on the Hudson Bay Railway line between The Pas and Churchill as "remote". Rail access-only communities include the Town of Churchill and the communities of Ilford, Pikwitonei, and Thicket Portage.







(Source: Aboriginal Affairs and Northern Development Canada 2012a)

Figure 18: Remote First Nations Communities in Manitoba

4.4.2 Population

Nineteen of these very remote locations are First Nations communities on federal land. They range in size from as few as 303 residents to as many as 2,871 (Statistics Canada 2011; AANDC 2014). Berens River, Brochet, Granville Lake, Gods Lake Narrows, Island Lake, Little Grand Rapids, Oxford Lake, Red Sucker Lake, and Princess Harbour are small Metis and non-Metis Community Councils, most of which are located in proximity to remote First Nations reserves and bear the same names as these reserves.

4.4.3 Transportation and Distribution

For all communities, personal mobility and movement of goods into and out of the region is by means of the winter road system, air transport, and in some cases, boat. Almost all of these communities have a Northern Store, and/or an independent store for groceries and general merchandise. The larger communities have additional retail services.

4.4.4 Overview of Waste System and Flows

Manitoba has 13 EPR programs for a range of products, including electronics, cell phones, paint, used lubricating oil (including containers and filters), tires, fluorescent lamps, and batteries (lead acid, primary and rechargeable) (Giroux 2014). Relevant PROs for electronics and cell phones include: EPRA Manitoba, Call2Recycle Canada (consumer batteries and cell phones), and the Canadian Wireless and Telecommunications Association (CWTA Recycle My Cell program). PROs for household hazardous and automotive products include ReGeneration (paint and fluorescent lights), Canadian Battery Association (CBA), Interstate Batteries, Manitoba Association for Resource Recovery Corporation (MARRC – used lubricating oil and antifreeze), and Tire Stewardship Manitoba (TSM).

Each remote First Nations community operates its own waste disposal site. The Berens River and Brochet communities use adjacent First Nations facilities, and Island Lake likely uses a low temperature incinerator. Information on waste disposal in other non-First Nations communities was not available. For the most part, metals, tires, batteries, used lubricating oil and electronics are not segregated from general waste. Until recently, there have been few community-driven waste diversion initiatives, and EPR programs have not extended into these remote regions. Lack of year-round road access, long distances to processing centres, and small population bases are among the factors determining the feasibility of waste diversion in these remote locations. However, this situation is changing.

At the federal level, AANDC, which provides funding to assist First Nations with the design, construction, operation and decommissioning of disposal sites, is helping communities upgrade or replace their disposal facilities, and improve operational practices such as waste segregation. AANDC is also facilitating community-based development of waste diversion projects and initiatives. In the context of these activities, AANDC has established an informal working group, referred to as the Solid Waste Action Team (SWAT). SWAT's aim is to address waste management issues and challenges in northern and remote Manitoba communities, including EPR. The working group includes AANDC, the Government of Manitoba, Green Action Centre (an ENGO), and representatives of PROs.

EPR programs are required by regulation to provide province-wide services. At an operational level, PROs recently started collaborating with each other in the development of an approach to servicing remote communities. A central driver in this collaborative effort is the recognition that collective efforts may offer logistical and cost advantages. In 2014, a pilot project was initiated in partnership with St. Theresa Point First Nation, an Oji-Cree community of approximately 2,800 people (Census 2011) located in northeastern MB. St. Theresa Point's involvement in the pilot arose from its own efforts to address its solid waste issues. In 2011, the Chief and Council initiated a project aimed at cleaning up the community, including organizing and consolidating wastes such as metals, tires, batteries and white goods. Faced with the challenge of getting these materials to markets in the south, PROs were approached for assistance. These outreach activities led to the development of the pilot project.

The scope of the pilot includes waste electronic equipment, HHW, used lubricating oil, lead acid batteries, tires, scrap vehicles and blue box materials. Six PROs are involved, including EPRA, ReGeneration,

TSM, MARRC, the CBA, and Multi-Material Stewardship Manitoba (MMSM). Preparation for the pilot began in 2014 with the intent of starting to transport materials when the winter road opens in 2015. The PROs are covering the costs of transportation and processing, and providing on-the-ground training and logistical support.

Recently, Manitoba released a recycling and waste reduction discussion paper in which northern and remote communities were identified as key priorities (Manitoba 2014).

4.5 Saskatchewan

4.5.1 Location

Communities that may be considered more or less remote are distributed across the northern half of Saskatchewan. For the purposes of this project, the focus is on First Nations communities and nearby hamlets in the remote Athabasca Region, located in the far north of the province. These seven communities do not have year round road access and rely on air transport, winter roads, and in one case, summer barge. Figure 19 provides the general location of these places (circled in red).



Figure 19: Saskatchewan Remote Communities

4.5.2 Population

There are two Denesuline First Nations on the Lake Athabasca system (Black Lake and Fond-du-Lac reserves). In addition, there are the settlements of Camsell Portage and Uranium City, and the hamlet of Stony Rapids. Populations in these places range from fewer than 50 persons in Camsell Portage to 1,060 at Black Lake (Statistics Canada 2011). The Hatchet Lake Dene First Nation community (pop. 1,251), and the associated unincorporated community of Wollaston Lake (pop. 251) are located on the east side of Wollaston Lake.

4.5.3 Transportation and Distribution

These communities have airstrips (or access to one in the case of Camsell Portage) and scheduled flights 4 to 7 days per week. With respect to road access, Provincial Road 905 extends north from Prince Albert to the west side of Wollaston Lake, where it ends at Points North Landing in the vicinity of a number of mines. A winter road is extended from Wollaston Lake to Black Lake, Fond-du-Lac and Uranium City. The road is typically opened in early February and closes by late March (Saskatchewan Highways 2013). The communities of Wollaston Lake access Provincial Road 905 in the summer via barge. It is likely that snowmobiles are an important means of transportation in winter months. There are Northern Stores in Black Lake, Fond-du-Lac and Stony Rapids, and a band store in Hatchet Lake / Wollaston. Stony Rapids has additional retail outlets and services (Saskatchewan Northern Business Directory 2013).

4.5.4 Overview of Waste System and Flows

Saskatchewan has EPR programs for electronics, paint, and used lubricating oil (including filters and containers). These programs are operated by EPRA, ReGeneration and the Saskatchewan Association for Resource Recovery Corporation (SARRC), respectively. The Saskatchewan Scrap Tire Corporation (SSTC) operates the tire stewardship program.

Each of the First Nations communities in the far north has a waste disposal facility, either on reserve or on provincial land. Waste segregation may be practiced, but definitive information was not available and stockpiles could not be readily confirmed. With respect to waste diversion, there is reportedly little underway. AANDC facilitated a partnership with Saskatchewan Power to provide for the removal of refrigerators and freezers from these communities – this project will be complete by the end of 2015. AANDC is reported to have funding available to facilitate waste diversion in these far north communities.

Existing EPR and stewardship programs have not, as yet, been extended to the remote far north communities. EPRA and the Keewatin Career Development Corporation (KCDC) undertook a "Northern Collection Pilot Project" in 2013 that rounded up electronics along Provincial Road 905 to Southend, and Provincial Road 955 to Buffalo Narrows / La Loche, among other places (EPRA/KCDC 2014). Information provided by SARRC shows that registered collectors service the northeast part of the province up the 905 road to Rabbit Lake Mine near the road's terminus. But collection service is not provided to the Hatchet Lake community on the east side of Wollaston Lake, nor does it continue up to Black Lake via the winter road. Some PROs operating in Saskatchewan are starting to collaborate on an approach for remote communities similar to the approach being developed in Manitoba.
4.6 Alberta

4.6.1 Location

Only two communities in Alberta were identified as remote insofar as they are not on a year-round accessible road network. These communities are located in the far north region of the province. Fort Chipewyan is situated on Lake Athabasca northeast of Fort McMurray. The Fox Lake reserve is located east of High Level, off Highway 58, on the south side of the Peace River.

4.6.2 Population

Fort Chipewyan is a hamlet located in the Regional Municipality of Wood Buffalo (RMWB), with a population of approximately 1,261 persons, primarily of Athabasca Chipewyan, Mikisew Cree, or Metis heritage (RMWB 2012). The Athabascan Chipewyan has an inhabited reserve across the lake from Fort Chipewyan and the Mikisew Cree nation has two reserves abutting the hamlet (Dog Head and Allison Bay). The Athabasca Tribal Council (ATC) represents these First Nations (ATC 2014a).

Fox Lake (pop. 1,875) is a reserve associated with the Little Red River Cree Nation in the Peace River region (Statistics Canada 2011). The head office for this First Nation is located in John D'Or Prairie.

4.6.3 Transportation and Distribution

Fort Chipewyan has an airport, and regular flights to Fort McMurray and Edmonton are available. Winter roads are extended to Fort McKay (approximately 200 km) to the south, and to Fort Smith, NT (228 km) to the north (RMWB no date; Parks Canada 2014). The hamlet is also connected to a river barge system that operates during the summer; the barge is an important mode for resupplying the community (RMWB 2008; ATC 2014b). A Northern Store provides groceries and general merchandise.

Fox River reserve is located 166 km east of High Level, AB, and is accessible by river barge in the summer and ice bridge during the winter. The community hosts a Northern Store, as well as a convenience store.

4.6.4 Overview of Waste System and Flows

Relevant to this project, Alberta has stewardship programs for electronics, paint, tires, and used lubricating oil (including filters and containers). These programs are managed by "delegated administrative organizations" (DAOs). The Alberta Recycling Management Authority (ARMA) is the DAO for electronics, paint, and tires, while the Alberta Used Oil Management Association (AUOMA) manages the program for used lubricating oil.

The RMWB manages solid waste in the community of Fort Chipewyan and the adjacent Mikisew Cree reserves. A new, engineered landfill was constructed in 2010. It is open to the public three days per week but there is a waste drop off area that is accessible at all times. The RMWB accepts paint, electronics, automotive batteries and HHW at the facility. The materials are being palletized and/or stored in totes or bins depending on the material. The intent is to transport them to Fort McMurray via the ice road.

Information provided by the RMWB indicates that there are considerable barriers inhibiting the movement of recyclables and hazardous wastes to processing facilities. The long distance to market and the need to rely on the ice road system are principal factors in this regard. In addition, there is a shortage of labour in the area, visitor accommodations are limited and transportation costs are relatively high. These factors cut short a metals recycling project that was initiated in 2014. The objective was to consolidate, crush and remove more than 50 tonnes of scrap metal and end-of-life vehicles (ELVs). However, as the crusher was too heavy to haul in on the winter road, metal had to be shipped unconsolidated. In addition, the project was terminated ahead of schedule due to warm weather. As a consequence of this situation, the RMWB is no longer accepting ELVs in its scrap metal area.

With respect to tires, Fort Chipewyan is a registered tire collection point under the ARMA program. Based on information provided by RMWB, there is a stockpile of tires at the facility but RMWB has not been able to ship them to market through the provincial program. This situation has arisen because approved tire processors are unwilling to make the trip to Fort Chipewyan.

The Fox Lake reserve is not a registered collection site for any of the stewardship programs.

4.7 British Columbia

4.7.1 Location

Communities that may be considered remote are located in various regions of British Columbia, such as the west coast of Vancouver Island, the central and north coast mainland and associated islands, and various inland areas. For this project, remoteness in the BC context was broadly defined in terms of limited access to transportation networks, as indicated by the Canada Post fly in list. Most of these communities are First Nations, and most are located in coastal areas of the province. The following discussion focuses on a number of remote coastal First Nations communities for which sufficient information was available to develop an overview of transportation networks and approaches to managing the wastes of interest to this project.

4.7.2 Population

This overview is based primarily on summary information regarding the following First Nations communities: Ahousat (Flores Island and vicinity); Tla-o-qui-aht (Meares Island and vicinity); Hesquiat (Hot Springs Cove and vicinity); Gitga'ata (Hartley Bay); Dzawada'enuxw (Kingcome Inlet); and Kitkatla/Gitxaala (Dolphin Island). On-reserve populations in these communities range from approximately 100 to 700 persons.

4.7.3 Transportation and Distribution

Private boat, water taxi and float plane are the primary modes of transportation in these areas. For many, the only scheduled freight service is a commercial fuel resupply barge; the fuel barge service may also be used for backhaul. Postal service is via air transport to Canada Post depots.

4.7.4 Overview of Waste System and Flows

Electronics and electrical equipment, paint, batteries, tires, fluorescent lights, and used lubricating oil (including filters and containers) are all designated in the BC *Recycling Regulation* (BC Reg. 449/2004) for EPR programming. PROs with approved plans relevant to these product categories include EPRA BC, ReGeneration, CBA and Interstate Batteries (lead acid batteries), Tire Stewardship BC (TSBC), BC Used Oil Management Association (BCUOMA), Canadian Wireless Telecommunications Association (CWTA Recycle-My-Cell program), and Call2Recycle Canada.

AANDC has been upgrading disposal facilities on reserves across BC and, where appropriate, has been introducing source segregation of recycling and HHW. As a result:

- Most unregulated landfill sites in First Nations remote communities have been closed. Most of the closed sites have been replaced by transfer stations.
- In water-based communities with transfer stations, waste is transported by barge to an approved disposal facility (e.g., Rabanco). In at least some cases, a fuel barge is contracted to backhaul waste.
- At remote disposal facilities, segregation and storage of scrap metal, tires and lead acid batteries is common.

- Less common, but starting to grow, is the segregation of recyclables. The establishment of the Multi-Material BC (MMBC) EPR program for packaging and paper has allowed several remote communities to implement residential recycling collection. AANDC is encouraging and supporting communities that want to set up recycling depots.
- There are also HHW sheds at many remote solid waste facilities these sites tend to focus on the types of products collected through the ReGeneration program (e.g., paints, solvents), but will also take dry cell batteries. Electronic equipment is also being stored in some cases. The sheds are part of the "new and improved" approach to solid waste management on reserves.
- One of the objectives of the ongoing system improvements is to minimize hazardous components in the residual waste stream.

AANDC's approach has been to enter a community to assist with a one-time site clean-up (removal of stockpiles, close down dumps, etc.), and with the identification of community partners for ongoing waste management / collection / removal services. AANDC, through its contractor, is working with the BC PROs to acquire financial support and regular removal of regulated EPR products from the remote communities.

The first outcome of these efforts was the establishment of an EPR Eco-Depot at the Bella Bella waste transfer station. Bella Bella is a Heiltsuk First Nation community on Campbell Island in the Central Coast region of BC. As it is on a regular *BC Ferries* scheduled route, the community is not as remote as some other places on the coast. Nonetheless, there are many similar challenges associated with organizing and financing the transport of recyclable materials and hazardous wastes to processing facilities. The Heiltsuk Environmental Bella Bella Eco-Depot, which is operated by the Heiltsuk, is the first aboriginally managed solid waste facility in BC to sign stewardship agreements with multiple PROs. For the community, an important advantage of this arrangement is that the participating PROs cover the transportation costs, which is a large operational expense.

Based on a review of online directories hosted by the Recycling Council of BC, BC Recycles, and various PROs, thus far the depot accepts products on behalf of: ReGeneration (paint, HHW), Canadian Battery Association, BCUOMA (lubricating oil), and Canadian Electrical Stewardship Association (ElectroCycle program for small appliances and power tools). PROs see the Bella Bella Eco-Depot as a model for delivering services to remote communities, allowing them to share transportation infrastructure and associated costs, and collaborate in solving logistical problems. In addition, Bella Bella can serve as a "hub" facility; recyclables from even more remote communities can be transferred to Bella Bella for consolidation and transport. Based on the success of Bella Bella, work is presently underway to establish an Eco-Depot in the remote First Nations community of Ahousat on Flores Island.

4.8 Summary of EPR Implementation and Gaps in Remote Regions of Provinces

The overview in the previous sections of how electronics, tires, batteries, lubricating oil, paint, and fluorescent lights are managed in remote regions of the provinces provides the basis for some general observations on the status of EPR / stewardship program implementation in these regions:

- NL In 2012, the ReGeneration Paint program commenced implementation in the remote coastal Labrador region, and services are now provided in many communities. This program is the second to be implemented in the region (after the beverage container program), and MMSB's intent is that the EPRA program will follow. Based on these findings, NL presents specific cases of EPR service implementation in remote conditions.
- QC The RecycQuebec stewardship program for tires has been operating in the remote coastal communities of Nunavik since 2005. The EPR program for used lubricating oil was implemented in Kuujuaq in 2014 and SOGHU's plan entails expansion to other communities. A pilot project for collecting electronics under the EPRA program is expected to launch in three communities in winter 2015. Five PROs have started to work together on an implementation approach. Based on these findings, QC presents one case of service implementation, and on-the-ground developmental work for at least two others (lubricating oil, electronics).
- ON Based on the research conducted, no EPR or stewardship programs have been implemented in the Far North region of Ontario.
- MB A pilot project involving six PROs has been implemented in the remote First Nations community of St. Theresa Point. Preparation for the project began in 2014 and transport of materials to market is planned for winter 2015. Based on these findings, on-the-ground developmental work is underway in one community for tires, batteries, used lubricating oil, electronics, and paint, and the intent is to expand the approach to other remote places.
- SK Based on the research conducted, no EPR or stewardship programs have been implemented in the remote Athabasca Region.
- AB Drawing on available information regarding Fort Chipewyan, the responsible municipal authority is collecting and storing paint, electronics, automotive batteries and HHW with the intent of hauling them to processing facilities when operational conditions permit. The community has faced challenges receiving service from the tire stewardship program. These findings indicate that stewardship programs have been implemented, but face operational constraints.
- BC An EPR pilot project associated with the remote Heiltsuk Environmental Bella Bella Eco-Depot has been implemented. The facility is currently handling paint, HHW, lubricating oil, lead acid batteries, and small appliances / power tools under contractual arrangements with PROs. A second project is underway in the remote First Nations community of Ahousat on the west coast of Vancouver Island. Based on these findings, services for some EPR products have been implemented in one community and on-the-ground development work is underway with the intent of expanding the model to other remote communities.

These research findings show that, with respect to the remote regions of the provinces, there are varying states and degrees of EPR / stewardship program implementation. NL and QC provide examples of complete or nearly complete implementation of at least one EPR program, and developments are underway for others. MB and BC provide examples of pilot initiatives, while no developments were evident in ON and SK. Finally, the information for AB suggests that, among other things, the operational challenges of extracting EPR and stewardship materials from remote places can slow or inhibit the implementation process.

5 EPR / Stewardship Implementation in Remote Regions – Best Practices Examples

Initiatives in the provinces of NL, QC, MB, and BC provide examples of best practices in the implementation of EPR / stewardship in remote regions. Aspects of each case are highlighted below:

EPR / Stewardship Programs in Coastal Labrador (NL)

In 2012, implementation of the ReGeneration (Product Care) paint program commenced in the remote coastal Labrador region, and services are now provided in many communities. This program is the second to be implemented in the region (after the beverage container program), and the EPRA program for electronics is expected to follow. Best practice highlights include:

- PROs are required to service all areas of the province; respective coastal communities are listed in approved stewardship plans.
- The Province allows PROs to modify collection systems to reflect lower waste generation rates and seasonal transportation systems. The frequency of collection may depend on the rate at which sea cans are filled up, and the timing of the seasonal ferry service.
- Coordination between EPR and stewardship programs is expected for cost saving purposes, as well as for community convenience.
- Partnerships have been established with local groups and/or businesses for the collection and consolidation of designated materials.

EPR / Stewardship Programs in Coastal Nunavik (QC)

The Recyc-Québec stewardship program for tires has been operating in the remote coastal communities of Nunavik since 2005. The EPR program for used lubricating oil was implemented in Kuujuaq in 2014 and will expand to include other communities. A pilot project for collecting electronics under the EPRA program is expected to launch in three communities in winter 2015. Best practice highlights include:

- Producers are required by regulation to service all northern and remote communities, including, at a minimum, annual pick-up of products (unless they can be recovered on-site).
- The responsible regional authority, Kativik Regional Government (KRG), actively facilitates local implementation of provincial EPR / stewardship programs.
- The KRG has allocated personnel for activities such as supporting communities with the operational aspects of EPR implementation and partnering with producer organizations in new initiatives.
- The region has demonstrated experience with marine backhaul of tires, lead acid batteries, and used lubricating oil to southern markets via the annual eastern Arctic sealift.
- A pilot project approach is being taken for the implementation of electronics, allowing for improvisation in the development of a model that is relevant to the circumstances across Nunavik.
- Five PROs have started to work together in the development of a coordinated approach.

EPR Pilot Project in St. Theresa Point (MB)

A pilot project involving six PROs has been implemented in the remote First Nations community of St. Theresa Point, Manitoba. The scope of the pilot includes waste electronic equipment, HHW, used lubricating oil, lead acid batteries, tires, scrap vehicles, and blue box materials. Preparation for the pilot began in 2014 with the intent of hauling materials out when the winter road opens in 2015. The PROs are covering the costs of transportation and processing, and providing on-the-ground training and logistical support. Best practice highlights include:

- The pilot was initiated in partnership with the St. Theresa Point First Nation.
- The Band and Council has allocated personnel to facilitate implementation on the ground.
- AANDC has facilitated development of the project.
- The collaborative approach being taken by the PROs helps minimize costs and address logistical difficulties associated with hauling designated materials out of regions dependent on winter roads.
- A pilot approach is being taken in St. Theresa Point, allowing for improvisation in the development of a model relevant to similar communities in remote regions of Manitoba.

EPR Pilot Project in Bella Bella (BC)

A pilot project has been implemented in the remote coastal Heiltsuk First Nations community of Bella Bella. The pilot involved the establishment of an EPR collection point at the First Nations-operated waste transfer facility. The facility is currently handling paint, HHW, used lubricating oil, lead acid batteries, and small appliances / power tools under contractual arrangements with PROs. The Heiltsuk Environmental Bella Bella Eco-Depot is the first aboriginally-managed solid waste facility in BC to sign stewardship agreements with multiple PROs. Best practice highlights include:

- AANDC facilitated development of the project, including allocation of personnel to assist the community in establishing the facility and working with the PROs on financial support and regular removal of regulated EPR products.
- There was strong community support for the project.
- The EPR eco-depot serves as a model for PROs in terms of delivering services to remote communities. They can share transportation infrastructure and associated costs, and collaborate in solving logistical problems.
- Bella Bella will serve as a "hub" facility; recyclables from even more remote communities can be transferred to Bella Bella for consolidation and transport.
- For the community, an important advantage of the eco-depot is that the participating PROs cover the transportation costs, which is a large operational expense.
- Based on the success of Bella Bella, work is presently underway to establish an eco-depot in the remote First Nations community of Ahousat on Flores Island.

6 Lessons Learned

The research provided evidence of successful initiatives and important developments across the country, and led to a number of lessons learned in implementing programs in northern and remote communities:

- Representatives of PROs emphasized the idea that, from their perspective, a successful project requires a willing community (i.e., support of Chief and Council), and a local champion who will coordinate the project on ground for the community. Local champions in First Nations and Inuit communities have been crucial in the development of initiatives in NL, QC, MB and BC.
- Interviews with community respondents suggest that remote communities may be willing but whether they have the financial, technical and/or operational capacity to initiate or pursue available EPR / stewardship opportunities varies. Facilitation may be necessary; for example, AANDC BC Region hired a contractor to facilitate partnerships between aboriginal communities and PROs.
- AANDC is a key participant in the extension of EPR / stewardship initiatives to remote provincial communities.
 - AANDC wants to facilitate and support such developments in additional provinces, and has some financial resources available to do so.
- Given the fragmented jurisdictional responsibilities for EPR implementation, and solid waste management more broadly, in remote communities, there is evidence that the coordination of governmental and PRO activities may be helpful. The Solid Waste Action Team established in Manitoba provides an example of a coordinating mechanism.
- PRO representatives emphasized the importance of collaboration with each other in the delivery of programs to remote regions. Collaborative efforts provide means for sharing costs, solving logistical problems specific to extreme conditions, and facilitating partnerships with communities.
- Operationally, given how remote communities can be spread out over long distances, the idea
 of a "hub" based collection model is being explored. In this model, permanent depots may be
 established in certain remote locations; communities in relatively nearby locations are reimbursed
 for the costs of transporting their materials to the remote depot. Alternatively, collection events
 may be staged.
- In communities where HHW and recyclable materials are dispersed at a waste facility (i.e., limited segregation / historic stockpiles) and/or stockpiled at various locations around the community, financial support may be needed to assist the community in consolidating such materials in preparation for an EPR program.

7 Estimated Quantities of Materials

7.1 Methodology

Quantities of material sold into the marketplace, and also quantities of material at end of life (EOL), and therefore available for collection, were estimated for the following waste streams of interest:

- Electronics
- Tires
- Used Lubricating Oil
- Batteries
- Paint
- Fluorescent Lamps

The general approach to developing quantities was to collect available data for provinces and territories across Canada, and convert available data to kg/capita/year sold into the marketplace, or at end-of-life, and therefore available for collection. Per-capita rates were calculated using the population values presented in Table 11. These per-capita rates were then applied to population numbers for the regions of focus to calculate estimated sales and end-of-life quantities. It is important to recognize that this approach provides estimates that are intended to provide approximations for planning purposes, based on assumptions and ranges of contributing values. These quantities are rough estimates, and would require more refining considering local factors to increase the level of precision.

It should be noted that existing stewardship programs only capture a percentage of the amount of material at end of life and therefore available for collection.

	Population (2013)
Canada	35,154,300
NL	528,200
PEI	145,500
NS	942,900
NB	755,600
QC	8,154,000
ON	13,550,900
MB	1,265,400
SK	1,106,200
AB	4,007,200
BC	4,582,600
ΥT	36,400
NT	43,800
NU	35,400

Table 11: Population by Province and Territory Used for Quantity Estimates

7.2 Electronics

The list of electronics to be addressed in the study is presented in Table 12.

Table 12: Targeted Materials for EPR in the North Study – Electronics

Electronics Category Description
Desktop Computers
Portable Computers
Display Devices (includes televisions and monitors)
Printers
Computer Peripherals
Personal / Portable Audio / Video Playback and/or Recording Systems
Home Audio / Video Playback and/or Recording Systems
Home Theatre in a Box
Vehicle Audio and Video Systems
Non-Cellular Telephones
Answering Machines

A number of sources of information regarding electronics programs were reviewed to develop the estimates in this report. While all provincial PROs report the amount of electronics collected (which is only a percentage of the amount at end of life and actually available for collection), only BC actually reports publicly on the amount sold (in units). ARMA in Alberta provides a recovery rate from which the amount at end of life was estimated (back-calculating from the recovery rate).

The reported data from different provinces varies by the types of electronics collected and local purchasing patterns.

Table 13 presents summary 2013 data available from PRO websites and direct contacts.

Province	Sold		llected	Recovery Rate	Calculated Amount at End of Life
		tonnes	kg/capita⁵	%	tonnes
BC (2013)	8,939,944 units (1.95 units/cap)	23,234	5.04	N/A	
AB (2013-2014)	2,605,449 units (0.65 units/ cap)	19,994	4.79	43.0%	45,216 (11.28 kg/cap)
SK (2013)	N/A	3,288	2.95	N/A	
MB (2013)	N/A	3,026	2.38	N/A	
ON (2013)	N/A	76,764	5.67	N/A	
QC (2013)	N/A	10,627	1.30	N/A	
NS (2013)	N/A	4,736	5.04	N/A	
PEI (2013)	N/A	645	4.40	N/A	

Table 13: Available Data on Electronics Products from PRO Sources Across Canada

⁵ Kg/capita information taken directly from annual reports (already calculated).

7.2.1 Electronics Sales

The previous table shows that the BC program reports the units sold into the market but not the weight.

A request was submitted to electronics PROs involved in the project workshop to provide the most recent year of annual sales of the products which are collected in their stewardship programs. Sales information was received from Alberta, and was used to reverse-calculate sales information. The Alberta program collects a smaller scope of materials than that considered for this report, therefore the numbers reported are not directly transferable.

In the absence of additional sales information, estimates of the number and weight of new products sold in the NT, which were developed by the consulting company Dessau in a report prepared for NT in 2012 are considered the most reliable available. The Dessau estimates were calculated using lifespan models, which take historical unit sales into the marketplace, lifespans of different designated products (e.g., televisions vs. printers vs. laptops, etc.), likely reuse rates and second use rates, as well as changing product weights into account when calculating the weight of electronics at end of life each year.

Dessau estimated that about 34,400 units, weighing 222.2 tonnes are sold into the NT market annually (Dessau 2012). This equates to approximately 0.8 unit/capita or 2.4 electronics units per household per year, which contrasts with 2 units/capita reported by BC. The estimated weight of electronics sold into the NT marketplace equates to 5.07 kg/capita or 15.2 kg/hh sold into the NT marketplace annually.

These values were applied to the other Territories and Remote Areas to estimate the amount of electronics sold into the marketplace annually (Table 15).

7.2.2 Electronics At End of Life

While PROs report the amount of electronics collected, this is not generally converted to a recovery rate (which would be calculated using the amount actually at end of life), except for Alberta (shown in Table 13 above). Back-calculating from the ARMA data indicates that the amount of electronics at end of life in Alberta is about 11.28 kg per capita. Alberta's program currently collects a smaller list of products than other programs, therefore these figures would need to be pro-rated to account for the additional products of interest to this study.

Table 14 presents end of life rates for electronics which were estimated by Dessau for 2012 to 2020 for NT. These estimates are considered the most reliable for use in this study, as they were developed through proper lifespan modeling, taking a number of factors into account (e.g., annual sales by unit, changing weight of electronics over time). Taking the average of the 2012 and 2016 values to estimate a 2014 value, the projected electronics at end of life are estimated at 4.6 to 7.6 kg/capita. The average of these values (6.1 kg/capita) was used to estimate electronics at end of life for the territories and remote areas in Table 15.

n 	20	12	20	16	2020	
CATEGORY	Min	Мах	Min	Max	Min	Max
Display devices	3,253	4,292	3,720	4,907	4,186	5,523
Desktops computers	1,305	1,745	1,492	1,996	1,679	2,246
Laptops computers	4,712	12,956	5,388	14,814	6,064	16,673
Printers / Fax Machines / Peripherals	3,780	7,741	4,323	8,851	4,865	9,962
Portable Audio / Video and Recording	10,467	14,665	11,968	16,769	13,470	18,873
Home Audio / Video Systems	3,378	6,937	3,863	7,932	4,348	8,927
Home Theatre in a Box	577	656	660	750	743	844
Cellular phones	3,329	16,308	3,807	18,648	4,285	20,987

Table 14: Estimated Electronics At End of Life in NT (2012 to 2020)

	20	12	20	16	2020	
CATEGORY	Min	Max	Min	Max	Min	Max
Non-cellular phones	4,140	9,198	4,734	10,517	5,328	11,836
After-market vehicle audio / video systems	998	998	1,141	1,141	1,285	1,285
TOTAL – e-waste generation (units)	35,940	75,495	41,095	86,325	46,251	97,156
TOTAL – e-waste generation (kg)	177,279	294,032	202,710	336,212	228,141	378,392
TOTAL – e-waste generation (kg/capita)	4.28	7.09	4.89	8.11	5.50	9.13

(Source: Dessau 2012)

7.2.3 Electronics Sales and End-of-Life Estimates

Table 15 presents calculated estimates of electronics sold and at end of life for the study area.

Territory	Population	Electronics Sold Annually (5.07 kg/cap)	Electronics at End of Life Annually (6.1 kg/cap)
NT	43,600	221	266
NU	36,600	186	223
YT	36,500	185	222
TOTAL	116,700	592	712
Remote Communities in the Provinces	Population	Electronics Sold Annually (tonnes)	Electronics at End of Life Annually (tonnes)
AB	2,727	13.8	16.6
BC	3,319	16.8	20.2
MB	21,295	108	130
NL	3,861	19.6	23.6
ON	19,509	98.9	119
QC	15,606	79.1	95.2
SK	2,425	12.3	14.8
TOTAL Remote Communities	68,742	349	419
TOTAL Study Area		940	1,131

Table 15: Estimated Electronics Sold and at End of Life in Study Area (tonnes/year)

The table shows that an estimated 940 tonnes of electronics are sold into the study area annually – about 592 tonnes to the territories and about 350 tonnes to remote communities in the provinces. The amount of electronics at end of life is estimated at 1,130 tonnes (712 tonnes in the territories and 420 tonnes in remote provincial communities. The weight of electronics discards is greater than the weight of new products, as the older electronics at end of life weigh more per unit than newer product designs.

7.3 Tires

Tires to be addressed in this study will generally follow the categories covered by existing stewardship programs. These include:

- Passenger and Light Truck (PLT)
- Medium Truck (MT) and
- Off the Road Tires (OTR).

CCME requested that available information on mining tires be considered in the scope of materials addressed. However, information on mining tires proved difficult to obtain, so this material has not been included in this report.

7.3.1 New Sales and End of Life Rates

Vehicle registrations per capita were reviewed to consider the impact that different vehicle usage may have on territories compared to other locations in Canada. As shown in Table 16, compared to other jurisdictions, Yukon has the highest total road vehicle registration per capita, while Nunavut has the lowest by a significant margin. Yukon has a very well-developed road system in relation to their population, which is consistent with their reported high vehicle usage. Nunavut, in contrast, has the least developed highway infrastructure, resulting in their very low road vehicle usage.

On a per-household basis, Yukon again has the highest vehicle registrations per household, although by a lower margin, while Nunavut has the lowest. NT falls into a similar range as the majority of provinces.

	Canada	NL	QC	Ont.	MB	SK	AB	BC	ΥT	NT	NU
Total road motor vehicle registrations per capita	0.65	0.70	0.64	0.60	0.64	0.80	0.83	0.64	1.02	0.60	0.14
Total road motor vehicle registrations per household	1.73	1.77	1.54	1.66	1.75	2.15	2.38	1.67	2.63	1.79	0.58
Off-road, construction, farm vehicles per capita	0.06	0.38	0.09	0.05	0.06	0.01	0.05	0.00	0.04	0.03	0.03
Off-road, construction, farm vehicles per household	0.15	0.96	0.22	0.14	0.16	0.02	0.14	0.01	0.11	0.10	0.12

Table 16: Motor Vehicle Registrations, by Province & Territory (2013)

(Source: Natural Resources Canada 2007)

Off-road vehicle registrations were also looked at to assess whether the low vehicle usage in NU is offset by off-road vehicle usage. As shown in Table 16, NU off-road vehicle registrations in fact fall into the lower range of all jurisdictions. However, anecdotal reports suggest that this may be at least somewhat offset by regional realities such as municipal fleet operations (that translate into more intense-than-average vehicle use), as well as the rough roads and a tendency for winter tires to be used year-round, which leads to increased tire wear.

Sales and end of life rates for tires were estimated by applying kg/capita rates in existing provincial tire stewardship programs across Canada to the study areas based on the population base. Yukon and Nunavut were adjusted based on relative vehicle registration rates.

Available information from PRO websites and annual reports on tires sold, at end of life (and therefore available for recovery), and recovered were reviewed to develop tire estimates. The information is reported in a number of different formats and at a different level of detail by provincial program. Some report units, some report weight, some report only total PTEs (passenger tire equivalents) sold. Data is generally broken out by 4-5 types of tire depending on the provincial program. A passenger tire weighs about 10.5 kg/unit, therefore all sales have been converted to PTEs. Weights of different tires presented in Table 17 were calculated using reported average PRO data.

Table 17:	Average	Tire Unit	Weights
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Tire Type	Weight (kg/unit)
Passenger	10.5
Medium truck	54.6
Agricultural	50.9
OTR (Off road tires)	228

Available data from PRO websites and annual reports, as well as direct contacts, are presented in Table 18.

	Tires														
	Passenger & Lig	ght Truck		Medium Tru	ck		Large Agricu	Itural		OTR Total (Passenger Tire Equivalents)					
Province	Tires Sold	Tires Collected	Recovery Rate %	Tires Sold	Tires Collected	Recovery Rate %	Tires Sold	Tires Collected	Recovery Rate %	Tires Sold	Tires Collected	Recovery Rate %	Tires Sold	Tires Collected	Recovery Rate %
BC (2013)	3,139,847 units	2,448,233 units; 25,826 tonnes	78.0%	288,993 units	235,785 units; 12,865 tonnes	82.0%	12,673 units	8,711 units; 443 tonnes	69.0%	2,863 units	898 units; 205 tonnes	31.0%	3,444,376 units	2,693,627 units	78.0%
AB (2013-2014)	4,376,496 units	42,461 tonnes	N/A	539,783 units	21,572 tonnes	N/A	N/A	N/A	N/A	26,385 units	N/A	N/A	N/A	N/A	N/A
SK (2013)	1,063,418 units	666,874 units	62.7%	200,561 units	118,250 units	59.0%	44,215 units	12,412 units	28.1%	8,922 units	1880 units	21.1%	1,596,886 units	799,416 units	50.1%
MB (2013)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16,589 tonnes	14,713 tonnes	89.0%
ON (2013)	99,897 tonnes	90,160 tonnes	90.30%	37,701 tonnes	30,349 tonnes	80.5%	N/A	N/A	N/A	17,457 tonnes	19,425 tonnes	131.0%	155,055 tonnes		
QC (2013-2014)	N/A	8,000,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NB (2013)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,099,000 units	1,026,000 units	93.4%
NS (2013-2014)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,070,000 units	77.3%
PEI (2012-2013)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2,509 tonnes	N/A
NL (2013-2014)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	465,000 units	N/A

 Table 18: Tire Sales and Recovery Rates from PRO Sources Across Canada

Data in Table 18 was used to estimate the weight of tires sold into the provinces where provincial programs reported data. Information from the five provinces reporting sales (BC, SK, MB, Ontario and NB) was used to estimate an average of 11.1 kg/capita sold for the five provinces, although the actual value varied widely, as shown in Table 19.

Province	Tires Sold Annually (kg/capita)
BC (2013)	7.9
SK (2013)	15.2
MB (2013)	13.1
ON (2013)	11.4
NB (2013)	15.3
Weighted Average	11.1

Table 19: Weight of Tires Sold by Province (kg/capita)

For a product like tires, the amount sold and the amount at end of life are considered to generally be about the same, even though the collection / recovery rate varies by provincial program. In all cases, the recovery rate is calculated assuming that the amount available for recovery is the same as the amount sold.

The amount of tires at end of life has been estimated assuming the same rate of 11.1 kg/capita applied to the study area populations, adjusted for relative vehicle registrations in the case of Nunavut (factor of 0.21) and Yukon (factor of 1.57) as previously discussed. Factors were not applied to remote communities in the provinces, as the relative vehicle usage is less well understood.

7.3.2 Tires Sales and End-of-Life Estimates

Table 20 presents estimates of tires for territories and remote provincial communities. The table shows that sold and end of life tires are the same value – about 1,295 tonnes/year for the territories and 763 tonnes for remote communities in the provinces.

	Population	Tires Sold Annually (11.1 kg/cap)	Tires at End of Life Annually (11.1 kg/cap)
Territories			
NT	43,600	484	484
NU*	36,600	85	85
YT**	36,500	636	636
TOTAL	116,700	1,205	1,205

Table 20: Estimated Tires Sold and at End of Life in Study Area (tonnes/year)

	Population	Tires Sold Annually (11.1 kg/cap)	Tires at End of Life Annually (11.1 kg/cap)
Remote Commun	ities in the Pro	vinces	
AB	2,727	30.3	30.3
BC	3,319	36.8	36.8
MB	21,295	236	236
NL	3,861	42.9	42.9
ON	19,509	217	217
QC	15,606	173	173
SK	2,425	26.9	26.9
TOTAL	68,742	763	763

*factor of 0.21 applied to NU based on relative vehicle registrations

**factor of 1.57 applied to NT based on relative vehicle registrations

7.4 Used Lubricating Oil, Oil Filters, Containers, and Antifreeze

Western program scope was used to develop the broad automotive product inclusion list of "used lubricating oil, oil containers, oil filters, and antifreeze".

7.4.1 New Sales and End-of-Life Rates

Available information on products sold from PRO websites and annual reports was used to calculate kg/capita sold and available for collection. For all automotive products, a certain amount is consumed and is not available for collection. About 30% of lubricating oil is consumed and 70% becomes a product at the end of its useful life and available for collection (BCUOMA 2013). About 55% of anti-freeze is consumed with about 45% becoming an end-of-life product available for collection. These values were applied to sold quantities to estimate amounts at end of life and available for collection.

Information from PRO sources on sales and recovery / collection rates for used lubricating oil, antifreeze, filters and containers is presented in Table 21 and was used to develop the study estimates.

	í.				í.											
2013		Lubricati	ing Oil			Antifreeze				Oil Filters				Containers		
Province	Sales (I)	End of Life and Available for Collection (I)	Quantity recovered (I)	Recovery Rate %	Sales (I)	End of Life and Available for Collection (I)	Quantity recovered (I)	Recovery Rate %	Sales (Millions)	End of Life and Available for Collection (Millions)	Quantity recovered (Millions)	Recovery Rate %	Sales (kg)	End of Life and Available for Collection (kg)	Quantity recovered (kg)	Recovery Rate %
BC	95,800,000	67,000,000	50,000,000	74.6%	13,450,000	6,400,000	2,630,000	41.1%	6,350,000	6,350,000	5,260,000	82.8%	2,177,000	2,177,000	1,626,000	74.7%
AB	N/A	N/A	95,012,635	81.0%	N/A	N/A	N/A	N/A	N/A	N/A	8,382,660	92.0%	N/A	N/A	2,456,182	88.0%
SK	N/A	25,000,000	18,740,000	73.0%	N/A	N/A	N/A	N/A	2,530,000	2,530,000	2,070,000	82.0%	930,000	930,000	420,000	45.0%
MB	28,300,000	18,400,000	13,600,000	74.0%	4,789,500	2,155,300	323,700	15.0%	2,145,000	2,145,000	1,570,000	73.0%	708,400	708,400	260,000	37% / 57%
ON	N/A	N/A	N/A	N/A	N/A	9,873,000	3,448,000	35.0%	9,576	9,576	8,726	91.0%	3,515,000	3,515,000	3,753,000	107%
QC	96,879,867	70,625,423	64,785,138	91.7%	13,262,856	5,968,285	1,523,638	25.5%	9,677,444	9,677,444	7,664,067	79.2%	1,863,983	1,863,983	1,850,135	99.3%

 Table 21: Available Information on Used Lubricating Oil, Oil Filters, Containers and Antifreeze Across Canada

New lubricating oil sales information was provided for three provinces. This information was used to estimate the amount sold at an average of 15.8 litres/capita for BC, MB and QC combined. The table shows that reported sales vary widely by province. An average value of 15.8 litres/capita was used for the study. At a specific gravity of 0.88 to 0.94 (average 0.91) this equates to about 14.4 kg/capita sold per year.

Province	Sales (litres)	Population	litres/cap sold	kg/cap sold	kg/cap at 70% available	litres/cap at 70% avail.
BC	95,800,000	4,582,600	20.9	19.0	13.3	14.6
MB	28,300,000	1,265,400	22.4	20.4	14.2	15.7
QC	96,879,867	8,154,000	11.9	10.8	7.6	8.3
Total (avg.)	220,979,867	14,002,000	15.8	14.4	10.1	11.0

Table 22: Lubricating Oil Sales Information Used For Estimates

7.4.2 Used Lubricating Oil and Antifreeze Sales and End-of-Life Estimates

Table 23 presents estimates of used lubricating oil sales and amounts at end of life (and available for collection) in both litres and tonnes for the study area. Adjustments were not made for relative vehicle registrations based on the balancing effect of increased oil change intervals due to dusty conditions, as well as consumption of additional oil products in other equipment such as generators and mining equipment in remote jurisdictions like Nunavut and Northwest Territories. Corroborating sources of used lubricating oil generation suggest potentially higher generation rates, with nearly 1.2 million litres of used lubricating oil documented in NT in 2013, a rate more than twice the amount calculated in this section.

Table 23: Estimated Lubricating Oil Sales and Used Lubricating Oil in Study Area

Territory	Population	Sold litres/year	Sold tonnes/year (14.4 kg/cap)	End of Life and Available for Collection litres/year	End of Life and Available for Collection tonnes/year (10.1 kg/cap)
NT	43,600	688,880	627.8	479,600	440.4
NU	36,600	578,280	527.0	402,600	369.7
YT	36,500	576,700	525.6	401,500	368.7
TOTAL	116,700	1,843,860	1,680.5	1,283,700	1,179

Remote Communities in the Provinces	Population	Sold litres/year	Sold tonnes/year (14.4 kg/cap)	End of Life and Available for Collection litres/year	End of Life and Available for Collection tonnes/year (10.1 kg/cap)
AB	2,727	43,087	39.3	29,997	27.5
BC	3,319	52,440	47.8	36,509	33.5
MB	21,295	336,461	306.6	234,245	215.1
NL	3,861	61,004	55.6	42,471	39.0
ON	19,509	308,242	280.9	214,599	197.0
QC	15,606	246,575	224.7	171,666	157.6
SK	2,425	38,315	34.9	26,675	24.5
TOTAL – Remote Communities	68,742	1,086,124	989.9	756,162	694.3
Total – Study Area		2,929,983	2,670	2,039,862	1,873

Information from the PRO websites and annual reports was used to estimate per capita new sales rates and end-of-life generation rates for antifreeze, oil filters and oil containers, which were in turn used to calculate sales and end-of-life generation rates. Over 50% of antifreeze is consumed in use, therefore the amount at end of life and available for collection is about half of the purchased / sold amount. Estimates were converted from litres to kg using a density of 1.156 kg/m³ for antifreeze. The amounts of filters and containers sold and at end of life are considered equal. The resulting estimates are presented in Table 24.

Table 24: Estimated Antifreeze, Oil Filters and Containers Sold and at End of Life and Available for Collection in Study Area (tonnes/year)

Territory	Population	Antifreeze Sold (2.5 kg/cap)	Antifreeze at End of Life and Available for Collection (1.2 kg/cap)	Filters Sold and at End of Life and Available for Collection (0.71 kg/cap)	Containers Sold and at End of Life and Available for Collection (0.32 kg/cap)
NT	43,600	109.0	52.3	31.0	14.0
NU	36,600	91.5	43.9	26.0	11.7
YT	36,500	91.3	43.8	25.9	11.7
TOTAL	116,700	291.8	140	82.9	37.3

Remote Communities in the Provinces	Population	Antifreeze Sold (2.5 kg/cap)	Antifreeze at End of Life and Available for Collection (1.2 kg/cap)	Filters Sold and at End of Life and Available for Collection (0.71 kg/cap)	Containers Sold and at End of Life and Available for Collection (0.32 kg/cap)
AB	2,727	6.8	3.3	1.9	0.9
BC	3,319	8.3	4.0	2.4	1.1
MB	21,295	53.2	25.6	15.1	6.8
NL	3,861	9.7	4.6	2.7	1.2
ON	19,509	48.8	23.4	13.9	6.2
QC	15,606	39.0	18.7	11.1	5.0
SK	2,425	6.1	2.9	1.7	0.8
TOTAL – Remote Areas	68,742	172	82.5	48.8	22.0
Total – Study Area	185,442	464	223	132	59

The table shows that the amount of antifreeze which is at end of life and available for collection annually is about 223 tonnes in the study area (140 tonnes in the territories and about 82 tonnes in the remote communities of other provinces). The amount of filters sold is estimated at 132 tonnes for the study area. The amount of filters at end of life and available for collection annually is estimated to also be 132 tonnes. The amount of containers sold into the study area and available for collection at end of life are estimated at the same amount – 59 tonnes.

7.5 Lead Acid Batteries

Lead acid battery products were aligned with programs run by the Canadian Battery Association in MB and BC (Green Manitoba 2015). Data on battery quantities collected from the BC and MB programs vary from 3.4 kg/cap in BC to 6 kg/cap in Manitoba. The rate of 6 kg/capita for Manitoba was considered more appropriate for the study area, based on similar weather conditions that lead to decreased battery life, and was then applied to the study area population to estimate sold rates and SLABs (spent lead acid batteries), sometimes referred to as ULABs (used lead acid batteries) at end of life and available for collection. It should be noted that for lead acid batteries in particular, it is generally accepted that the amount sold is equal to the amount at end of life and available for collection, as lead acid battery replacement is generally a one-for-one exchange. The amounts are roughly equal as there is no consumption during use.

The 6 kg/capita/year value was used to calculate both sold lead acid batteries, as well as those at end of life and available for collection, presented in Table 25.

Territory	Population	Lead Acid Batteries Sold and also at End of Life and Available for Collection (6 kg/cap)
NT	43,600	262
NU	36,600	220
YT	36,500	219
TOTAL – Territories	116,700	700
Remote Communities in the Provinces	Population	Lead Acid Batteries Sold and also at End of Life and Available for Collection (6 kg/cap)
AB	2,727	16.4
BC	3,319	19.9
MB	21,295	128
NL	3,861	23.2
ON	19,509	117
QC	15,606	93.6
SK	2,425	14.6
TOTAL – Remote Communities	68,742	413
Total – Study Area	185,442	1,113

Table 25: Estimated Lead Acid Batteries Sold and at End of Life and Available for Collection in Study Area (tonnes/year)

The amount of lead acid batteries sold into the study area, and the amount at end of life and available for collection each year is estimated at the same quantity – an estimated 1,112.7 tonnes for the study area.

7.6 Fluorescent Lights

For this project, fluorescents include generally consumer products – CFLs (compact fluorescent lamps) and small fluorescent tubes. Sales estimates as well as amounts at end of life and available for collection reported by programs in BC and MB were used to estimate values for the study area.

Information on units of compact fluorescent lamps (CFL) and fluorescent tubes sold into the market were reported in the BC and MB programs. These unit values were converted to weight using an average weight of 0.1 kg (100 grams) for a CFL and a weight ranging from 272 to 375 grams for fluorescent tubes (LightRecycle 2010), resulting in an estimated sales rate of 0.34 kg/capita per year. The estimates of fluorescent lamps "available for recycling" or at end of life were provided for both provinces and translated to a rate of 0.36 kg/capita per year. The higher amount at end of life compared to sales (as measured by weight) is explained by the lighter weight of new tubes and formats such as CFLs compared to older fluorescent tubes. The long lifespan of these lamps means lamps at end of life are much heavier than new products entering the market.

The amount at end of life each year is estimated by LightRecycle for BC using an "available to recycle" model which takes lifespans and numbers of fluorescent lamps sold into the marketplace historically over many years into account.

The estimated amounts of fluorescent lamps sold and at end of life and available for collection in the study area annually are presented in Table 26.

Territory	Population	Fl lamps Sold Annually (0.34 kg/cap)	FI lamps at End of Life and Available for Collection Annually (0.36 kg/cap)
NT	43,600	14.8	15.7
NU	36,600	12.4	13.2
YT	36,500	12.4	13.1
TOTAL – Territories	116,700	39.7	42.0
Remote Communities in the Provinces	Population	FI lamps Sold Annually (0.34 kg/cap)	FI lamps at End of Life and Available for Collection Annually
			(0.36 kg/cap)
AB	2,727	0.9	(0.36 kg/cap) 1.0
AB BC	2,727 3,319	0.9	(0.36 kg/cap) 1.0 1.2
AB BC MB	2,727 3,319 21,295	0.9 1.1 7.2	(0.36 kg/cap) 1.0 1.2 7.7
AB BC MB NL	2,727 3,319 21,295 3,861	0.9 1.1 7.2 1.3	(0.36 kg/cap) 1.0 1.2 7.7 1.4
AB BC MB NL ON	2,727 3,319 21,295 3,861 19,509	0.9 1.1 7.2 1.3 6.6	(0.36 kg/cap) 1.0 1.2 7.7 1.4 7.0
AB BC MB NL ON QC	2,727 3,319 21,295 3,861 19,509 15,606	0.9 1.1 7.2 1.3 6.6 5.3	(0.36 kg/cap) 1.0 1.2 7.7 1.4 7.0 5.6
AB BC MB NL ON QC SK	2,727 3,319 21,295 3,861 19,509 15,606 2,425	0.9 1.1 7.2 1.3 6.6 5.3 0.8	(0.36 kg/cap) 1.0 1.2 7.7 1.4 7.0 5.6 0.9
AB BC MB NL ON QC SK TOTAL – Remote Communities	2,727 3,319 21,295 3,861 19,509 15,606 2,425 68,742	0.9 1.1 7.2 1.3 6.6 5.3 0.8 23.4	(0.36 kg/cap) 1.0 1.2 7.7 1.4 7.0 5.6 0.9 24.7

Table 26: Estimated Quantities of Fluorescent Lamps Sold Into the Study Area and at End of Life and Available for Collection Annually (tonnes/year)

It is estimated that about 67 tonnes of fluorescent lamps are sold into the study area annually. The amount at end of life and available for collection is estimated at about 63 tonnes, based on lifespan modelling previously outlined.

7.7 Paint

The list of products captured under the paint category are those collected by Product Care and ARMA programs. Paint stewardship programs are operating in a number of Canadian provinces. The available information from these programs is presented in Table 27 and was used to develop estimates of paint sold and unused paint as well as paint containers available for recycling in the study area. Paint is different to other materials studied in that most of the paint is consumed and only a small percentage is left as residual and therefore at end of life and available for collection.

A total of 78 million litres of paint was sold into six provinces for which data were reported. This translates into an average of 7.1 litres/capita sold. At a density of 1.3 kg/m³, this equates to 9.2 kg/capita/year. This value was used for the study area.

	Paint	(non aeros	iol)	Pa	aint Aerosol			Total Paint		Pa	Paint Containers			
Province / Territory	Sold (litres)	Residual Recovery Volume (litres)	Recovery Rate (%)	Sold (litres)*	Residual Recovery Volume (litres)	Recovery Rate (%)	Total Paint Sold (litres)	Total Residual Recovery Volume (litres)	Overall Recovery Rate (%)	Metal Containers Collected	Plastic Containers Collected	Total		
BC (2013)	27,123,049	2,852,349	10.52%	1,123,771	37,008	3.29%	28,246,820	2,889,357	10.23%	N/A	N/A	N/A		
AB (2013-2014)	N/A	N/A	N/A	N/A	N/A	N/A	33,000,000	2,380,000	7.21%	469,592 kg	123,254 kg	592,846 kg		
SK (2013)	N/A	380,664	N/A	N/A	66 tubskids collected = 28,512 l	N/A	6,280,000	2,209 tubskids collected = 954,288 l	5.58%	115.3 tonnes	5 tonnes	120.3 tonnes		
MB (2013)	6,584,133	260,912	3.96%	873,053 units	28,525 units	3.27%	N/A	N/A	N/A	N/A	N/A	N/A		
ON (2012)	N/A	N/A	N/A	N/A	N/A	N/A	9,765 tonnes (available for collection)	9,377 tonnes	96.00%	696 tonnes	N/A	N/A		
QC (2013)	51,524,716	N/A	N/A	N/A	N/A	N/A	N/A	see note	N/A	N/A	N/A	N/A		
NB (2013)	N/A	236,187	N/A	N/A	562	N/A	5,491,670	236,749	4.31%	54.35 tonnes	4.86 tonnes	59.21 tonnes		
PEI (2013)		63,014			44		249,925	63,058	25.23%	N/A	N/A	N/A		
NL (2013)	5,019,943	161,036	3.21%	168,565	47	0.03%	5,188,508	161,083	3.10%	31.7 tonnes	2.56 tonnes	34.26 tonnes		

Table 27: Available Information on Paint Stewardship Programs Across Canada

The amount of paint not consumed during use and therefore available for collection at end of life is estimated at 10% to 15% (average 12%) of the amount sold (ARMA 2014). It may take years for people to actually make the paint which has been sitting in cans for some time available for collection. Half-empty paint cans tend to sit in garages, cottages, and basements for years before being considered at end of life. The estimate of the paint at end of life on an annual basis was based on 12% of the quantity sold into the market – 0.85 litres/cap or 1.1 kg/cap.

Steel paint cans sold were estimated using a value of 5,072,000 kg of steel paint cans sold into the Ontario market (population 13.3 million) reported by stewards to Stewardship Ontario. This converts to 0.37 kg/cap. Plastic paint cans are generally a small percentage of the steel cans – a value of 10% was used for the preliminary estimates.

7.7.1 Paint Sales and End-of-Life Estimates

Estimates for paint sold, paint residual at end of life, and paint cans sold and at end of life are presented for the study area in Table 28.

Territory	Population	Paint Sold (9.2 kg/cap)	Paint Residual at End of Life (1.1 kg/cap)	Steel Paint Cans (0.37 kg/cap)	Plastic Paint Cans (0.037 kg/cap)
NT	43,600	401.1	48.0	16.1	1.6
NU	36,600	336.7	40.3	13.5	1.4
ΥT	36,500	335.8	40.2	13.5	1.4
TOTAL	116,700	1,074	128	43.2	4.3
Remote Communities in the Provinces	Population	Paint Sold (9.2 kg/cap)	Paint Residual at End of Life (1.1 kg/cap)	Steel Paint Cans (0.37 kg/cap)	Plastic Paint Cans (0.037 kg/cap)
AB	2,727	25.1	3.0	1.0	0.1
BC	3,319	30.5	3.7	1.2	0.1
MB	21,295	196	23.4	7.9	0.8
NL	3,861	35.5	4.2	1.4	0.1
ON	19,509	180	21.5	7.2	0.7
QC	15,606	144	17.2	5.8	0.6
SK	2,425	22.3	2.7	0.9	0.1
TOTAL Remote Communities	68,742	632	75.6	25.4	2.5
Total – Study Area	185,442	1706	204	68.6	6.9

Table 28: Estimated Paint Sold and Paint Residual at End of Life in the Study Area (tonnes/year)

The table shows that an estimated 1,706 tonnes of paint are sold into the study area. About 204 tonnes of paint is not consumed and is a paint residual at end of life and available for collection. An estimated 68 tonnes of steel paint cans and about 7 tonnes of plastic cans are sold into the market in the study area. A similar amount is expected to be at end of life and available for collection.

7.8 Consumer Batteries

For consumer batteries, the list collected by the Call2Recycle program are of interest to the study. These are listed in Table 29.

Table 29: Consumer Batteries Included in EPR North Study

Nickel cadmium (NiCd)
Lithium Ion (Li-Ion)
Small Sealed Lead Acid (SSLA)
Nickel Metal Hydride (NiMH)
Nickel zinc (Ni-ZN)
Alkaline / single use
Lithium primary batteries

The amount of consumer batteries sold into the study area is based on a rate of 0.55 kg/cap calculated from the Ontario and BC programs. The amount discarded was estimated in a 2009 Environment Canada study to range from 0.50 to 0.53 kg/capita/year in 2007, increasing by 20% to 0.56 to 0.64 kg/capita/year by 2015 (Environment Canada / Natural Resources Canada 2009). The Environment Canada study was based on sales data available in 2007. Because actual sales data available for Ontario and BC are much more current, this was considered a more reliable basis for the end of life estimates for this study. The amounts by location in the study area are presented in Table 30 which shows that the total for the study area is about 102 tonnes/year.

Table 30: Consumer Batteries Sold and Available for Collection at End of Life in the Study Area (tonnes/ year)

Territory	Population	Consumer Batteries Sold and also at End of Life and Available for Collection (0.55 kg/cap)
NT	43,600	24.0
NU	36,600	20.1
YT	36,500	20.1
TOTAL	116,700	64.2

Remote Communities in the Provinces	Population	Consumer Batteries Sold and also at End of Life and Available for Collection (0.55 kg/cap)
AB	2,727	1.5
BC	3,319	1.8
MB	21,295	11.7
NL	3,861	2.1
ON	19,509	10.7
QC	15,606	8.6
SK	2,425	1.3
TOTAL	68,742	37.8
Total – Study Area	185,442	102

7.9 Summary Quantity Estimates of Products Sold and Disposed

Table 31 summarizes the estimated weights of products sold and at end of life and available for collection by broad category in the territories and remote regions of the provinces.

Jurisdiction	Population	Electronics Sold	Electronics EOL	Tires Sold	Tires EOL	Used Oil Sold (I)	Used Oil Sold (t)	Used Oil EOL (I)	Used Oil EOL (t)	Antifreeze Sold	Antifreeze EOL	Filters Sold and EOL	Containers Sold and EOL	Lead Acid Batt Sold and EOL	FI lamps Sold	FI lamps EOL	Paint Sold	Paint EOL	Steel Paint Cans	Plastic Paint Cans	Consum Batt Sold and EOL
kg/cap		5.07	6.10	11.1*	11.1*	15.8	14.4	11	10.1	2.5	1.2	0.71	0.32	6	0.34	0.36	9.2	1.1	0.37	0.037	0.55
NT	43,600	221	266	484	484	688,880	628	479,600	440	109	52	31	14	262	15	16	401	48	16	1.6	24
NU	36,600	186	223	406	406	578,280	527	402,600	370	92	44	26	12	220	12	13	337	40	14	1.4	20
YT	36,500	185	223	405	405	576,700	526	401,500	369	91	44	26	12	219	12	13	336	40	14	1.4	20
TOTAL	116,700	592	712	1,295	1,295	1,843,860	1,681	1,283,700	1,179	292	140	83	37	700	40	42	1,074	128	43	4.3	64
Remote Com	munities in t	he Provinces																			
AB	2,727	14	17	30	30	43,087	40	29,997	28	6.8	3.3	1.9	0.9	16	0.9	1.0	25	3.0	1.0	0.1	1.5
BC	3,319	17	20	37	37	52,440	48	36,509	34	8.3	4.0	2.4	1.1	20	1.1	1.2	31	3.7	1.2	0.1	1.8
MB	21,295	108	130	236	236	336,461	307	234,245	215	53	26	15	6.8	128	7.2	7.7	196	23	7.9	0.8	12
NL	3,861	20	24	43	43	61,004	56	42,471	39	9.7	4.6	2.7	1.2	23	1.3	1.4	36	4.2	1.4	0.1	2.1
ON	19,509	99	119	217	217	308,242	281	214,599	197	49	23	14	6.2	117	6.6	7.0	180	22	7.2	0.7	11
QC	15,606	79	95	173	173	246,575	225	171,666	158	39	19	11	5.0	94	5.3	5.6	144	17	5.8	0.6	8.6
SK	2,425	12	15	27	27	38,315	35	26,675	25	6.1	2.9	1.7	0.8	15	0.8	0.9	22	2.7	0.9	0.1	1.3
TOTAL	68,742	349	419	763	763	1,086,124	990	756,162	694	172	83	49	22	413	23	25	632	76	25	2.5	38
Territories ar	nd Remote Re	egions combir	ned																		
TOTAL	185,442	940	1,131	2,058	2,058	2,929,984	2,670	2,039,862	1,873	464	223	132	59	1,113	63	67	1706	204	69	6.9	102

Table 31: Quantities by Community and Material

*factors of 0.21 and 1.57 applied to NU and NT, respectively, based on relative vehicle registrations

8 Information Gaps

Compiling information in this report presented challenges based on gaps in information available in accessible, consolidated form. Specifically, the gaps included the following:

- Quantified sales of products into the territories (all channels retail, online, out-of-province)
- Information regarding historic stockpiles of target materials in the territories
- Total quantified amounts shipped for recycling for each target material by territory. Currently available information is fragmented and in some cases anecdotal.
- Without specific sales and waste generation amounts for the territories, national per-capita averages were used. Although some adjustments were made for known regional differences (i.e., lower vehicle usage in NU), information regarding differences in material use in remote regions was anecdotal at best, not allowing accurate adjustments to be incorporated.
- Uncertainties of identifying "remote" communities. The definition of no year-round road access used for this study potentially misses communities that experience challenges of remoteness.
- Population data was difficult to obtain for some remote communities, requiring the use of multiple sources, including Statistics Canada and AANDC.

The study team was able to obtain representative information or extrapolate available data to be able to develop reasonable assumptions and estimates for the purposes of understanding the general flow of material and waste management systems for specified product categories in the regions of interest. However, additional quantification would increase the level of accuracy and overall comprehensiveness of the results.

Appendices

Appendix A: Summary of CAP EPR Phase 1 Materials

(Source: State of Waste Management in Canada, Giroux Environmental Consulting 2014)

Legend:

All EPR programs are shaded in blue cells.



				aate Diverar		otowaruship	r rogramaj c		last i mate	laio			
Material	BC	AB	SK	MB	ON	QC	PE	NB	NS	NL	YT	NT	NU
Packaging - Milk Containers	E-V	Р	E-V	S	S	S	Р	E-V	S	(E – V)	consider	Р	
Packaging - Beverage Containers	E-L	Р	Р	E-L	P liquor/wine	P beer & soft drinks	Р	Р	Р	Р	Р	Р	(P) liquor/ beer
Multi-packaging and printed materials	E-L	consider	S	S	S	S	consider	consider	consider	consider			
Electronics - Audio- visual and Telecom	E-L	consider	E-L	E-L	E-L	E-L	E-L	pending	E-L	E-L	consider	consider	
Electronics - cell phones	E-L	E-V	E-V	E-L	E-L	E-L	E-L	E – V*	E-L	E-L	E – V consider P	E-V	
Electronics- computers, accessories and IT equipment	E-L	Р	E-L	E-L	E-L	E-L	E-L	pending	E-L	E-L	consider	consider	
Electronics - tools	E-L	consider				consider	consider						
Electronics - TVs	E-L	Р	E-L	E-L	E-L	E-L	E-L	pending	E-L	E-L	consider	consider	
HHSW- batteries	E-L	S*	E-V	E-L	E – L single use	E-L	E-V	E-V	E-V	E – V*			
HHSW- corrosives & irritants	E-L	S*	consider	E – L corrosives	E-L	consider	Р		consider	consider			
HHSW- aerosols, solvents & flammables	E-L	S*	consider	E – L solvents & flammables	E-L	consider	Р		consider	consider			
HHSW- mercury lamps, other mercury products	E-L	consider	consider	E-L	Р	E-L	pending		consider	consider			
HHSW - paint	E-L	Р	E-L	E-L	E-L	E-L	E-L	E-L	E-L	E-L			
HHSW -pesticides/ fertilizers & containers	E – L pesticides	E-V	E – V*	E-L	E-L	E-V	E-V	E–V	E-V	E-V			
HHSW-pharmaceuticals	E-L	E-V	E-V	E-L	E-L	E-V	pending	E-V	E – V*	E-V	E-V		E – V
HHSW- sharps/syringes			consider	E-L	E-L	consider	pending		E – V*	consider	E-V		
Automotive -batteries	E-L			E-L		consider	pending	E-V		E – V*			
Automotive -tires	E-L	Р	Р	E-L	E-L	P*	Р	P*	Р	Р	Р		
Automotive -used oil, oil containers and/or filters	E-L	Р	E-L	E-L	E – L (containers and filters)	E-L	pending	E-L	P* (used oil)	P*			
Automotive -other (e.g. glycol)	E-L	consider	E-L	E-L	E-L	E-L	pending	E-L	consider	pending			

Exhibit 16: MSW Waste Diversion (EPR and Stewardship Programs) CAP EPR Phase 1 Materials

Notes: * = legislated EPR being considered; (P) = Deposit is charged territory-wide, collection depot only in Iqaluit. This inventory does not take into account initiatives led by individual manufacturers or retailers to collect end-of-life products. There is a national stewardship program for mercury switches (end-of-life vehicles, ELVs) as part of the federal notice to prepare and implement pollution prevention plans for mercury releases from ELVs processed by steel mills. Currently, there are no legislated EPR requirements at the federal level.

Ar	pendix	B:	Remote	Communities	by	Province

Province	Remote Communities	
AB	Fort Chipewyan	Fox Lake
BC	Ahousat / Marktosis 15	Ocean Falls
	Hartley Bay / Kulkayu 4	Oona River (Porcher Island)
	Kingcome Inlet / Quaee 7	Opitsat 1 (Meares Island)
	Kitkatla / Gitxaala / Dolphin Is 1	Oweekeno
	Klemtu / Kitasoo	Refuge Cove 6 / Hesquiat 1
	Kyuquot / Houpsitas	Tseh Keh Dene
	Lax Kw'Alaams / Port Simpson	Fort Ware / Kwadacha
MB	Berens River 13 First Nation (FN)	Oxford House (FN)
	Berens River Community Council (CC)	Oxford House (CC)
	Bloodvein 12 (FN)	Pauingassi (FN)
	Brochet 197 (FN)	Poplar River 16 (FN)
	Brochet (CC)	Pukatawagan 198 (FN)
	Garden Hill (FN)	Red Sucker Lake 1976 (FN)
	Gods Lake (23) Narrows (FN)	Red Sucker Lake (CC)
	Gods Lake Narrows (CC)	Shamattawa 1 (FN)
	Gods River 86A (FN)	South Indian Lake (FN)
	Granville Lake (CC)	St. Theresa Point (FN)
	Island Lake (CC)	Tadoule Lake (FN)
	Lac Brochet 197A (FN)	Waasagomach (Wasagamack) (FN)
	Little Grand Rapids (FN)	York Landing (FN)
	Little Grand Rapids (CC)	Princess Harbour (CC)
NL	Black Tickle	Postville
	Hopedale	Rigolet
	Makkovik	Norman Bay
	Nain	Williams Harbour
	Natuashish	

Province	Remote Communities	
ON	Angling Lake / Wapeketa	Muskrat Dam
	Attawapiskat	North Spirit Lake
	Bearskin Lake	Ogoki Post / Marten Falls
	Big Trout Lake / Kitchenuhmaykoosib	Peawanuck
	Cat Lake	Pikangikum
	Deer Lake	Poplar Hill
	Eabametoong Lake / Fort Hope 64	Sachigo Lake
	Fort Albany 67 (Part)	Sandy Lake
	Fort Severn	Slate Falls
	Kasabonika	Summer Beaver / Nibinamik
	Kashechewan / Fort Albany 67 (Part)	Weagamow Lake / North Caribou
	Keewaywin	Webequie
	Kingfisher Lake	Wunnummin Lake
	Lansdowne House / Neskantaga	Wawakapewin
QC	Akulivik	Kangiqsujuaq
	Aupaluk	Kangirsuk
	Chevery	Kuujjuaq
	Harrington Harbour	Kuujjuarapik
	Kegaska	Pakuashipi
	Tête-à-la-Baleine	Port-Menier / L'Île-d'Anticosti
	La Romaine	Puvirnituq
	Unamen Shipu	Quaqtaq
	La Tabatière	Salluit
	Mutton Bay	St. Augustin, ME
	Inukjuak	Tasiujaq
	lvujivik	Umiujaq
	Kangiqsualujjuaq	
SK	Black Lake (Chicken 224)	Stony Rapids
	Camsell Portage	Uranium City
	Fond-du-Lac 874	Wollaston Lake / Lac La Hache 220

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