Regional Waste Backhaul in Rural Alaska

YR 2015 Baseline Assessment Draft Report

Researched and Compiled by

Zender Environmental Health and Research Group

For

Booz | Allen | Hamilton

With Funding from the

United States Environmental Protection Agency

November 2015

Table of Contents

Executive Summary

A unique component of a remote Alaska community waste management program, backhaul refers to transporting wastes and used materials hundreds to thousands of miles to end-recycling destinations, most commonly by barge or plane. Each region has different shipping logistics, end- recyclers, season/weather constraints, collection and storage infrastructure, and different logistics within each of its villages.

While still challenging for small towns, Alaska's metropolitan areas and road system communities do not face the same daunting logistical or financial hurdles as their more isolated counterparts. And Southeast communities and the Aleutians for the most part have individual programs that work directly with regular Seattle year-round barge service. Financing backhaul is also not a present concern of Arctic Slope communities that benefit from a Borough program and well-developed transportation infrastructure. This report therefore focuses on Bering Straits, Calista, Bristol Bay, Nana, Koniag, and Doyon regions. Villages here are primarily off-road, with limited barge schedules and transportation options, and economically depressed. Operating backhaul programs is incredibly complex and financially challenging.

It has been observed by backhaul experts for several years now that the regions with the greatest proportion of villages consistently backhauling are those with established regional programs offering transport assistance from the hub-based coordinators and a range of technical assistance as needed. Supporting the supposition that coordinative assistance might facilitate successful backhaul, many villages that perform larger backhaul projects on their own use extensive technical assistance. The Environmental Protection Agency (EPA) therefore commissioned this report to assess regional backhaul conditions as currently experienced and efforts as currently practiced, and to use the garnered information to project the cost for each region of operating an established program.

As of 2015, Nana and Bering Straits regions are home to the sole operational regional backhaul programs servicing most or all of their communities, and are used here as regional program models. Both programs, managed by Maniilaq and Kawerak, are operated with a "hub and spoke" structure, whereby for the most part, the village programs stage, package, and prepare

materials, then ship them by barge, small boat, plane, or ice road to the hub. The hub program then organizes and implements consolidated or individual shipments to the end-destinations (Anchorage or Seattle). The hub program coordinators also serve to educate, train, and assist village staff with organizing, packaging, labeling, and a variety of other technical needs.

Village communication and assistance are essential to the regional programs because the infrastructure, personnel, and community participation determine the volume and type of materials, if any, routed to the hub. Also, many individual villages carry out backhaul projects and programs separate from the hub program. Coordination between hub and village for these projects can result in better relationships with transporters and more in-kind opportunities from a wider stakeholder network.

Not all regions are ideally suited to a full hub and spoke model, at least based on current hub port, staging, or coordinative capacities. There may also be varied shipping logistics so that it is more economical to ship direct from some villages to Anchorage or Seattle, or it is simply infeasible to ship from the hub port. For example, barges stop at Toksook Bay in Western Alaska on their way to Seattle. For those materials to be flown by plane to Bethel only to be placed on that same barge to Seattle can result in an unnecessary transport cost incurred by the village or regional program. Several Lake and Peninsula Borough villages rely on a series of landing craft, small family-owned barges, trucks, and/or planes to bring their materials to market, often via Homer. Direct backhaul of hazardous wastes, such as lead-acid batteries, from some "Lake and Pen" villages to Dillingham is not possible.

Yet, even with individual village logistics necessitating different approaches, hub and spoke programs can still serve to provide economy-of-scale supplying, training, transporter networking and discounting, and much more. Hub and spoke routing can be carried out for those villages where it makes sense, while regional programs can assist in village direct routing for the rest. With the positive benefits and ability for regional programs to support either hub or individual village routing, it is hoped that this report's results provide useful information for decision makers, backhaul practitioners, and potential backhaul financiers in exploring regional

program financial feasibility for all of Alaska's small off-road villages.

This report is divided into two main sections. Regional summaries are offered first with a description of existing and recent backhaul efforts. For focus regions, a budget table of projected costs for a fully operational regional program is also provided. Wrapping up the report main body is a description of key factors contributing to regional program costs and the dynamic nature of backhaul program efforts.

Projected program costs are listed in the table at bottom for focus regions to provide "hub and spoke" logistical and technical backhaul support for backhaul with exception of scrap metal backhaul for which technical assistance only is included. At certain volumes, scrap transport is performed free-of-charge by metal companies, and without this free transport to Seattle, scrap recycling is financially untenable. Because scrap metal poses no harm with proper vehicle and appliance staging, conventional wisdom is to store on- or off-site until a use is found, or bury it. Informative scrap metal backhaul data is sorely lacking as a result, and scrap recovery volume— which is needed to project scrap backhaul costs, cannot be reliably estimated.

The projected program value assumes no discount or donation, and varies primarily with shipping costs and number of villages. The backhaul volume projected for each village is consistent with the pound per person rates of well-supported village programs. The average projected household cost is derived from that value using the total number of a region's households, and is a better comparative value. Two scenarios are included: with a 50 percent transportation discount, and without. Additionally, a truer household cost is provided that includes the cost of the local village program. For simplicity, household costs are for all households across the region to pay an equal portion of the total region-wide household cost. Detailed budget tables can be found in the report under each region. With its lower shipping rates and fewest villages, Koniag region program costs are by far the lowest. Comparatively, Bristol Bay faces the highest per household cost at more than 2.5 times with its high shipping rates reflective of challenging logistics and high number of small population villages to serve. Calista, with the greatest number of villages and highest personnel demand has the highest program cost, but one of the lowest household costs due to the large number of households. Shipping costs are not the highest budget line item. The assumption of discounted shipping across all regional programs lowers the household cost by just $19 to $25. Incorporation of the local village program burden increases regional program cost substantially and unmasks a tremendous variation among regions.

The backhaul programs and efforts described here represent a snapshot only. Backhaul feasibility – whether via established programs or smaller projects varies annually, seasonally, and daily. Primary variables and extra-regional challenges contributing to this dynamic include temporal parameters such as fuel costs, commodity values, revenue streams heavily dependent on variable federal grant cycles, state revenue sharing, private donations, and the global transportation economy. Geographic variables include shipping season dates, barge routing, river depth hydrology, transport company service areas, and climate change factors affecting port infrastructure. Village infrastructural variables include ownership or use of staging equipment, storage areas (and access to those areas during spring and winter), packaging supplies, village staff experience, availability, and training, and village priorities and emergencies. Additionally regional staff experience, regional hub infrastructure, and hub priorities are critical.

Annual Backhaul Program Costs, By Region

	Bering Straits	Nana	Bristol Bay	Doyon	Calista	Koniag
Projected Regional Program Value	$217,764	$122,869	$189,881	$150,362	$536,897	$126,482
Per household cost	$144	$113	$194	$172	$110	$71
With 50% shipping discount	$117	$88	$175	$158	$88	$50
With local program cost	$314	$271	$600	$546	$277	$139

## The Status of Backhaul and Projected Program Costs, by Region

This section presents the status of backhaul programs by region, along with the anticipated costs and material volumes to operate an established regional program in the regions currently lacking a working model.

Methodology

As of 2015, Nana and Bering Straits regions are home to the sole operational regional backhaul programs servicing most or all of their communities (operated by Maniilaq and Kawerak respectively). Both operate in what is often referred to as a "Hub and Spoke" backhaul program. A hub coordinator assists village programs in relaying their materials to the hub by providing varying degrees of education, supplies, training, hands-on packing assistance, and regional transporter networking and logistics planning. The coordinator then consolidates and/or organizes shipment of materials from the hub to the end-destination, often securing better rates and service than an individual is able to procure. While each region varies with village program need, shipping logistics and costs, transporter donations, hub facilities, and much more, the Maniilaq and Kawerak programs serve as a general template in projecting needs and costs in establishing hub and spoke programs in other regions.

Program information for these and other region program and efforts was obtained directly from regional backhaul service providers—primarily hub-based backhaul coordinators or hub-based Tribal environmental coordinators. Communications used included email, phone, and a facilitated in-person all-regions meeting on October 14, 2015 in Anchorage. Additional information, when needed, was obtained from individual village programs. To calculate a projected program cost for regions without a true regional program, an annual average per capita waste volume, by type, was determined for off-road villages using backhaul data from 37 villages, supplied by Total Reclaim, Zender Environmental, and St. Mary's Environmental program. Only backhaul volumes from operational programs were used, and to the extent possible in deriving sustained year-to-year operational costs, annual waste volumes were distinguished from backhaul projects that sent historic accumulated wastes ("legacy waste"). After much research, the data sets used were determined to be the only available in the state that both separated out waste type and tracked the village and time period. The annual average per capita waste volume backhauled from fully operational village programs was multiplied by the village populations for each region to obtain total region and per village backhaul volumes. To derive a shipping cost, average village to hub and hub to port quotes were obtained for each region (primarily per barge connex or per flight weight costs), and multiplied by the projected backhaul volumes. The remaining program costs were estimated using Kawerak and Maniilaq costs, with personnel proportionately adjusted for number of villages served, and shipping costs adjusted for total waste volume projected. Note, villages vary in size so that waste volume, and hence shipping costs for ten villages in one region may vary greatly from ten villages in another.
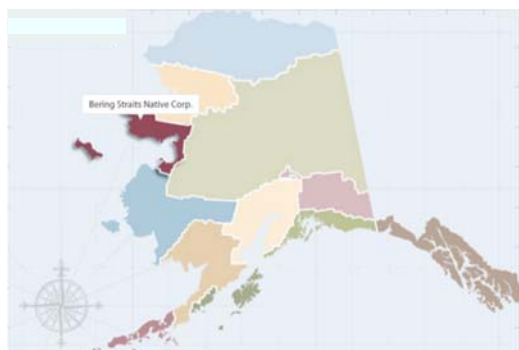
Bering Straits Native Corporation Region

Hub: Nome
Contact Information: Anahma Shannon, Environmental/Backhaul Coordinator env.coord@kawerak.org
(907) 443-4249

Current Program Summary

Degree of village backhaul servicing in/from hub:	High
Entity operating backhaul program in Nome:	Kawerak
Waste types backhauled	Lead acid batteries, E-waste, large home appliances (i.e. refrigerators, freezers), lights, household batteries, toner.
Number of villages in service area	4 Native Villages in Nome, 15 outside of Nome.
Number of villages typically participating	4 Native Villages in Nome, and 13 Villages outside of Nome, (plus businesses and households in Nome).
Annual waste volume backhauled	30,000 pounds (lbs) mixed e-waste, 25,000 lbs lead acid batteries
Where wastes are shipped	E-waste, household batteries, lights, toner, white goods to Total Reclaim, Seattle. Lead acid batteries to West Seattle Recycling, Seattle
How are wastes shipped – Connex/barge, pallets/plane, etc.	By air from villages to Nome and then by Connex/barge from Nome to Seattle.
Funded by:	Indian Environmental General Assistance Program (IGAP), Kawerak discretionary funding, and recycling revenue from lead acid batteries.
Donations:	Alaska Logistics provides free shipping for non-hazardous wastes and 50 percent reduced shipping for batteries. (Kawerak pays all fuel surcharges). Bering Air provides free shipping from villages to Nome.

History and Overview of Backhaul Program

Operating since 2010, the backhaul program in Nome is managed by Kawerak and funded by the USEPA Indian Environmental General Assistance Program (IGAP). On an annual basis, 17 of 19 Tribes participate, four of which are based in Nome. Materials are also accepted from businesses and households in Nome. Of the materials that Kawerak receives, two-thirds are from Villages, and one-third is from the four Nome-based tribes and Nome businesses and households. A Kawerak Coordinator carries out all program planning and logistics, and assists Village Environmental Programs in bringing their materials to Nome, including supplying them with battery totes. Throughout the year, the Village Programs collect and package materials from the community and send to Nome via Bering Air on a no-cost space available basis. Kawerak picks up Village shipments at the airport and consolidates them in storage connexes supplied by the current shipper, Alaska Logistics. Once per year, Kawerak palletizes and packages all Village

materials and Nome community materials and ships them to Seattle in connexes separated by waste type. Once the connexes reach Seattle, they are picked up by the end-destination vendors, currently West Seattle Recycling for lead acid batteries, and Total Reclaim for e-waste, lights, and occasional white goods. City of Nome also sends a connex to Seattle with baled paper and cardboard in a separate program.

In addition to backhaul with Kawerak, some villages carry out individual backhaul projects. Last year, Unalakleet carried out a large e-waste backhaul and sent materials directly to Seattle.

Other villages have had EPA Special IGAP backhaul projects. Savoogna carried out a large scrap metal backhaul. Alaska Logistics worked directly with the Village to ship out six full connexes of scrap in Summer 2014, and another six in Summer 2015. Alaska Logistics paid for all the shipping and kept the proceeds from the recycled scrap metal. But the project operated at a loss, and Alaska Logistics is not interested in performing similar projects in the future. Several other villages have substantial scrap to send out – and in 2016, five Villages will be funded through EPA Special IGAP to ship out scrap metal.

2015 Program Costs and Estimated Full Value for a Bering Straits Region Backhaul Program

Item	Incurred	Value at full operation
Personnel $60,000/year (yr) 1.0 full time employee (FTE) for Coordinator (Current direct backhaul time is 0.15 FTE, FTE balance is supportive such as education, other solid waste assistance)	$9,000	$60,000
Fringe 65%	$5,850	$39,000
Supplies (safety gear, shrinkwrap, totes, vermiculite, tote return shipping)	$2,000	$2,000
Flatbed truck (insurance, fuel, and maintenance)	$1,500	$1,500
Shipping		
3 connexes/yr of e-waste, lights, household batteries, toner, white goods[1, 4]	$1,899	$12,810
1 connex/yr of lead acid batteries[1, 4]	$2,170	$4,270
Shipping from villages to hub[2]	$0	$63,620
Recycling fees for e-waste/lights [3]	$4,500	$4,865
Subtotal	$26,919	$188,064
Indirect, 30% (on personnel and fringe)	$4,455	$29,700
Total Regional Program Cost/Value per year (13 villages current, 15 villages projected in 2016)	**$58,293**	**$217,764**
Total Regional Program Cost/Value per year with 50% transportation discount		**$177,415**
Number of households[5]	1515	1515
Household Cost of Regional Program Support	**$38.48**	**$143.76**
Estimated Village Program Cost per year, at full operation[6]		**$17,215**
Total Village Program Value (multiply by village number)		**$258,225**
Total Regional Backhaul Value/Cost		**$475,989**
Annual Household Cost of Village/Regional Programs		**$314**

1. Bering Air provides free shipping from the Village, and Alaska Logistics provides e-waste shipping for free and 50% discount for lead acid batteries. Since transport donations are not guaranteed in the future, full price shipping costs are used.
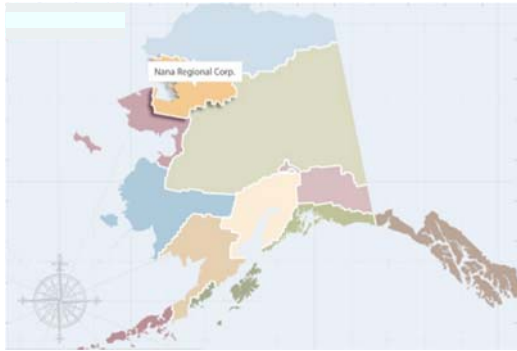*2. Based on average shipping quotes from villages to Nome*
3. Current recycling fees of $0.25/lb for e-waste and $1.14/lb for lights were used for value at full operation
4. Material amounts are from villages only and do not include the hub
5. Four people per household used
6. For a detailed list of estimated annual village backhaul costs, see Appendix B.

NANA Regional Corporation Region

Hub: Kotzebue
Contact Information: Stanley Tomaszewski, Backhaul and Brownfield Coordinator stanley.tomaszewski@maniilaq.org
(907) 442-7639

Current Program Summary

Degree of village backhaul servicing in/from hub:	High
Entity operating backhaul program in Nome:	Maniilaq Association
Waste types backhauled	E-waste, batteries (lead acid), ballasts (no lamps). White goods (washers, dryers, ovens, but not refrigerators).
Number of villages in service area	Nine villages plus Kotzebue. Point Hope is served by North Slope Borough.
Number of villages typically participating	8-9
Annual waste volume backhauled	Approximately 55,000 pounds per year, 75% from villages and 25% from Kotzebue.
Where wastes are shipped	All materials go to Seattle (Seattle Metal Recycling).
How are wastes shipped – Connex/barge, pallets/plane, etc.	By air (usually Ryan Air) from Villages to Kotzebue and then by Connex/barge on Alaska Marine Lines (AML) from Kotzebue to Seattle.
Funded by:	Maniilaq Association
Donations:	AML provides free shipping to Seattle (Maniilaq pays wharfage and handling fees). Ryan Air provides a reduced rate for shipping from villages to Kotzebue.

History and Overview of Backhaul Program

Operating since 2008, the backhaul program in Kotzebue is managed by Maniilaq. On an annual basis, eight of nine Tribes participate. Materials are also accepted from businesses, schools, and households in Kotzebue. Of the materials that Maniilaq receives, three-fourths are from villages, and one-fourth is from Kotzebue businesses, schools, and households. An Environmental Coordinator at Maniilaq carries out all program planning and logistics, and assists Village Environmental Programs in materials transport to Kotzebue, including supplying pallets and shrink wrap. Throughout the year, the Village Programs collect and package materials and send to Kotzebue via Ryan Air. Villages pay for their own

shipping but Maniilaq works with villages to get a discounted shipping rate. Maniilaq picks up Village shipments at the airport and consolidates them in storage connexes supplied by the current shipper, AML. Twice per year, Maniilaq palletizes and packages all Village and Kotzebue materials and ships them to Seattle in connexes. Once the connexes reach Seattle, they are picked up by the end-destination vendors, currently Seattle Metal Recycling, for lead acid batteries, e-waste, fluorescent light ballasts, and occasional white goods. Individual village programs send the fluorescent light bulbs and aluminum cans to Alaskans for Litter Prevention and occasionally refrigerators to Total Reclaim.

2015 Program Costs and Estimated Full Operational Value for a Nana Region Backhaul Program

Item	Incurred	Value at full operation
Personnel $60,000/yr 1.0 FTE for Coordinator (Direct Backhaul time is 0.25 FTE, FTE balance is supportive such as education, other solid waste assistance). Personnel at full operation is 0.67 FTE	$15,000	$40,000
Fringe 20%[1]		$8,000
Supplies (safety gear, shrinkwrap, totes, vermiculite, tote return shipping)	$500	$1,333
Flatbed truck (insurance, fuel, and maintenance)	$500	$1,000
Shipping		
4 connexes/yr of e-waste, lights, batteries[2, 5]	$4,000	$15,154
Shipping from villages to hub[3]	$13,920	$39,491
Recycling fees for e-waste/lights [4]	$0	$3,491
Subtotal	$26,919	$108,469
Indirect, 30% (on personnel and fringe)		$14,400
Total Regional Program Cost/Value per year (9 villages current, 10 villages projected)	**$60,839**	**$122,869**
Total Regional Program Cost/Value per year with 50% transportation discount		**$95,547**
Number of households[6]	**1087**	**1087**
Household Cost of Regional Program Support	**$55.97**	**$113**
Estimated Village Program Cost per year, at full operation[7]		**$17,215**
Total Village Program Value (multiply by village number)		**$172,150**
Total Regional Backhaul Value/Cost		**$295,019**
Annual Household Cost of Village/Regional Programs		**$271**

1. Fringe of 20% used for each program
2. Alaska Marine Lines provides free shipping costs for four connexes a year but charge for wharfage and handling, approx. $1,000 per connex. Ryan Air used to offer free shipping to villages but now charges $0.50/lb to the three furthest and $0.24/lb to the 5 closest villages. These rates are still discounted. Because transport donations are not guaranteed in the future, full price shipping is used for the Value at full operation.
3. Based on average shipping quotes from villages to Kotzebue.
4. Seattle Metal Recycling does not charge Maniilaq recycling fees. Because future donations are not guaranteed, current recycling fees of $0.25/lb for e-waste and $1.14/lb for lights are used for full operation value.
5. Estimated material volume is from villages only and does not include materials generated in Kotzebue
6. Four people per household assumed.
7. For a detailed list of estimated annual village backhaul costs, see Appendix B.
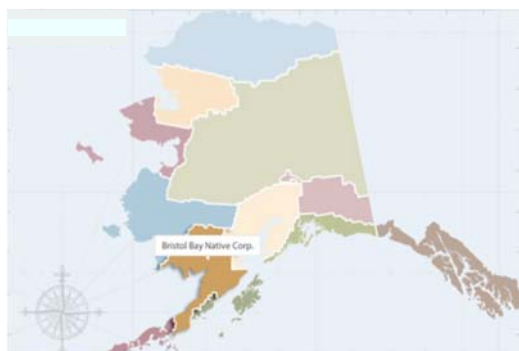
Bristol Bay Native Corporation (BBNC) Region

Two programs operate in the region that serve more than one community. By design, neither is a true regional program. Curyung Tribe's longstanding Dillingham-based program serves a small number of villages on a case by case basis, and the Lake and Peninsula Borough Program is an advent of a four year project grant to carry out a one-time backhaul from those villages. Because they provide informative backhaul logistics and lessons learned, they are both described below. Following the narratives, the Projected Cost for a full hub and spoke program for the BBNC region is provided that assumes Dillingham, with its already in-place nascent program, and best developed port and landfill facilities, as the hub.

Program 1
Hub: Dillingham
Contact Information: Billy Maines, Tribal Environmental Coordinator, Curyung Tribe, (907) 842-1751 billy@curyungtribe.com

Current Program Summary	
Degree of village backhaul servicing:	Low—Not a true regional program
Entity operating backhaul program:	Curyung Tribe
Waste types backhauled	E-waste, fish web
Number of villages in service area	23
Number of villages typically participating	1-2 villages a year send Curyung a portion of their backhaul. Also 8 village schools.
Annual waste volume backhauled	22,000 lbs of e-waste 24,000 lbs of web
Where wastes are shipped	E-waste goes to Total Reclaim in Seattle Fish web goes to Skagit in Seattle
How are wastes shipped – Connex/barge, pallets/plane, etc.	Connex/barge
Curyung backhaul program cost	For above e-waste: • Shipping costs: ~$2,250/connex with an AML 50% discount • Total Reclaim recycling fees: ~$4,000/yr (~$2,000 per connex) • Supplies and labor: ~$1000 For fish web recycling: $2,250/ with AML discount. No recycling fees
Funded by:	Curyung Tribe IGAP
Donations:	AML provides 50% shipping rates.

History and Overview of Program

The Curyung Tribe has operated an e-waste backhaul program for ten years, with fish web added five years ago. Unlike Nome and Kotzebue, a National Automotive Parts Association (NAPA) store is located in Dillingham, and it ships out lead acid batteries free of charge. Three-quarters of the wastes are from businesses in Dillingham and the remaining waste comes mostly by charter plane from eight village schools

and occasional e-wastes from one or two villages. Dillingham residential wastes comprise a negligible fraction.

Electronic waste and fish webbing drop-off and staging is at connexes sited at the landfill. Annually, the Coordinator, who has managed the program since inception, will recruit volunteers (often his own family) to help him go through the one or two connexes and separate, palletize, package and strategically load e-wastes. Any trash and cork is pulled from the fishing web throughout the year, and the web is also loaded. A local contractor transfers the loaded connexes to the dock and Alaska Marine Lines, who pays for half of all the shipping costs, and then barges them to Seattle. Empty connexes are dropped off

at the same time the full ones are picked up, so they can be loaded over the following year.

The Tribe is working on a long term effort to ship out stockpiled scrap metal from the landfill—junk cars, skiffs, and white goods. Cars were last landfilled five years ago and 500 more vehicles since then have been junked. Last year, Central Recycling quoted a $130,000 fee to process and ship them out. This year, the Tribe was funded for a forklift and flatbed to begin prepping the vehicles itself, and to use the equipment eventually for other scrap. Used oil and antifreeze are collected and then recycled in used oil burners throughout town and an antifreeze recycler. The Tribe also stockpiles tires, however they are not shipped out.

Program 2

Hub: King Salmon
Contact Information: Ranya Aboras, Lake and Peninsula Borough, (907) 469-0367, cdc@lakeandpen.com

Current Program Summary

Degree of village backhaul servicing in/from hub:	High but only for one-time projects
Entity operating backhaul program:	Lake and Peninsula Borough
Waste types backhauled	Electronic waste, lead acid batteries, lights, household appliances, scrap metal, paint, partial and full drums of hazardous liquids {Freon, antifreeze, used oil, etc}
Number of villages in service area	16
Number of villages participating	12 with one pending
Waste volume backhauled	*Currently waiting for data**
Where wastes are shipped	Approximately 50% of materials go to Total Reclaim Anchorage/Seattle, 40% to Central Recycling Anchorage/Seattle, 10% to Interstate Batteries Anchorage/Seattle, and a very small amount of fish web goes to Seattle for recycling.
How are wastes shipped – Connex/barge, pallets/plane, etc.	Six to nine villages ship by air to Anchorage on Northern Aviation, Everett, or Desert Air Cargo Three ship by barge to Seattle on Alaska Marine Lines. Three communities use both air and barge.
Backhaul program cost	$50,000-$70,000 per community over the project life.
Funded by:	Coastal Impact Assessment Program (CIAP) Grant

History and Overview of Backhaul Program

The Lake and Peninsula Borough received a YR 2013 CIAP grant in 2013 for backhaul, with a

project completion deadline of December 2016. Fourteen villages have backhauled or will

backhaul through the grant. To help with assessing project costs, best shipping logistics, and technical assistance needs, the Borough requires a backhaul inventory from each community before being eligible for reimbursement of shipping, supply, personnel, or recycling costs. The Borough's Community Development Planner provides the communities technical assistance on shipping logistics, training, supply information, and pricing. She also oversees the project and tracks the shipped materials.

Shipping logistics vary greatly with some towns on rivers, some on lakes, and some on the coast. So a portion ship by air only, others by barge only, and others a by combination of air and barge. Most are shipping materials in batches with multiple small backhauls during the project period. Materials go to either Anchorage or Seattle depending on least cost route. The Borough has asked communities to provide at least a 5% match where possible to help build support.

Estimated Full Operational Value/Cost for a BBNC Regional Backhaul Program

Item	Value at full operation
Personnel $60,000/yr 1.53 FTE for Coordinators[1]	$92,000
Fringe 20%[2]	$18,400
Supplies (safety gear, shrinkwrap, totes, vermiculite, tote return shipping [3]	$3,067
Flatbed truck (insurance, fuel, and)[3]	$2,300
Shipping	
3 connexes/yr of e-waste, lights, batteries [4, 7]	$9,149
Shipping from villages to hub[5]	$28,709
Recycling fees for e-waste/lights [6]	$3,137
Subtotal	$156,761
Indirect, 30% (on personnel and fringe)	$33,120
Total Regional Program Cost/Value per year	**$189,881**
Total Regional Program Cost/Value per year if in-kind equivalent to Maniilaq/Kawerak (50% transportation discount)	**$170,952**
Number of households[8]	**977**
Household Cost of Regional Program Support	**$194**
Estimated Village Program Cost per year, at full operation[9]	**$17,215**
Total Village Program Value (multiply by village number)	**$395,945**
Total Regional Backhaul Value/Cost	**$585,826**
Annual Household Cost of Village/Regional Programs	**$599**

1. Salary and FTE based on Kawerak program and proportionately adjusted for number of villages served.
2. Fringe of 20% used for each program.
3. Supplies and truck costs based on Kawerak program and proportionately adjusted for number of villages served.
4. Based on shipping quote from Dillingham to Seattle.
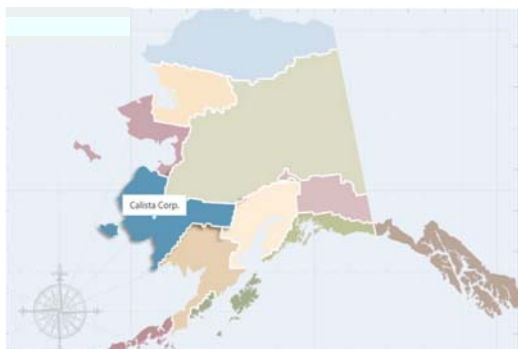5. Based on average shipping quotes from villages to Dillingham.
6. Current recycling fees of $0.25/lb for e-waste and $1.14/lb for lights were used.
7. Estimated material volume is from villages only and does not include materials generated in Dillingham.
8. Four people per household assumed.
9. For a detailed list of estimated annual village backhaul costs, see Appendix B.

Calista Region

There are no true regional programs operating at present. However, as summarized below, the regional non-profit Association of Village Council Presidents (AVCP) and at least two semi-regional entities, Nelson Island Consortium and Middle Kuskokwim Consortium, have operated multi-village backhaul projects recently. Following the narratives, the Projected Cost for a full hub and spoke program for the Calista region is provided. Bethel, with its best developed port and landfill facility and regional organization base, is assumed as the developed backhaul hub. In 2012, a region-wide backhaul summit was hosted by Nelson Island Consortium, with assistance from Kuskokwim River Intertribal Watershed Council and Zender Environmental. The facilitated sequential sessions, intended to develop a basic regional plan, were attended by 21 villages, and included transporters, vendors, and service providers, all of whom were able to respond on priorities and decisions via electronic response technology. Reflecting routing complexity, village independence, and/or doubt for adequate regional infrastructural or technical support, villages were equally divided as to whether an individual, sub-regional, or regional program approach was most desirable here. For stakeholders interested in forming a regional program, a significant volume of work and detailed considerations are included in the summit report at http://www.nelsonislandconsortium.org/docs/summit.pdf.

Program 1

Hub: Bethel
Contact Information: Ben Balivet (907) 543-7362 BBalivet@avcp.org, Sharon Slim SSlim@avcp.org, Association of Village Council Presidents (AVCP)

Degree of village backhaul servicing in/from hub:	Medium, however two one-time projects since FY12, no regular program.
Entity operating backhaul projects:	AVCP
Waste types backhauled	e-waste, Lights, Batteries
Number of villages in service area	56 Tribes and their 45* communities
Number of villages participating	4 -12 per project
Waste volume backhauled	41,733 lb average for past four years, (2,206 lb per village).
Where wastes are shipped	Anchorage Total Reclaim for the YR12 project Seattle Total Reclaim for the YR15 project
How are wastes shipped – Connex/barge, pallets/plane, etc.	Plane (1st project) or Barge (2nd project)
Backhaul project cost	First project with 12 villages Total Cost =$75,000, including personnel & supplies. Villages to Bethel flight, =$0.65/lb, Bethel to Anchorage flight= $0.35/lb, e-waste recycling fee= $0.25/lb,
Funded by:	AVCP funded by EPA special IGAP and base IGAP grant funds.
Donations:	No donations from shippers but the NAPA in Bethel accepts batteries free-of-charge

History and Overview of Backhaul Program

In FY12-FY14 EPA funded AVCP to coordinate and fund an e-waste and battery backhaul project for its villages. AVCP paid Ryan Air to ship batteries and e-waste from villages to Bethel. Batteries went to NAPA in Bethel free of charge and e-waste was consolidated, packaged, and sent to Total Reclaim in Anchorage via Northern Air Cargo. Total Reclaim charged $0.25/lb for the e-waste. The total amount of waste shipped out was 30,733 pounds from 12 villages, so the average per pound cost for just shipping and recycling was $1.25.

Currently, AVCP is operating a smaller EPA-funded e-waste, lights, household batteries, and lead acid battery project with Kalskag, Eek, Napakiak, Akiak, and Bethel. Unlike the prior project, villages paid for material transport to Bethel (primarily via village small boat delivery). AVCP loaded materials into their connex and shipped via Alaska Marine Lines (AML) to Total Reclaim in Seattle. AVCP does not have the equipment needed to bring connexes to the port and was charged a transport fee by AML. As part of this project, AVCP produced a backhaul video on the process for collecting and shipping materials that showcases both the FY12-14 and FY15 projects.

Program 2

Hub: Chefornak
Contact Information: Hazel Flynn (907) 867-8316, Nelson Island Consortium, http://www.nelsonislandconsortium.org/

Current Program Summary

Degree of village backhaul servicing in/from hub:	High but performed by one-time projects and not a program.
Entity operating backhaul project:	Nelson Island Consortium
Waste types backhauled	E-waste, Lights, Batteries, Other Hazardous, Scrap Metal
Number of villages in service area	7 (Tununak, Newtok, Chefornak, Toksook Bay, Kipnuk, Nightmute, and Umkumiut)
Number of villages participating	7
Project waste volume backhauled	62,283 lbs (8,898 lb per villages)
Where wastes are shipped	Direct from each village to Seattle
How are wastes shipped	Barge
Project cost	**Approximate cost per year:** Supplies $2,450 Village labor $10,500 Shipping $19,250 Recycling fees $4,500 Coordination $7,800 Total **$44,500**
Funded by:	EPA special IGAP grant, EPA Alaska Household Hazardous Waste (HHW) grant.
Donations:	Northland barge provided connex shipping free of charge for villages wishing to ship more than one connex. Ryan Air provided free pallets.

History and Overview of Backhaul Program

In FY11 and FY12, the Nelson Island Consortium (NIC) received two EPA Special IGAP grants to work on backhaul. In FY11, wastes were inventoried and the backhaul summit was organized. In FY12, supplies were purchased, and materials were packaged and shipped directly from the villages to Seattle. In FY12 and 13, the Native Village of Kipnuk received an EPA grant on behalf of the NIC to carry out more backhaul. Over 62,000 lbs of materials total were shipped out from the seven communities over a two year period.

Program 3

Hub: Akiachak
Contact Information: Greg Charlie, Akiachak gregcharlie@yahoo.com, (907) 852-2211, Akiachak Native Community

Current Program Summary	
Degree of village backhaul servicing in/from hub:	High but one-time project and not a program.
Entity operating backhaul project:	Middle Kuskokwim Consortium
Waste types backhauled	Electronic Waste, Lights, Batteries, Other Hazardous, Scrap Metal
Number of villages in service area	4 (Akiachak, Akiak, Kwethluk, and Tuluksak)
Number of villages participating	4
Project waste volume backhauled	35,586 lbs over 2 yrs (8,896 lb per village)
Where wastes are shipped	Direct from each village to Total Reclaim, Seattle
How are wastes shipped	Barge

Project cost	**Approximate cost per year:**
	  Supplies $2,700
	  Shipping and
	  Recycling fees $20,500
	  Coordination $3,400
	  Total **$26,660**

Funded by:	Akiachak Native Community (EPA Alaska HHW & EPA Special IGAP grants).
Donations:	Northland barge provided connex shipping free of charge for villages wishing to ship more than one connex

History and Overview of Backhaul Program

The Native Village of Akiachak on behalf of the Middle Kuskokwim Consortium (MKC) villages of Akiachak, Akiak, Kwethluk, and Tuluksak, also coordinated a backhaul of batteries, e-waste, and lights. Over 35,000 pounds of materials were shipped out in YR13 and YR14 summers. The MKC requested and received an extension on the project due to late season shallow river conditions and the necessity of barge schedule cancellation.

Estimated Full Operational Value/Cost for a Calista Regional Backhaul Program

Item	Value at full operation
Personnel $60,000/yr 3.13 FTE for Coordinators[1]	$188,000
Fringe 20%[2]	$37,600
Supplies (safety gear, shrinkwrap, totes, vermiculite, shipping to get totes back to villages)[3]	$6,267
Flatbed truck (insurance, fuel, and maintenance)[3]	$4,700
Shipping	
16 connexes/yr of e-waste, lights, batteries[4, 7]	$43,246
Shipping from villages to hub[5]	$173,770
Recycling fees for e-waste/lights [6]	$15,634
Subtotal	$469,217
Indirect, 30% (on personnel and fringe)	$67,680
Total Regional Program Cost/Value per year	**$536,897**
Total Regional Program Cost/Value per, 50% transportation discount	**$428,389**
Number of households[8]	**4868**
Household Cost of Regional Program Support	**$110**
Estimated Village Program Cost per year, at full operation [9]	**$17,215**
Total Village Program Value (multiply by village number)	**$809,105**
Total Regional Backhaul Value/Cost	**$1,346,002**
Annual Household Cost of Village/Regional Programs	**$276**

1. *Salary and FTE based on Kawerak program and proportionately adjusted for number of villages served.*
2. *Fringe of 20% used for each program*
3. *Supplies and truck costs based on Kawerak program and proportionately adjusted for number of villages served.*
4. *Based on shipping quote from Bethel to Seattle*
5. *Based on average shipping quotes from villages to Bethel*
6. *Current recycling fees of $0.25/lb for e-waste and $1.14/lb for lights were used*
7. *Material amounts are from villages only and do not include materials generated in Bethel*
8. *Four people per household used*
9. *For a detailed list of estimated annual village backhaul costs, see Appendix B*
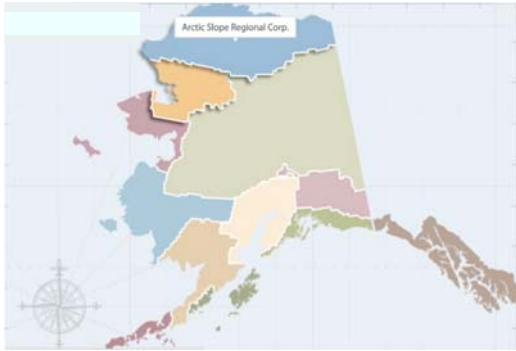
Arctic Slope Corporation Region

Hub: Barrow
Entity operating backhaul program in Barrow: North Slope Borough (NSB)
Contact Information: Tom Nicolos (907) 852-0371
tom.nicolos@north-slope.org

Current Program Summary

Degree of village backhaul servicing in/from hub:	Low to none
Entity operating backhaul program:	Communities manage their own backhaul programs although costs are covered by the North Slope Borough
Waste types backhauled	Batteries and lights
Number of villages in service area	7
Number of villages participating	All
Waste volume backhauled	*Data Unavailable*
Where wastes are shipped	Anchorage
How are wastes shipped – Connex/barge, pallets/plane, etc.	Barge and air
Backhaul program cost	All costs are covered by the North Slope Borough and programs are not comparable
Funded by:	North Slope Borough
Donations:	No shipping donations but Excide accepts batteries free-of-charge

History and Overview of Program

Most of this region's communities operate similar backhaul programs. Each community houses two connexes that are filled with batteries and lights throughout the year and the materials are either shipped out by barge or air to Anchorage annually. The North Slope Borough (Borough) covers all shipping and recycling costs. There may be no need for a regional backhaul program in this region because the current system is working well, with no concerns found in this assessment phase. The schools and businesses produce the vast majority of e-waste and they directly pay for and ship e-waste to be recycled. Residential e-waste that is generated is stripped of hazardous parts and the non-hazardous portions are landfilled. Most or all communities have used oil burners, wastes from construction projects are taken care of by the construction companies, and household hazardous wastes are collected in the connexes. In Barrow, there is a thermal oxidation system (incinerator) that processes almost all wastes other than batteries, e-waste, and construction waste. Batteries, e-waste, and construction waste in Barrow are handled in the same way as other communities. Batteries in this region are sent to Exide in Anchorage and are recycled free-of-charge.
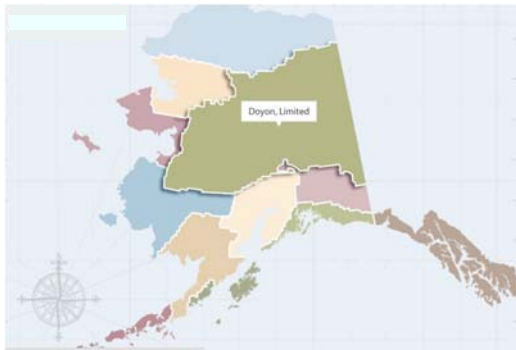
Doyon, Limited Corporation Region

Hub: Fairbanks
Contact Information: Trisha Bower, ADEC (907) 451-2174
trisha.bower@alaska.gov Becca Brado and La'ona Dewilde,
Greenstar
(907) 452-4152 info@iagreenstar.org

Current Program Summary

Degree of village backhaul servicing in/from hub:	High, but currently a temporary situation. Greenstar is developing a true regional program model
Entity operating backhaul program:	Temporarily, Alaska Dept. of Conservation (ADEC) provides primary coordinative role and assistance, transitioning to Interior Greenstar, Fairbanks.
Waste types backhauled	Electronic waste, lights, and lead acid batteries. Some communities that ship by barge to Nenana ship junk vehicles occasionally
Number of villages	38
Number of villages participating	34-38 villages, plus 3-4 non-tribal communities.
Annual waste volume backhauled	*Data unavailable.* Materials from the borough and villages are mixed in, with no record currently kept.
Where wastes are shipped	Materials are shipped to Fairbanks or Nenana, processed through Interior Greenstar, and then to Anchorage (mostly to Total Reclaim).
How are wastes shipped – Connex/barge, pallets/plane, etc.	Some villages ship by air to Fairbanks via Warbelows, Wrights, Era, or Raven. Others by barge to Nenana via Ruby Marine or Inland Barge. And others by road to Fairbanks.
Fairbanks program cost	*Indeterminate at present.* See below setup.
Funded by:	Greenstar (recycling fees for TV's and computer monitors and material transport FBK-ANC), ADEC (technical assistance). Villages GAP (shipping, supplies).
Donations:	Interstate Batteries (Battery totes). Warbelow's, Ruby Marine, and Ice Road Truckers (reduced or free shipping). Villages

History and Overview of Program

In the early 2000's ADEC and Yutana Barge offered a backhaul service to communities on the Yukon River for batteries, e-waste, used oil, antifreeze and more. In the later half of the decade, Yukon River Intertribal Watershed Council (YRITWC) worked with Yutana barge to build and coordinate a strong program. In the last few years, YRITWC's backhaul program stopped operating. In 2014 and 2015, ADEC Solid Waste Fairbanks office stepped in to fill the assistance

void left in the region, and began working with Interior Greenstar for that entity to operate a permanent regional program.

Villages now ship materials by air, barge, or road to Fairbanks on their own. ADEC staff provides as much technical assistance to village Environmental Coordinators on packaging materials and arranging shipping logistics as needed. Villages pay for their own packing

supplies, with the exception of battery totes, which Interstate Batteries provides for free. Once the materials arrive in Fairbanks or Nenana, Greenstar collects and processes them, then transports e-waste to Total Reclaim in Anchorage, and recycles batteries locally in Fairbanks. Communities are not charged recycling fees for e-waste or batteries. Neither Greenstar nor ADEC have the staff time to track the volume of waste currently being routed through Fairbanks, and village waste is mixed in with Borough wastes during processing and shipping. However, currently seeking funds, Greenstar plans to provide full time coordinators for the program soon. A feasibility study is nearly complete for a large recycling building handling recycling from all of Interior Alaska. They plan to also set up hubs in Tok and Nenana.

Of final note, the Native Village of Venetie and Arctic Village manage their own packing and shipping logistics and ship materials directly to recyclers in Fairbanks.

Estimated Full Operational Value/Cost for a Doyon Regional Backhaul Program

Item	Value at full operation
Personnel $60,000/yr 1.27 FTE for Coordinators[1]	$76,000
Fringe 20%[2]	$15,200
Supplies (safety gear, shrinkwrap, totes, vermiculite, shipping to get totes back to villages)[3]	$2,533
Flatbed truck (insurance, fuel, and maintenance) [3]	$1,900
Shipping	
~3 Truckloads/yr of e-waste, lights, batteries[4, 7]	$953
Shipping from villages to hub[5]	$23,609
Recycling fees for e-waste/lights [6]	$2,806
Subtotal	$123,002
Indirect, 30% (on personnel and fringe)	$27,360
Total Regional Program Cost/Value per year	**$150,362**
Total Regional Program Cost/Value per year (50% transportation discount)	**$138,081**
Number of households[8]	**874**
Household Cost of Regional Program Support	**$172**
Estimated Village Program Cost per year, at full operation [9]	**$17,215**
Total Village Program Value (multiply by village number)	**$327,085**
Total Regional Backhaul Value/Cost	**$477,447**
Annual Household Cost of Village/Regional Programs	**$546**

1. Salary and FTE based on Kawerak program and proportionately adjusted for number of villages served.
2. Fringe of 20% used for each program
3. Supplies and truck costs based on Kawerak program and proportionately adjusted for number of villages served.
4. Based on trucking quote from Fairbanks to Anchorage
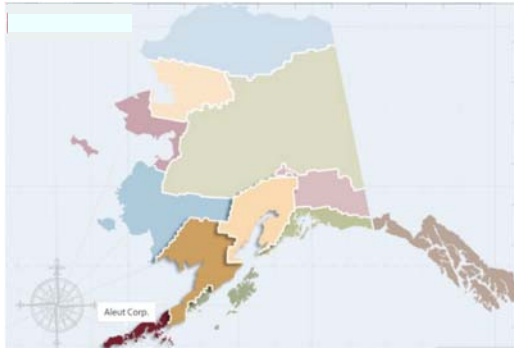5. Based on average shipping quotes from villages to Fairbanks
6. Current recycling fees of $0.25/lb for e-waste and $1.14/lb for lights were used
7. Estimated material volume is from villages only and does not include materials generated in Fairbanks
8. Four people per household assumed
9. For a detailed list of estimated annual village backhaul costs, see Appendix B

Aleut Corporation Region

Hub: None
Contact Information: Karen Plentikoff, APIA (907) 276-2700 karenp@apiai.org, Sand Point Karis Porcincula (907) 383-6968 qttenvironmental@arctic.net

Current Program Summary

|	
Degree of village backhaul servicing in/from hub:	Very low – Communities each have individual programs.
Waste types backhauled	E-waste, batteries, lights
Number of villages in service area	13
Number of villages participating	Varies each year
Waste volume backhauled	*Data Unavailable*
Where wastes are shipped	Seattle
How are wastes shipped – Connex/barge, pallets/plane, etc.	Barge
Backhaul program cost	Varies tremendously and programs are not comparable
Funded by:	IGAP, Municipalities
Donations:	Coastal Transportation provides free shipping, Trident Seafood provides free pallets.

History and Overview of Program

In the Aleut region, communities backhaul their own materials and there is no central regional program, and little concern is expressed in developing one. Barge access to Seattle is relatively easy and most communities ship materials through Coastal Transportation. Sand Point is one of the few communities that ships materials annually (other communities in the region backhaul when funding is available). For the past five years, Sand Point, has shipped solely e-waste to Total Reclaim in Seattle. Coastal Transportation offers free shipping to Sand Point, and they receive free pallets and totes for packing materials from the local Trident Seafood company. They ship three to four pallets total each year and IGAP covers personnel and end destination recycling costs.
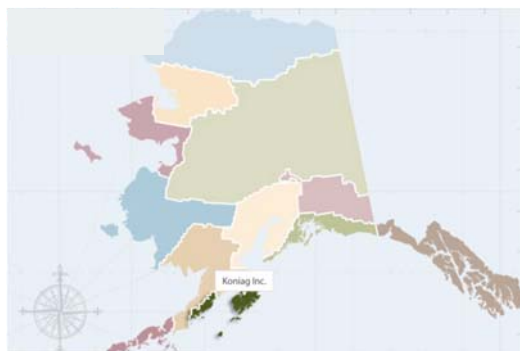
Koniag, Incorporation Region

Hub: Kodiak
Contact Information: Tyler Kornelis, Project Manager,
KANA (907) 486-1393
Cell (907) 654-5620
tyler.kornelis@kanaweb.org

Current Program Summary

Degree of village backhaul servicing in/from hub:	High but only for one-time project
Entity operating backhaul program:	Kodiak Area Native Association (KANA)
Waste types backhauled	Scrap metal
Number of villages in service area	6
Number of villages participating	6
Annual waste volume backhauled	From Larsen Bay: 366 tons of scrap From Ouzinkie: 10,000 lbs of scrap From Akhiok: 83 tons of scrap From Old Harbor: 80 tons of scrap (junk vehicles) (through a separate grant)
Where wastes are shipped	Homer and then scrap is picked up and trucked to Soldotna by Alaska Scrap. Scrap is also shipped to Anchorage where it is picked up by Central Recycling
How are wastes shipped – Connex/barge, pallets/plane, etc.	Landing crafts (barges that can dock directly on the beach) take the materials from communities on the island to Homer or Anchorage.
Kodiak backhaul project cost	Coastal Impact Assessment Program (CIAP) Grant used to ship scrap metal out of Kodiak Island totals $2.4 million. A line item breakdown was unavailable for this report but primary costs include the regional coordinator, transportation fees & recycling fees, supplies, training
Funded by:	CIAP Grant, managed by KANA with oversight from Kodiak Borough and Kodiak Housing Authority.

History and Overview of Program

The Kodiak Island Borough (KIB) received a YR 2013 Coastal Impact Assessment Program (CIAP) Grant in 2013 for backhaul, with a project completion deadline of December 2016. KANA manages the project with additional oversight from the Kodiak Housing Authority. KANA provides a coordinator to work directly with the communities on Kodiak Island and handles all shipping and recycling logistics. Six villages have backhauled or will backhaul through the grant. The grant specifies scrap metal is the only waste material to be backhauled through the project but KANA is looking to see if other wastes such as batteries and e-waste could also be shipped out either at the same time, or once the metal is all shipped out.

Shipping logistics can be difficult on the island since some communities don't have docks. Landing crafts (barges that can land on beaches) need to be used in that situation. Typically, materials are taken to Homer by barge or landing craft and Alaska Scrap picks up and trucked to Soldotna for recycling. Old Harbor, a community on the Island, sometimes uses the State Ferry to send e-waste to Kodiak for recycling but scheduling and logistics are difficult and the costs end up being high. Flying materials from communities to Kodiak is also costly.

Estimated Full Operational Value/Cost for Koniag Regional Backhaul Program

Item	Value at full operation
Personnel $60,000/yr 0.47 FTE for Coordinators[1]	$28,000
Fringe 20%[2]	$5,600
Supplies (safety gear, shrinkwrap, totes, vermiculite, tote return shipment)[3]	$933
Flatbed truck (insurance, fuel, and maintenance)[3]	$700
Shipping	
6 connexes/yr of e-waste, lights, batteries[4, 7]	$23,413
Shipping from villages to hub[5]	$52,067
Recycling fees for e-waste/lights [6]	$5,688
Subtotal	$116,402
Indirect, 30% (on personnel and fringe)	$10,080
Total Regional Program Cost/Value per year	**$126,482**
Total Regional Program Cost/Value per year (50% transportation discount)	**$88,742**
Number of households[7]	**1,771**
Household Cost of Regional Program Support	**$71**
Estimated Village Program Cost per year, at full operation [8]	**$17,215**
Total Village Program Value (multiply by village number)	**$120,505**
Total Regional Backhaul Value/Cost	**$246,987**
Annual Household Cost of Village/Regional Programs	**$139**

1. Salary and FTE based on Kawerak's program and proportionately adjusted for number of villages served.
2. Fringe of 20% used for each program
3. Supplies and truck costs based on Kawerak's program and proportionately adjusted for number of villages served.
4. Based on shipping quote from Kodiak to Seattle
5. Based on average shipping quotes from villages to Kodiak
6. Current recycling fees of $0.25/lb for e-waste and $1.14/lb for lights were used
7. Four people per household used
8. For a detailed list of estimated annual village backhaul costs, see Appendix B
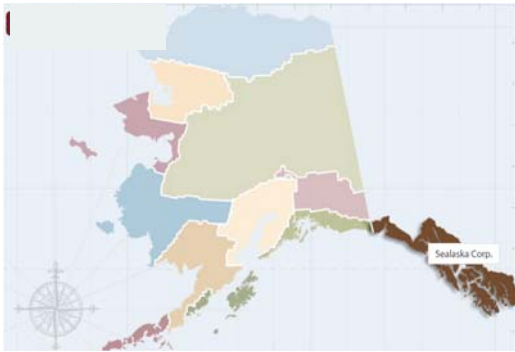
Sealaska Corporation Region

Hub: None
Contact Information: Total Reclaim: Reilly Kosinski
AkOutreach@TotalReclaim.com (907) 561-0544, Southeast
Conference: (907) 523-4350, Central Council Tlingit & Haida
Indian Tribes (CCTHITA): (907) 463-7184

Current Program Summary

Degree of village backhaul servicing in/from hub:	Very low – Communities each have functional individual programs.
Entities operating backhaul programs for more than 1 village:	Total Reclaim hosts annual collection events in Haines, SE Conference hosts an HHW annual collection in various communities, Central Council Tlingit & Haida Indian Tribes have a regional Environmental Program that works with other Tribal communities.
Waste types backhauled	All
Number of villages in service area	19, plus additional communities without Tribes
Number of villages participating	1 – 5 in above programs and all perform individual backhaul.
Waste volume backhauled	*Data Unavailable*
Where wastes are shipped	Seattle
How are wastes shipped – Connex/barge, pallets/plane, etc.	Barge
Backhaul program cost	Varies tremendously and programs are not comparable
Funded by:	IGAP, Municipalities, In-kind Shipping, In-Kind Recycling, SE Conference

History and Overview of Program

A relatively large volume of backhaul takes place in the Southeast region because of its close proximity to Seattle recyclers, lower shipping rates and, for most communities, well-developed, year-round barge schedules. Because each community has established relationships with their barge suppliers and have higher population bases to support a backhaul program there is no regional program, and little concern is expressed in developing one. Primarily, communities backhaul their own materials. Prince of Wales Island communities in the past have worked together to consolidate materials, but those joint efforts have waned substantially. Hosted by Total Reclaim, Haines holds an annual collection event for any community or family to bring e-waste and fish web for free recycling. The Southeast Conference sponsors an annual program where household hazardous waste is collected from several communities. Materials are sent to Emerald Services in Seattle.

AHTNA Region

Hub: Glennallen
Contact Information: Copper River Sanitation
(907) 822-3600, Recycling Our Areas Resources (ROAR) 907
822-6777 https://www.facebook.com/pages/Recycling-Our-
Area-Resources-ROAR/185227084852105

Current Program Summary

|	
Degree of village backhaul servicing in/from hub:	Low – No regional backhaul program but communities can drive their batteries to Glenallen.
Entities operating backhaul programs for more than 1 village:	Copper River Sanitation, ROAR
Waste types backhauled	Batteries, lights, cans, paper
Number of villages in service area	13
Number of villages participating	13 (for lead acid batteries)
Waste volume backhauled	*Data Unavailable*
Where wastes are shipped	Anchorage
How are wastes shipped – Connex/barge, pallets/plane, etc.	By truck and car on pallets, totes, or loose.
Backhaul program cost	*Not applicable. No true regional program.*
Funded by:	IGAP, Tazlina River Trading, ROAR, volunteers.
Donations:	In-kind battery recycling by NAPA, Interstate Batteries.

History and Overview of Program

Communities in this region are all on the road system so backhauling materials out is less of an issue than communities that are coastal or are only accessible by air or barge. The regional landfill in Glenallen accepts lead acid batteries, along with the Tazlina River Trading Post, and NAPA (although NAPA will only accept the types of batteries they sell). The 13 communities all drop off their batteries to one of these three places. The landfill also accepts lights from households but not from businesses, and accepts household batteries in limited quantity.

E-waste that comes to the landfill is buried with regular trash and not recycled. So Village IGAP programs separately transport village e-waste to Anchorage for recycling. There is a village effort to have school districts recycle their own e-waste.

ROAR operates a 24/7 recycling facility in Glenallen where residences and businesses can drop off aluminum cans, office paper, mixed paper, shredded paper and newspapers. Volunteer organizations sort materials, transfer them to a trailer and transport to Anchorage for recycling. The revenue that ROAR receives from aluminum cans doesn't cover the transportation and it seeks financial assistance where it can.
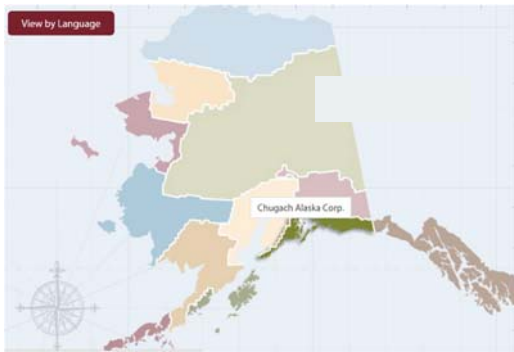
Chugach Alaska Corporation and Cook Inlet Region, Incorporated Regions

In these regions there are mostly road system communities, and just a few villages where it is difficult to ship materials, including Seldovia, Nanwalek, Port Graham (Chugach Alaska Corp.) and Tyonek (CIRI). Crossing both regions, it is primarily the Kenai Borough that operates a regional program, as described below. While off-road communities are authorized to make use of the Borough's backhaul programs, transport logistics are more difficult than their on-road counterparts. So also described is a Seldovia regional backhaul program that included fellow offroad communities Nanwalek and Port Graham.

Program 1

Hub: Soldotna
Contact Information: Jack Marriott, Kenai Borough (907) 262-9667

Current Program Summary	
Degree of village backhaul servicing in/from hub:	Low service – No outreach/technical assistance but communities can drive their materials to Soldotna or Homer when needed, or on collection days.
Entity operating backhaul program:	Kenai Peninsula Borough
Waste types backhauled	E-waste, batteries, HHW
Number of villages in service area	7 in the Homer area 6 in the Soldotna area 5 in the Seward area
Number of villages typically participating	18
Annual waste volume backhauled	*Data Unavailable*
Where wastes are shipped	Homer or Soldotna.
How are wastes shipped – Connex/barge, pallets/plane, etc.	By truck and car on pallets, totes, or loose.
Soldotna backhaul program cost	*Not Applicable. No true regional program.*
Funded by:	The Kenai Borough runs the landfill and sponsors e-waste and HHW collection days along with Total Reclaim and the National Response Corporation

History and Overview of Borough Program

Most of the communities in this region are on the road system with the ability to drive materials to a recycle hub, so backhaul is less of an issue here. The regional landfill in in Soldotna and is operated by the Kenai Borough. The Borough doesn't collect from communities but it works with Total Reclaim to hold annual e-waste recycling events in Homer and Soldotna when communities can bring in their materials. Households are not charged to recycle e-waste however businesses are charged by weight. Household hazardous waste (HHW) collection days are held eight times each year in Homer and Soldotna and communities can bring in HHW, including batteries. Like the e-waste events, households don't pay for drop-off but businesses do. Communities can drop-off small quantities of batteries anytime at the landfill, but larger quantities must wait for the HHW collection days.

Program 2

Hub: Seldovia
Contact Information: Michael Opheim mopheim@svt.org (907) 435-3247 and Tracie Merrill, tmerrill@svt.org

Current Seldovia Program Summary

Degree of village backhaul servicing in/from hub:	High but only for one-time projects
Entity operating backhaul program:	Seldovia Village Tribe
Waste types backhauled	E-waste, batteries
Number of villages in service area	3
Number of villages typically participating	3
Project waste volume backhauled	5,300 lbs in the most recent two-year project.
Where wastes are shipped	E-waste sent to Homer where is it processed by Cook Inlet Keeper and then driven to Total Reclaim, Anchorage .
How are wastes shipped – Connex/barge, pallets/plane, etc.	Landing craft (with totes/pallets) and then trucked.
Seldovia backhaul program cost	Costs vary. $75,000 covers personnel, supplies, transport, and recycling fees. Landing craft from 3 communities to Homer = $2700. Trucking materials to the Homer recycling area = $200 Recycling fees = $800.
One-time projects funded by:	IGAP, EPA Hazardous Waste Grant, Cook Inlet Keeper in-kind

History and Overview of Seldovia Program

In 2011 and 2012, Cook Inlet Keeper (CIK) funded backhaul of e-waste from Seldovia, Nanwalek, and Port Graham, but since then has lacked funds to do so. Regularly scheduled boat and ferry services to the communities don't exist and flying materials to Homer is expensive. Due to port characteristics, a landing craft is required to take materials to Homer. A local trucking company picks up the materials and takes them to a processing point in Homer before they are further trucked to Total Reclaim in Anchorage. In 2013 and 2014, Seldovia continued to backhaul for their community through community fundraising and Gap funds. In 2014/2015, Seldovia received an EPA Tribal Hazardous Waste Grant to carry out a backhaul and educational project with the three communities. The same backhaul logistics as the CIK backhaul projects were used, and a dedicated electronics backhaul person was hired to work on the project in Nanwalek and Port Graham.

Backhaul Variables and Challenges

The current regional efforts described in this Baseline Assessment reflect a moment in time only. Backhaul began in earnest from villages in the early 2000's, with a number of villages beginning lead acid battery backhaul on barges offering free space, and ADEC and Yutana Barge developing a collection program for dozens of river communities. While supporting records are unavailable, the volume of backhaul statewide has grown substantially since then as the number of participating villages and programs have grown. The material receipt records of Total Reclaim, Anchorage, themselves a significant factor in increased backhaul since mid-2000's, show a geometric leap supporting village backhaul in the past few years. Yet, many variables and events have affected backhaul in Alaska and will continue to do so. For example, Yutana Barge program ceased, and in response to personnel demand as more villages began programs, the free battery backhaul did as well. In comparison, the increased e-waste recycling from 2011 - 2015 appears to correlate with increased education, training, and village GAP funding offered. As with all else in Alaska, fuel costs are primary, and with fixed budgets, the volume of backhaul that is feasible changes with this commodity. There is a greater complexity than the advent and decline of programs, technical assistance, funding criteria, and fuel cost. Significant factors affecting the development and operation of backhaul programs and their costs are listed below. These considerations were primarily identified via several avenues: 1) The interviews and facilitated meeting discussions with regional backhaul experts and coordinators specifically performed for this assessment report and described in the prior Section Methodology, 2) Direct and substantial technical assistance work by the authors with over 20 village backhaul programs over the past seven years, 3) Shared information via networking with Solid Waste Alaska Taskforce (SWAT) members, 4) Direct discussions with transporters and vendors via Adopt a Barge meeting.

Shipping Price

Without any discount, shipping can form one-quarter to nearly one-half of a program budget. Projection of shipping costs for the next backhaul season is central to effective program operation. However costs are affected by:

- Base shipping prices vary by region and among villages in the region, and are temporally dependent not just on fuel costs but port access and other logistics and supply/demand factors.

- Fuel surcharge rates fluctuate every year.

- Wharfage fees vary from port to port.

- Some companies charge a hazardous materials fee, some don't

- Some companies charge a fee to help complete shipping paperwork, some don't

- Various companies offer various types of shipping donations – from offering free shipment of connexes, to discounted rates, to discounted weights, to free additional shipping of connexes (once full price of 1 has been paid)

- Airlines have even more variable donation types throughout the state. Some offer free backhaul on a space available basis, some offer discounted rates or weights, and some discounted flat fees). The discounts offered vary over time and may be offered to some regions and villages but not to others.

End-Destination

Recycling fees for e-wastes and lights form a smaller portion of the budget, as do revenues from lead acid batteries. Unlike shippers, it is not common for recyclers to offer in-kind services. As some grant sources disallow expenditures for recycling fees and, unlike shipping, there is less opportunity for in-kind donation. The amount of time spent in redeveloping a logistics plan each year to best economize backhaul funds can be significant. Of note:

- Different recyclers charge or pay different rates, even when located in the same city.

- Material prices constantly fluctuate with global market.

- Some companies offer discounts, but these are temporary and unpredictable. For example, Total Reclaim, Anchorage currently takes e-waste directly from

Alaska villages free of charge, but is unable to provide this service with higher volumes that may occur with regional program development.

- Some recycling companies will charge a trucking fee to pickup connexes from the Seattle dock, and others won't.

Staging, Storage area, Landing area

Infrastructure is variable between the hubs and villages which changes the feasibility and timing of backhaul. Regional programs need to adjust for this challenge and change their consolidation/shipping practices to conform to the volume and amount of materials received from each village. Logistics for shipper collection and loading can change for villages as landing areas deteriorate or equipment breaks down. Sometimes regional programs or the individual villages must establish new protocols in how to get out their materials. Also:

- Some villages or hubs have land or storage buildings/connexes that are available free of charge.   Others may have to pay for the storage site.

- Some villages may have storage areas that are a distance away from the barge dock and may not have equipment to transport a connex or totes to the dock. In this situation, villages need to pay the shipping company to transfer the materials.

Supplies and Equipment

Supplies, including but not limited to safety gear (goggles and gloves), shrinkwrap, totes, pallets, scales, and connexes, are essential for backhaul. Pallet jacks, forklifts or other equipment to transport the materials and move them around the staging area also are needed or a backhaul program must stop. These items and their need for inclusion in budgets are variable among villages and regions.

- Some villages may have equipment locally but must rent it from the owner, others need to purchase equipment and pay for it's shipping, and others must wait for a mechanic to fly into the village to repair equipment. Any scenario costs

money and risks missing the barge season.

- Just because the right equipment is on hand does not mean a backhaul program is functioning. Training is needed to operate the equipment and a place to store it out of the weather is necessary to maintain it.

Hydrology, Weather, and Other Routing Factors

Unsurprisingly, extreme weather affects backhaul programs.

- In several villages, barges might cancel scheduled stops due to shallow water at the dock or river. Some Bethel area villages have a better chance of barge delivery late summer while some villages in the Arctic have a better chance of early summer delivery. Increasingly some villages are unable to receive any barge service in a given year.

- Stormy weather can also delay barges and potentially cause cancellation of some stops for a barge to get back on schedule. Losing a barge opportunity may mean losing an opportunity to backhaul because funds are often tied to strict grant closure deadlines that cannot accommodate a year extension.

- High snowfall may prevent staff from accessing buried connexes and delay material preparation.

- Severe cold can hamper or prevent backhaul events and preparation. The vast majority of backhaul storage facilities are unheated connexes or totes stored outside or in unheated buildings. Prep and packaging work is nearly impossible when wearing full Arctic gear. Equipment and vehicles can also stop working.

Personnel

Personnel costs make up the bulk of a program budget. As such, the number of staff available directly relate to the amount of backhaul achievable.

- Village staff turnover is high. Staff

turnover can delay the progress of backhaul programs or halt programs for a period of time. Not only must new staff be trained, but also often new logistics must be planned as the knowledge of how backhaul was done the prior year is lost. Training involves significant travel expense, which can literally wipe out the annual budget for recycling and shipping fees.

- There may simply be a lack of funding or personnel needed to carry out a backhaul program – IGAP funds might not exist or there might not be enough IGAP funding to cover backhaul.

Rural Life

Disasters strike. In small communities a single fire can take out the only school or store. A freeze-up can destroy the water supply system and force a transition back to "honeybuckets". Backhaul staff and administrators and the community that drop off materials all wear multiple hats, several of which may be much more important than backhaul. A search and rescue involves the entire town and may take weeks. Preventing a suicide copycat may consume everyone's focus for a year. An Elder's, or anyone's, funeral is attended by all in town as nearly everyone will have been related in complex and strong extended familial ties.

Village and hub political alliances and objectives can hinder backhaul programs. Entities that need to work together and provide support to make backhaul happen, such as cities and tribes within a village, may clash and hinder progress. Power struggles with individuals or families might also affect programs. New community leaders might not support or prioritize backhaul needs.

Appendices

Appendix A

Map of Regional For-Profit Native Corporations
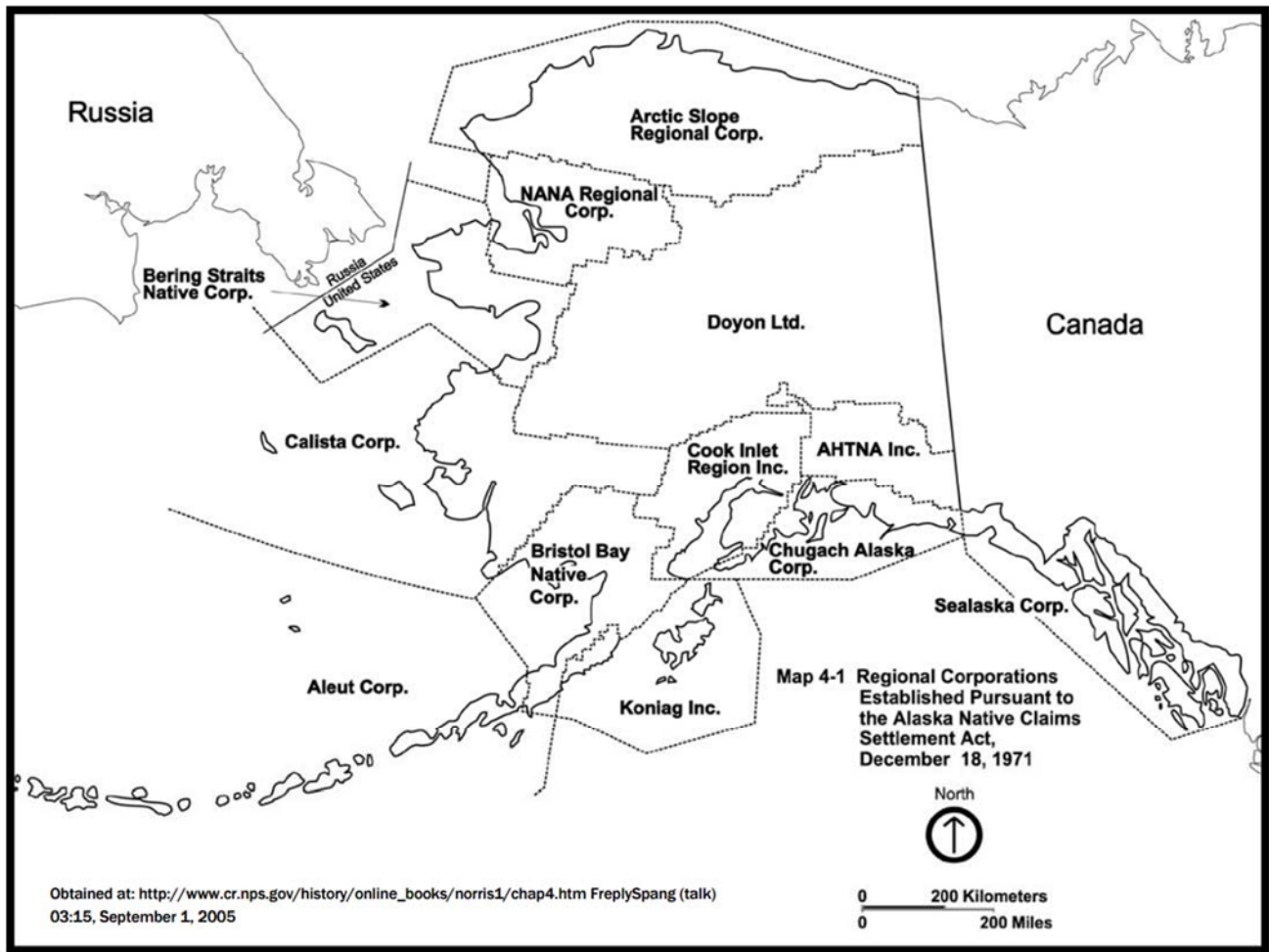
Alaska Rural Backhaul Stakeholder List

Name	Affiliation	Phone	Email

NGO Solid Waste Service Providers

Name	Affiliation	Phone	Email
Lynn Zender	Zender/SWAT/ Adopt a Barge	907 277-2111	lzender@zendergroup.org
Simone Sebalo	Zender/SWAT/Adopt a barge	907 277-2111	ssebalo@zendergroup.org
Evelyn Agnus	Zender/ Adopt a barge	907 277-2111	eagnus@zendergroup.org
Kristin K'eit	Zender/ Adopt a barge	907 277-2111	kkeit@zendergroup.org
Desirae Roehl	ANTHC/SWAT	907 729-3496	droehl@anthc.org
Ted Jacobsen	EPA/RurALCAP/SWAT	907 279-2511	tjacobson@ruralcap.com
Oxcenia O'domin	ANTHC/SWAT	907 729-3492	orodomin@anthc.org
Mary Fisher	ALPAR/Adopt a barge	907 274-3266	alpar@gci.net
Becca Brado	Interior Greenstar	907 452-4152	becca@iagreenstar.org

Regional Backhaul Coordinators or Regional Program Contacts

Name	Affiliation	Phone	Email
Anahma Shannon	Kawerak/SWAT/ Adopt a barge	907 443-4249	env.coord@kawerak.org
Ben Bavilet	AVCP Contact	907 543-7362	bbalivet@avcp.org
Sharon Slim	AVCP	907 543-7362	SSlim@avcp.org
Stan Tomaszewski	Maniilaq	907 442-7639	stanley.tomaszewski@maniilaq.org
Mike Grundberg	Yukon River InterTribal Watershed	907 258-3337	mgrundberg@yritwc.org
Billy Maines	Curyung Tribe	907 842-1751	billy@curyungtribe.com
Sue Flensburg	BBNA	907 842-5257	sflensburg@bbna.com
Reilly Kosinski	Total Reclaim	907 561-0544	AkOutreach@TotalReclaim.com
Bobbi Anne Barnowsky	Native Village of Old Harbor Environmental Department	907 286-2315	bobbi.barnowsky@ohtcmail.org
Tyler Kornelis	KANA	907 486-1393	tyler.kornelis@kanaweb.org
Michael Ophiem	Seldovia Village	907-435-3247	mopheim@svt.org
Lance Whitwell	Native Village of Venetie Tribal Government	907 849-8165	lancewhitwell@yahoo.com
Ray Paddock	CCTHITA	907 463.7184	rpaddock@ccthita.org
Karen Pletnikoff	APIA	907 276-2700	karenp@apiai.org
Ranya Aboras	Lake and Pen Borough	907 469-0367	cdc@lakeandpen.com
Tom Nicolos	North Slope	907 852-0371	tom.nicolos@north-slope.org

State Solid Waste Program Backhaul Contacts

Name	Affiliation	Phone	Email
Rebecca Colvin	DEC SW/SWAT/ Adopt a barge	907 269-7802	rebecca.colvin@alaska.gov
Trisha Bower	DEC SW/SWAT	907 451-2174	trisha.bower@alaska.gov
Stephen Price	DEC SW	907 269-7467	stephen.price@alaska.gov

End Destination/Recyclers

Name	Affiliation	Phone	Email
Larry Zirkle	Total Reclaim/SWAT/ Adopt a barge	907 561-0544	LarryZ@TotalReclaim.com
Nate Kruk	Central Recycling	907 748-7400	nate@crs-alaska.com
John Howe	West Seattle Recycling	206 935-4255	jon@westseattlerecycling.com

Steve Glucoft	Calbag Metals	503-226-3441	Metals@calbag.com
Phil Cole	K&K Recycling	907 488-1409	kandkrecycling.net/contact-us/
Beth Munson	Schnitzer Steel	907 349-4833	bmunson@schn.com
Chris Fedele	Alaska Scrap & Recycling	907 277-2727	cfedele@alaskascrap.com

Transporters/Transport Logistics

Don Hansen	AML/Adopt a barge	206 892-2595 206 369-1194	donh@aml.lynden.com
Paul Gillet	Naniq Global logistics/Adopt a barge	907 345-6122 907 331-8933	paul.gillett@ngl-intl.com
Debbie Brueckner	Alaska Logistics	907 677-2505	Debbie@alaska-logistics.com
Matt Sweetsir	Ruby Marine	907 832-1062	rubymarine@alaska.net
Endil Moore	Crowley/Adopt a Barge	907 832 5505	endil.moore@crowley.com
Paul Abad	Everts	907 243-0009	pabad@evertsair.com
Ben Anspacker	Northern Air Cargo	907 243-3331	customercare@nac.aero
Nancy Neidlinger	Warbelows	907 474-0518	nancy@warbelows.com
Mark Cline	Ryan Air	907 562-2227	mcline@ryanalaska.com
Eddie Walton	Matson Logistics	8776787447	ewalton@matson.com
John Armstrong	Carlile	800 478-1853	customerservice@carlile.biz
Charley Hnilicka	Inland Barge	907 832-5645	inlandbarge@gmail.com
Bruce Flanigan	Alaskan Coastal Trans.	907 235-3660	captainbruceflanigan@myway.com
Don Sangsaas	Ravn	907 450-7202	

U.S. Senate

Deborah Vo	Senator's office/Adopt a barge	907 586-7277	deborah_vo@murkowski.senate.gov

Native Corporations

Tom Maloney	CEO, Ahtna, Inc.	907 868-8250	tmaloney@ahtna.net
Matthew Fagnani	CEO, Aleut Corporation	907 561-4300	taf@thealeutfoundation.org
Rex Rock	CEO, Arctic Slope Regional Corporation	907 852-8633	thardt@asrc.com
Gail R. Schubert	CEO, Bering Straits Native Corporation	907 443-5252	info@beringstraits.com
Jason Metrokin	CEO, Bristol Bay Native Corporation	907 278 3602	jmetrokin@bbnc.net
Andrew Guy	CEO, Calista Corporation	907 275-2800	aguy@calistacorp.com
Gabriel Kompkoff	CEO, Chugach Alaska Corporation	907 563-8866	gabriel.kompkoff@chugach.ak.net
Sophie Minich	CEO, Cook Inlet Region, Incorporation	907 274-8638	sminich@ciri.com
Aaron M. Schutt	CEO, Doyon, Limited	907 375-4220	info@doyon.com
Elizabeth Perry	CEO, Koniag, Incorporation	907 486-2530	eperry@koniag.com
Wayne Qaniqsiruaq Westlake	CEO, Nana Regional	907 442-3301	news@nana.com
Anthony Mallott	CEO, Sealaska Corporation	907 586-1512	corpsec@sealaska.com

Federal Agencies

Santina Gay	EPA/SWAT Ex Officio	907 271-3413	Gay.Santina@epa.gov
Crystal Leonetti	Native Liaison, US Fish & Wildlife	907 786-3868	crystal_leonetti@fws.gov
Jerome Montague	Native Affairs and Natural Resources Advisor Alaskan Command	907 552-2769	Jon.Montague@us.af.mil
Michael Haller	Tribal and Community Liaison Alaska OCS Region	907 334-5276	michael.haller@boem.gov
Lillian Petershoare	Native Liaison USDA Forest Service	907 586-7089	lpetershoare@fs.fed.us
Adrienne Fleek	National Park Service	907 644-3511	adrienne_fleek@nps.gov
Givey Kochanowski	Dept. of Energy	907 271-1423	Givey.Kochanowski@hq.doe.gov
Elizabeth Hoffman	DOT/FHWA	907-586-7188	Elizabeth.Hoffman@dot.gov
Joel Neimeyer	Denali Commission	907 271-1440	JNeimeyer@denali.gov
Brenda TakesHorse Ralph Eluska	Bureau of Land Management (BLM)	907 271-3547	Btakes@blm.gov Reluska@blm.gov
Leslie Grey	Federal Aviation Admin	907 271-5453	Leslie.Grey@faa.gov
Adrienne Fleek	National Park Service	907 644-3511	adrienne_fleek@nps.gov
Ramona VanCleve	FEMA	907 271-4302	Ramona.VanCleve@fema.dhs.gov
Kristine Harper	USDA Natl Resource Conservation Svc	907 761-7737	Kristine.Harper@ak.usda.gov
Jim Nordlund Jolene John Tasha Deardorff	USDA Rural Development Econ Development RAVG, TAT	907 761-7705 720 544-2911	Jim.Nordlund@ak.usda.gov Jolene.John@ak.usda.gov Tasha.Deardorff@ak.usda.gov
Heidi Edwards	AK Federal Executive Assoc), DOJ	907 271-2754	Heidi.M.Edwards@usdoj.gov
Christopher Mandregan, Jr.	IHS Area Director	907-29-3686	Christopher.Mandregan@ihs.gov

State Agencies and City/Borough Representation

Mike Hanley	Commissioner, Dept. of Education & Early Development	907 465-2802	Mike.Hanley@alaska.gov
Katherine Eldemar	Division Director, Dept of Community & Regional Affairs	907 269-4501	katherine.eldemar@alaska.gov
Dave Kemp	Tribal Advisor, Dept. of Transportation	907 269-0811	David.Kemp@alaska.gov
Tom Wolforth	Dept Military & Vet Aff. AK Army National Guard	907 428-6896	Tom.Wolforth@alaska.gov
Gina Shirey,	DEC Local & Tribal Govt. Coordinator	907 465-5272	Gina.Shirey@alaska.gov
Kathie Wasserman	Alaska Municipal League Exec. Director	907 586-1325	Kathie@akml.org

Miscellaneous Stakeholders

John MacKinnon	Exec Dir. Assoc. General Contractors of Alaska	907 561-5354	info@agcak.org
	Alaska Air Charters	800-396-9514	
Leona Lane	Skyjet	855-567-9837	llane@skyjet.com

State Legislature

Bob Herron	House of Representatives (Bethel)	907 465-4942	Representative.Bob.Herron@akleg.gov
Neal Foster	House of Representatives (Nome), House Transportation Co-Chair		Representative.Neal.Foster@akleg.gov
Bryce Edgmon	House of Representatives (Dillingham)		Representative.Bryce.Edgmon@akleg.gov
Les Gara	House of Representatives (Anchorage)	907 465-2647	Representative.Les.Gara@akleg.gov
Charisse Millet	House of Representatives Majority Leader		Representative.Charisse.Millett@akleg.gov
Berta Gardner	Alaska Senate, District I	907 465-4930	Senator.Berta.Gardner@akleg.gov
Benjamin Nageak	House of Representatives (Barrow) House Transportation Comm.	907 465-3473	Representative.Benjamin.Nageak@akleg.gov
Lyman Hoffman	Alaska Senate, Bethel, Regional & Community Affairs	907 465-4453	Senator.Lyman.Hoffman@akleg.gov
Donny Olson	Alaska Senate, Nome	907 465-3707	Senator.Donny.Olson@akleg.gov
Gary Stevens	Alaska Senate, Kodiak	907 465-4925	Senator.Gary.Stevens@akleg.gov
Click Bishop	Alaska Senate, Fairbanks, Chair Regional & Comm Aff, Co-Chair Trans. Com	907 456-8161	Senator.Click.Bishop@akleg.gov

Acronyms

Abbrev.	Name
SWAT	Solid Waste Alaska Taskforce
EPA	Environmental Protection Agency
ANTHC	Alaska Native Tribal Health Consortium
ALPAR	Alaskans for Litter Prevention and Recycling
AVCP	Association of Village Council Presidents
BBNA	Bristol Bay Native Association
RurALCAP	Rural Alaska Community Program
KANA	Kodiak Area Native Association
CCTHITA	Central Council Haida and Indian Tribal Association
YRITWC	Yukon River Inter-Tribal Watershed Council
APIA	Aleutian Pribilof Island Association
DEC	Department of Environmental Conservation
DEC SW	DEC Solid Waste Program
DCRA	Alaska Division of Community and Regional Affairs
DEED	Alaska Dept. of Education & Early Development
AML	Alaska Marine Lines
ROAR	Recycling Our Area's Resources

Appendix B

Village Backhaul Costs

Village Program Costs

EPA IGAP funds are often used by Villages to cover most or all of the backhaul costs. Beginning in FY18, EPA IGAP will not cover costs associated with trash or recycling collection, or the costs associated with shipping recyclables or electronics wastes. With IGAP funds unavailable for backhaul soon, it is important to include consideration of village costs in the projected regional program costs. Costs that a village might incur while participating in a regional program include personnel to coordinate the backhaul (including shipping logistics) and arrange collection of materials within the village, personnel/labor to package and load materials, safety gear for personnel to use, packaging supplies (such as pallets, shrink wrap, banding, totes, vermiculite (for batteries), cardboard (for packing batteries), boxes), use of vehicle and fuel to get the materials to the airstrip or to collect materials from within town, use of other equipment and fuel to lift heavy totes or pallets

(such as a forklift or pallet jack). In some regional projects, villages are also required to pay for shipping to the hub. *But for this report, village to hub shipping costs are assumed covered by the regional programs, and included in the regional program projected costs.*

Village program costs primarily vary with salary and backhaul volume. Based on interviews with regional representatives, basic village program costs do not vary remarkably overall. Most programs tend to pack and ship their materials annually, and the amount of time taken to educate the community, and arrange for and label a half-full connex is nearly the same as for 3 connexes. While, program costs vary from village to village and region to region, the following budget was used as a reasonable cost estimate for a typical program. *The budget assumes needed equipment, connexes, and storage and staging space are already present in the village and represents a maintenance budget only.*

Estimated Average Annual Village Operation and Maintenance Costs for Backhaul, Excluding Transport to Hub.

Item	$
Personnel	
Coordinator (collection of materials, shipping logistics, supply/safety gear ordering, attend training, oversee and conduct packing and loading, shipping paperwork, communication with regional coordinator) Annual salary $45,000, 0.2 FTE	$9,000
Laborer (attend training, package materials, move materials, load materials) $35,000/yr 0.05 FTE	$1,750
Fringe 20%	**$2,150**
Packaging supplies (shrink wrap, banding, pallets, totes, vermiculite, boxes)	$650
Safety Gear	$150
Training, 1 person to anchorage for 2 day training	$1,550
Fuel/oil/maintenance for ATV/snowmobile/bobcat/pallet jack	$400
Indirect cost 10%	$1,565
TOTAL	**$17,215**