

Seeds of Success: 2013 Field Season Report



Photo: Nolan Creek collection site in the Brooks Range, Justin R. Fulkerson

Justin R. Fulkerson



Alaska Natural Heritage Program

UNIVERSITY of ALASKA ANCHORAGE

707 A Street

Anchorage, AK 99501

Summary Prepared for:

Bureau of Land Management



Alaska State Office
222 W. 7th Avenue, #13
Anchorage, AK 99513

Table of Contents

Table of Contents	i
List of Tables	i
List of Figures	i
Background	1
Introduction and Methods	1
Results	2
Seward Peninsula	2
McGrath Area	3
Coldfoot and Dalton Highway	4
Notes on Collected Species.....	5
Discussion	5

Tables

Table 1. Summary of 2013 AK930 SOS collections.....	6
Table 2. Observed rare species tracked by AKNHP during SOS collection trips.....	8
Table 3. Non-native species tracked by AKNHP during SOS collection trips.....	9

Figures

Figure 1. Seeds of Success collection sites since 2002.....	10
Figure 2. Seward Peninsula SOS collections sites for 2013	11
Figure 3. McGrath SOS collections sites for 2013.....	12
Figure 4. Coldfoot Highway SOS collections sites for 2013	13

Appendices

Appendix A. Photographs of SOS specimens.....	CD
Appendix B. Scanned SOS Data Forms and Spreadsheet	CD
Appendix C. Poster presented at the 2013 Native Seed Conference in New Mexico	CD

Background

In 2000, the Bureau of Land Management (BLM) engaged in a collaborative effort to establish a seed collection for native plants from the United States. The seed collection was specifically intended for conservation purposes, particularly for restoration and emergency fire rehabilitation projects, but also intended to bank seeds for the future. To meet these goals the seed collection was conducted by plant population level and protocols for documentation and methodologies were established. This effort was part of a nationwide, interagency program known as “Seeds of Success” (SOS), and for several years was also a part of the international “Millennium Seed Bank Partnership” of the Royal Botanic Gardens, Kew, London.

Introduction and Methods

The Alaska State Office of the BLM partnered with the Alaska Natural Heritage Program (AKNHP), University of Alaska Anchorage to collect seeds from targeted populations of Alaska native plants since 2007. To date AKNHP has made 570 SOS collections from 256 different species (Figure 1). This report summarizes the 2013 SOS Field season where SOS collections were made, comments on complications encountered at sites, and potential future SOS collection sites.

The seed collecting team used the national protocol to make collections of 10,000 to 20,000 seeds from specimens of a given plant population. Seeds were gathered from at least 50 individual plants to maximize genetic diversity and collectors did not gather more than 20% of the seed produced by a population. Species of conservation concern, agricultural species, and species with recalcitrant seeds were not within the scope of the project; these, as well as non-native species, were not collected. Collecting efforts were focused on species with traits that would provide advantages in the contexts of stabilization, restoration, and rehabilitation. Seed collections were transferred to the Alaska Plant Materials Center for processing, storage, and in some cases grown for an increase of seed quantity.

In addition to the seed collections, digital photographs and data on the location, habitat, associated species, landform, land use, geology, and soil type were recorded for each collection site (Appendix A and B). These data were submitted to the national program offices in Washington, DC, and copies are kept at AKNHP in Anchorage. One to three voucher specimens were taken for each collection. These specimens will be sent to the U.S. National Herbarium at the Smithsonian, the herbarium of the Museum of the North at the University of Alaska Fairbanks (ALA), and the herbarium the University of Alaska Anchorage (UAAH). This project fell within the State of Alaska guidelines for non-commercial harvesting, and thus did not require a permit for collections on state land. Rare plant species recorded were added to the AKNHP Rare Plant Database and non-native species were entered into the Alaska Exotic Plants Information Clearinghouse (AKEPIC).

SOS AK930 had a much larger scope in 2013 than the 2012 season by having a goal of 60 collections. The goal was met with an additional seven collections in the event some species did not meet the SOS criteria. The scope of work was focused in three main locations: the Seward Peninsula, McGrath/Interior Alaska, and the Arctic (Coldfoot to Galbraith Lake). Since seeding and restoration typically occurs on the road system in Alaska, collections were focused away from the road system when possible. Helicopter assistance aided this effort in the Seward Peninsula and McGrath area. Collections were made from July 17 to September 7. A poster was presented at the 2013 National Native Seed Conference titled “A Decade of Success: Alaska

Seeds of Success Program” in April (Appendix C). The poster highlighted the purpose and results of the Seeds of Success program in Alaska from 2002-2012.

Results

For the 2013 field season, 67 collections were made from 53 different species (Table 1). There were an additional three collections made, but they did not meet SOS protocol due to the shortfall in the number of seed collected (Table 1). Observed non-native and sensitive plant species were recorded at site locations and summarized in Tables 2 and 3.

Seward Peninsula

Overall a late blooming season was observed in Alaska, especially in the Seward Peninsula, making it difficult to collect seed. There were 16 collections made in the Seward Peninsula with a majority of them from the Quartz Creek Airstrip near the end of Kougarok Road (Table 1; Figure 2). This was the only area encountered with an adequate amount and quality of seed for collecting. A buffer around the airstrip appeared to be drill seeded with *Puccinellia nuttalliana* and was avoided for collection. Non-native species were recorded at the airstrip as well (Table 3).

Helicopter assistance provided access to off-the-road area such as the Pargon River, Mt. Dixon, and the Kigluaik Mountains (Sinuk River and Windy Creek confluence). The Pargon River area was open alder-willow scrub and dry sparsely vegetated gravel, providing less desirable habitat than had been anticipated based on aerial photographs. A single SOS collection (*Carex inferalpina* ssp. *norvegica*) was made due to the poor phenology of other desirable work-horse species. For example, seed was not yet set or ready for collection in *Carex saxatilis*, *Juncus castaneus*, and *Poa alpina*.

Despite Mount Dixon having south-facing aspect and barren soil that may facilitate a quicker phenology rate of associated plants; it did not contain SOS target species. It is characterized as a barren limestone mountain, providing a high probability of harboring rare species; however no rare or non-native species were encountered on a cursory 2 acres survey. The Sinuk River and Windy Creek is a river floodplain with point bars, open meadows, and south facing bluff/slough habitat. Flowering species were in early or full bloom for our visit on 5 August 2013 and seed were not ready from potential SOS species such as *Poa alpina*, *Poa arctica*, and *Spiraea stevenii*. Rare species such as *Botrychium alaskense*, *Cardamine blaisdellii* and *Micranthes nudicaulis* were observed with no apparent threats (Table 2). Non-native plant species were not observed away from the road system (Table 3).

An unplanned collection was made in McCarthy Marsh at the end of the BLM Western Arctic Caribou Habitat monitoring project, which finished early and staff were able to make one collection (*Eriophorum vaginatum*) and scout areas for a return visit (Figure 2). One collection (*Parnassia kotzebuei*) by Mike Duffy at the UAF-Nome campus was made (Figure 2). Additionally, scouting was done by Mike Duffy between site locations for the BLM/UAF Reindeer Monitoring Project in the Seward Peninsula. Dr. Greg Finstad of the Reindeer Monitoring Program, University of Alaska Fairbanks (UAF), provided lodging for SOS staff in Nome for the Seward Peninsula trip.

McGrath Area

There were 20 collections made in the McGrath area (Figure 3). Several attempts to collect at the Nixon Fork Mine near McGrath were made but appropriate transportation and BLM liaison/guide was not available due to scheduling or transportation conflicts. However, eight SOS collections were made about 9 km northeast of Nixon Fork Mine, downstream of the confluence of Mystery Creek and the Nixon Fork River (Figure 3; Table 1). The Nixon Fork contained dry and moist herbaceous gravel bar meadows and open willow scrub sites. Nixon Fork River provided the best collecting opportunities with a diverse and abundant amount of appropriate work-horse taxa but the collecting process was terminated early due to an aggressive bear. Areas downstream of this point also provided collections, but not the sheer number of species or quantity as the first collection site. The large open marsh valley holding the Nixon Fork is composed of wet graminoid herbaceous tundra, boggy oxbow lakes, and open black spruce forest. Our scouting observations of this area found few work-horse species or target habitat. Scouting was not done at the mountain bases north or west of the Nixon Fork. A single collection (*Pedicularis lanata*) was made at Limestone Mountain which provides a good collecting location for alpine species if a visit is done earlier in the season. Scouting was done between Limestone Mountain and Nixon Fork collection sites, but the area was dominated with closed black spruce forest, providing little to no appropriate habitat or work-horse species.

Six collections were made along the Big River and Lone Mountains, southeast of McGrath (Figure 3). Point bars along the Big River are sparsely vegetated meadows and open alder-willow scrub and contained few SOS appropriate species. Several collections were made from an old filled-in oxbow lake of the Big River. The old oxbow lakes were not as productive collecting sites as anticipated, possibly due to aerial imagery showing an earlier seral stage than what was observed in the field. *Cicuta bulbifera* and *Carex eburnea*, both rare species, were encountered along the Big River (Table 2). Scouting was done along the lower half of the Windy Fork, a large braided river, however no suitable species in sufficient quantities were found other than *Dryas* species. *Dryas octopetala* ssp. *octopetala* was not successfully collected for SOS in 2012 due to a low number of viable seed and lower number of seed collected than anticipated and therefore not collected in 2013. The landscape south of the Kuskokwim River is a mix of open black spruce forest, low open scrub, and wet graminoid herbaceous vegetation. Potential habitat, such as barren lakes and ancient sand dunes along the Iditarod Trail were scouted from helicopter but did not seem to contain appropriate associated vegetation for work-horse species. Some drainage streams from Windy Fork and the Lone Mountains have small sandy banks and bars seen from helicopter and may contain appropriate SOS species, but were not explored due to time constraints.

Two AKNHP staff overlapped their stay in McGrath while doing a survey of burned areas on BLM land. The staff made four SOS collections within McGrath and an additional two collections at a burned survey site (Cheeneetnuk River) when time permitted (Figure 3). Natalie Baumgartner, City Administrator of the City of McGrath, provided essential information on local public and native land boundaries and where permission would be needed for collecting within town. Information was also provided on recent and historical seeding vegetation efforts by the Alaska Department of Transportation for the road corridor in town and that “weird plants” have been growing in these areas. Observations found the “weird plants” to be invasive weed species that have likely been introduced from DOT seed mixes, notably *Helianthus annuus* and

Hordeum vulgare (Table 3). Habitat within McGrath and away from town on the main road provided few suitable locations for SOS collections.

Future collection efforts should concentrate along the upper section of the Nixon Fork that contains gravel point bars and the Nixon Fork Mine area. Scouting areas to the west of McGrath have not been explored but herbarium records indicate many work-horse type species in the Ganes Creek area and some seral habitats occur such as mine tailings and open gravel borrow pits. This area was not explored due to time constraints and private mining activity. Detailed boundary maps would be needed for this area for scouting and collecting.

Coldfoot and Dalton Highway

Collections were made further north on the Dalton Highway than in previous years, reaching the Arctic Seed Zone, an underrepresented seed collecting region (Figure 4). Thirty collections were made from this region (Table 1). A gravel stream adjacent to a borrow pit in the Galbraith Lake area provided nine collections and the sand dunes along the Atigun River provided a single collection (Table 1). The Galbraith Lake area is composed of gravel mesic herbaceous meadow/open willow scrub, dwarf mixed scrub tundra, moist herbaceous depressions, and hillside seeps. Common species in the area that were not collected because of earlier phenology include *Poa alpina*, *Poa arctica* ssp. *arctica*, *Trisetum spicatum*, *Chamerion latifolium*, *Dodecatheon frigidum*, and *Oxytropis jordalii*. Notably, several hundred large *Hedysarum alpinum* plants were found at the BLM Galbraith Lake Campground providing an excellent source of extra seed from the same geographic population as the borrow pit. The sand dunes along the Atigun River had low willow scrub with open pockets and banks of sparsely vegetated sand, which provided a single SOS potential species.

Nine collections were made from old mine tailings and the roadside of Nolan Creek, which was within 0.5 km of mining activity at the Silverado Gold Mine. Nolan Creek is characterized by wet sedge meadows, willow scrub, and sparse gravel bars with herbaceous meadows. A small section of hillside between the creek and road appeared to be recently seeded with a *Puccinellia* species and was therefore not collected. This area was easily accessible and provides a potential seed source for reclamation of Silverado Gold Mine if needed.

Seven collections were made on gravel bars at the Dietrich River Crossing (Figure 4). This habitat provided excellent quantities of many work-horse taxa such as *Hedysarum boreale* ssp. *mackenziei*, *Oxytropis deflexa* var. *foliolosa*, *Castilleja caudata*, and *Poa glauca* ssp. *glauca*. Suitable populations of *Calamagrostis purpurascens*, *Carex aquatilis*, *Juncus arcticus*, *Trisetum spicatum*, *Hedysarum alpinum*, and *Artemisia tilesii* were observed at this location but were not collected because seed had already dispersed, fungal infections of seeds were observed, or observed species was previously collected at Galbraith Lake or Nolan Creek this season. A broader search would be needed to determine if the population of *Carex capillaris* is viable for collection here. Two collections of *Artemisia* (Table 1) were made at Dalton Highway milepost 228.8 on the Dietrich River (Figure 4). No other appropriate SOS species were observed at this location.

Early scouting in the Chandalar Shelf area below Atigun Pass was made by Eric Geisler of the BLM in August 2013 to determine phenology and potential SOS taxa. Four collections were made along the Trans-Alaska Pipeline access road, which is composed of dry herbaceous meadow and open low willow scrub-wet streamside meadow. *Anemone richardsonii* appeared

locally common but sufficient time was not available to make a broader search to collect enough seed. *Dodecatheon frigidum* and *Parnassia palustris* were locally common but seed was dispersed prior to our arrival. Chandalar shelf provides excellent collection opportunities for *Poa arctica* and *Polemonium acutiflorum*, with large populations on a visible hillside in a drainage east of the Dalton Highway (a 20min walk, 68.058, -149.595), but most of the seed had dispersed. A large population of *Boykinia richardsonii* was observed on the north downhill slope of Atigun Pass (68.1308, -149.4377), but time constraints and winter weather conditions were not conducive for collecting. Rare species encountered on the Coldfoot trip were *Carex eburnea*, *Cryptogramma stelleri*, and *Eriophorum viridi-carinatum* (Table 2). Several non-native plants were encountered and a notable range extension to the north of *Melilotus albus* at Dalton Highway milepost 195.5 (Table 3).

Notes on Collected Species

We made very large collections of *Eurybia sibirica*, an appropriate species for reclamation/increase. In the past, the AK PMC has reported low seed number and broken or unusable seed for this species. We gathered larger seed quantities to better estimate field collecting methods for this species. Therefore collections AK930-530 and AK930-547 may not meet SOS protocol by containing a fewer number of seeds than required. Three collections were made that did not meet SOS criteria because there was not a sufficient number of seed or number of individuals (Table 1). Therefore, these were not given an official SOS number, but the collections are still useful for direct application in seed mixes for this region.

Discussion

Despite a late seasonal flowering period for most of Alaska, SOS AK930 made seven extra collections, exceeding the goal of 60 collections for the 2013 field season. Many collections were made off the road system, reducing the chance of collecting reclaimed seed. Additionally, numerous collections were made near two different mines, providing a diverse amount of seed for future reclamation when the mines close. Seed has been delivered to the Palmer Plant Materials Center and should be finished processing by early spring of 2014. Herbarium voucher specimens have been dispersed to appropriate herbaria. Several new populations have been identified for future seed collection efforts and AKNHP staff are working on plans for the 2014 field collecting season.

Table 1. Summary of 2013 AK930 SOS collections.

SOS #	Name	Family	Locality	Seed Zone
503	<i>Eriophorum vaginatum</i>	Cyperaceae	McCarthy Marsh	West
504	<i>Parnassia kotzebuei</i>	Parnassiaceae	Nome	West
505	<i>Silene involucrata</i> ssp. <i>involucrata</i>	Caryophyllaceae	Kougarok River	West
506	<i>Poa alpina</i>	Poaceae	Kougarok River	West
507	<i>Trisetum spicatum</i>	Poaceae	Kougarok River	West
508	<i>Beckmannia syzigachne</i>	Poaceae	Kougarok River	West
509	<i>Astragalus eucoismus</i> ssp. <i>eucoismus</i>	Fabaceae	Quartz Creek airstrip	West
510	<i>Carex krausei</i>	Cyperaceae	Quartz Creek airstrip	West
511	<i>Descurainia sophioides</i>	Brassicaceae	Quartz Creek airstrip	West
512	<i>Elymus macrourus</i>	Poaceae	Quartz Creek airstrip	West
513	<i>Carex norvegica</i> ssp. <i>inferalpina</i>	Cyperaceae	Pargon River	West
514	<i>Poa glauca</i> ssp. <i>glauca</i>	Poaceae	Quartz Creek airstrip	West
515	<i>Juncus arcticus</i> ssp. <i>alaskanus</i>	Juncaceae	Quartz Creek airstrip	West
516	<i>Juncus castaneus</i>	Juncaceae	Quartz Creek airstrip	West
517	<i>Erysimum inconspicuum</i>	Brassicaceae	Quartz Creek airstrip	West
518	<i>Chamerion latifolium</i>	Onagraceae	Quartz Creek airstrip	West
519	<i>Calamagrostis canadensis</i> var. <i>langsдорffii</i>	Poaceae	Big River oxbow	Interior
520	<i>Carex utriculata</i>	Cyperaceae	Big River oxbow	Interior
521	<i>Comarum palustre</i>	Rosaceae	Big River oxbow	Interior
522	<i>Hedysarum alpinum</i>	Fabaceae	Big River point bars	Interior
523	<i>Chamerion latifolium</i>	Onagraceae	Big River point bars	Interior
524	<i>Leymus innovatus</i>	Poaceae	Lone Mountain area	Interior
525	<i>Pedicularis lanata</i>	Orobanchaceae	Limestone Mountain	Interior
526	<i>Calamagrostis canadensis</i> var. <i>langsдорffii</i>	Poaceae	Nixon Fork River1	Interior
527	<i>Arctagrostis latifolia</i> ssp. <i>arundinacea</i>	Poaceae	Nixon Fork River1	Interior
528	<i>Agrostis scabra</i>	Poaceae	Nixon Fork River1	Interior
529	<i>Chamerion latifolium</i>	Onagraceae	Nixon Fork River1	Interior
530	<i>Eurybia sibirica</i>	Asteraceae	Nixon Fork River2	Interior
531	<i>Erigeron acris</i> ssp. <i>politis</i>	Asteraceae	Nixon Fork River2	Interior
532	<i>Galium boreale</i>	Rubiaceae	Nixon Fork River2	Interior
533	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	Poaceae	Nixon Fork River2	Interior
534	<i>Juncus alpinoarticulatus</i>	Juncaceae	McGrath- Sand Island	Interior
535	<i>Chamerion angustifolium</i>	Onagraceae	McGrath- Sand Island	Interior
536	<i>Beckmannia syzigachne</i>	Poaceae	McGrath	Interior
537	<i>Chamerion angustifolium</i>	Onagraceae	McGrath	Interior
538	<i>Chamerion angustifolium</i>	Onagraceae	Cheeneetnuk River	Interior
539	<i>Iris setosa</i>	Iridaceae	Cheeneetnuk River	Interior

SOS #	Name	Family	Locality	Seed Zone
540	<i>Zigadenus elegans</i>	Melanthiaceae	Galbraith Lake	Arctic
541	<i>Parnassia kotzebuei</i>	Parnassiaceae	Galbraith Lake	Arctic
542	<i>Solidago multiradiata</i>	Asteraceae	Galbraith Lake	Arctic
543	<i>Senecio lugens</i>	Asteraceae	Galbraith Lake	Arctic
544	<i>Hedysarum alpinum</i>	Fabaceae	Galbraith Lake	Arctic
545	<i>Festuca altaica</i>	Poaceae	Galbraith Lake	Arctic
546	<i>Boykinia richardsonii</i>	Saxifragaceae	Galbraith Lake	Arctic
547	<i>Eurybia sibirica</i>	Asteraceae	Galbraith Lake	Arctic
548	<i>Oxytropis borealis</i> ssp. <i>viscida</i>	Fabaceae	Atigun River	Arctic
549	<i>Parnassia palustris</i>	Parnassiaceae	Nolan Creek	Arctic
550	<i>Lomatogonium rotatum</i>	Gentianaceae	Nolan Creek	Arctic
551	<i>Juncus arcticus</i> ssp. <i>alaskanus</i>	Juncaceae	Nolan Creek	Arctic
552	<i>Carex aquatilis</i>	Cyperaceae	Nolan Creek	Arctic
553	<i>Triglochin palustris</i>	Juncaginaceae	Nolan Creek	Arctic
554	<i>Calamagrostis stricta</i> ssp. <i>stricta</i>	Poaceae	Nolan Creek	Arctic
555	<i>Eriophorum scheuchzeri</i>	Cyperaceae	Nolan Creek Road	Arctic
556	<i>Juncus castaneus</i>	Juncaceae	Nolan Creek Road	Arctic
557	<i>Artemisia tilesii</i>	Asteraceae	Nolan Creek Road	Arctic
558	<i>Elymus alaskanus</i> ssp. <i>alaskanus</i>	Poaceae	Dietrich Crossing	Arctic
559	<i>Hedysarum boreale</i> ssp. <i>mackenziei</i>	Fabaceae	Dietrich Crossing	Arctic
560	<i>Castilleja caudata</i>	Orobanchaceae	Dietrich Crossing	Arctic
561	<i>Poa glauca</i> ssp. <i>glauca</i>	Poaceae	Dietrich Crossing	Arctic
562	<i>Chamerion latifolium</i>	Onagraceae	Dietrich Crossing	Arctic
563	<i>Oxytropis deflexa</i> var. <i>foliolosa</i>	Fabaceae	Dietrich Crossing	Arctic
564	<i>Erigeron lonchophyllus</i>	Asteraceae	Dietrich Crossing	Arctic
565	<i>Artemisia tilesii</i>	Asteraceae	Dietrich River	Arctic
566	<i>Artemisia alaskana</i>	Asteraceae	Dietrich River	Arctic
567	<i>Astragalus alpinus</i>	Fabaceae	Chandalar Shelf	Arctic
568	<i>Gentianella propinqua</i>	Gentianaceae	Chandalar Shelf	Arctic
569	<i>Erigeron acris</i> ssp. <i>politis</i>	Asteraceae	Chandalar Shelf	Arctic
570	<i>Arctagrostis latifolia</i> ssp. <i>latifolia</i>	Poaceae	Chandalar Shelf	Arctic
No SOS #	<i>Parnassia palustris</i>	Parnassiaceae	Nixon Fork River	Interior
No SOS #	<i>Antennaria pulcherrima</i>	Asteraceae	Nolan Creek	Arctic
No SOS #	<i>Geum macrophyllum</i> ssp. <i>perincisum</i>	Rosaceae	Nixon Fork River	Interior

Table 2. Observed rare species tracked by AKNHP during SOS collection trips.

Tracked Taxa	Rank	Collection Trip	General Location	Notes
<i>Botrychium alaskense</i>	G4 S3	Seward Peninsula	Sinuk River and Windy Creek	
<i>Cardamine blaisdellii</i>	G3G4 S3S4	Seward Peninsula	Sinuk River and Windy Creek	BLM Watch
<i>Micranthes nudicaulis</i>	G3G4Q S3	Seward Peninsula	Pargon River	
<i>Micranthes nudicaulis</i>	G3G4Q S3	Seward Peninsula	Sinuk River and Windy Creek	
<i>Micranthes nudicaulis</i>	G3G4Q S3	Seward Peninsula	Sinuk River	
<i>Carex eburnea</i>	G5 S3	McGrath	Big River Point Bars	
<i>Cicuta bulbifera</i>	G5 S3	McGrath	Oxbow Lake-Big River	
<i>Arenaria longipedunculata</i>	G3G4Q S3S4	Coldfoot	Chandalar Shelf	BLM Watch
<i>Carex eburnea</i>	G5 S3	Coldfoot	Wiseman	
<i>Cryptogramma stelleri</i>	G5 S3S4	Coldfoot	Weihl Mountain fen	
<i>Eriophorum viridi-carinatum</i>	G5 S2S3	Coldfoot	Weihl Mountain	Range Extension

Table 3. Non-native species tracked by AKNHP during SOS collection trips.

Tracked Taxa	Collection Trip	General Location
<i>Brassica</i> sp.	McGrath	McGrath Roadside
<i>Bromus inermis</i> ssp. <i>inermis</i>	McGrath	McGrath Roadside
<i>Capsella bursa-pastoris</i>	McGrath	McGrath Roadside
<i>Capsella bursa-pastoris</i>	Coldfoot	Middle Fork of Koyukuk at Wiseman
<i>Chenopodium album</i>	McGrath	McGrath Roadside
<i>Chenopodium album</i>	McGrath	McGrath Sand Island
<i>Crepis tectorum</i>	McGrath	McGrath Roadside
<i>Descurainia sophia</i>	McGrath	McGrath Roadside
<i>Descurainia sophia</i>	McGrath	McGrath Sand Island
<i>Elymus repens</i>	McGrath	McGrath Roadside
<i>Helianthus annuus</i>	McGrath	McGrath Roadside
<i>Hordeum vulgare</i>	McGrath	McGrath Roadside
<i>Matricaria discoidea</i>	McGrath	McGrath Roadside
<i>Matricaria discoidea</i>	McGrath	McGrath Sand Island
<i>Matricaria discoidea</i>	McGrath	McGrath Sand Island
<i>Melilotis albus</i>	Coldfoot	Middle Fork of Koyukuk at Wiseman
<i>Melilotis albus</i>	Coldfoot	Dalton Highway MP 195.5
<i>Persicaria maculosa</i>	McGrath	McGrath Roadside
<i>Persicaria maculosa</i>	McGrath	McGrath Sand Island
<i>Plantago major</i>	McGrath	McGrath Roadside
<i>Plantago major</i>	McGrath	McGrath Sand Island
<i>Poa pratensis</i> ssp. <i>pratensis</i>	McGrath	Nixon Fork River Point Bar1
<i>Poa pratensis</i> ssp. <i>pratensis</i>	McGrath	McGrath Roadside
<i>Polygonum aviculare</i>	McGrath	McGrath Roadside
<i>Polygonum aviculare</i>	McGrath	McGrath Sand Island
<i>Stellaria media</i>	McGrath	McGrath Roadside
<i>Taraxacum officinale</i> ssp. <i>officinale</i>	McGrath	McGrath Roadside
<i>Taraxacum officinale</i> ssp. <i>officinale</i>	McGrath	McGrath Sand Island
<i>Taraxacum officinale</i> ssp. <i>officinale</i>	Seward Peninsula	UAF Nome Campus
<i>Trifolium hybridum</i>	McGrath	McGrath Roadside
<i>Trifolium hybridum</i>	McGrath	McGrath Sand Island
<i>Trifolium pratense</i>	McGrath	McGrath Roadside
<i>Trifolium repens</i>	McGrath	McGrath Roadside
<i>Vicia cracca</i>	Seward Peninsula	Quartz Creek Airstrip

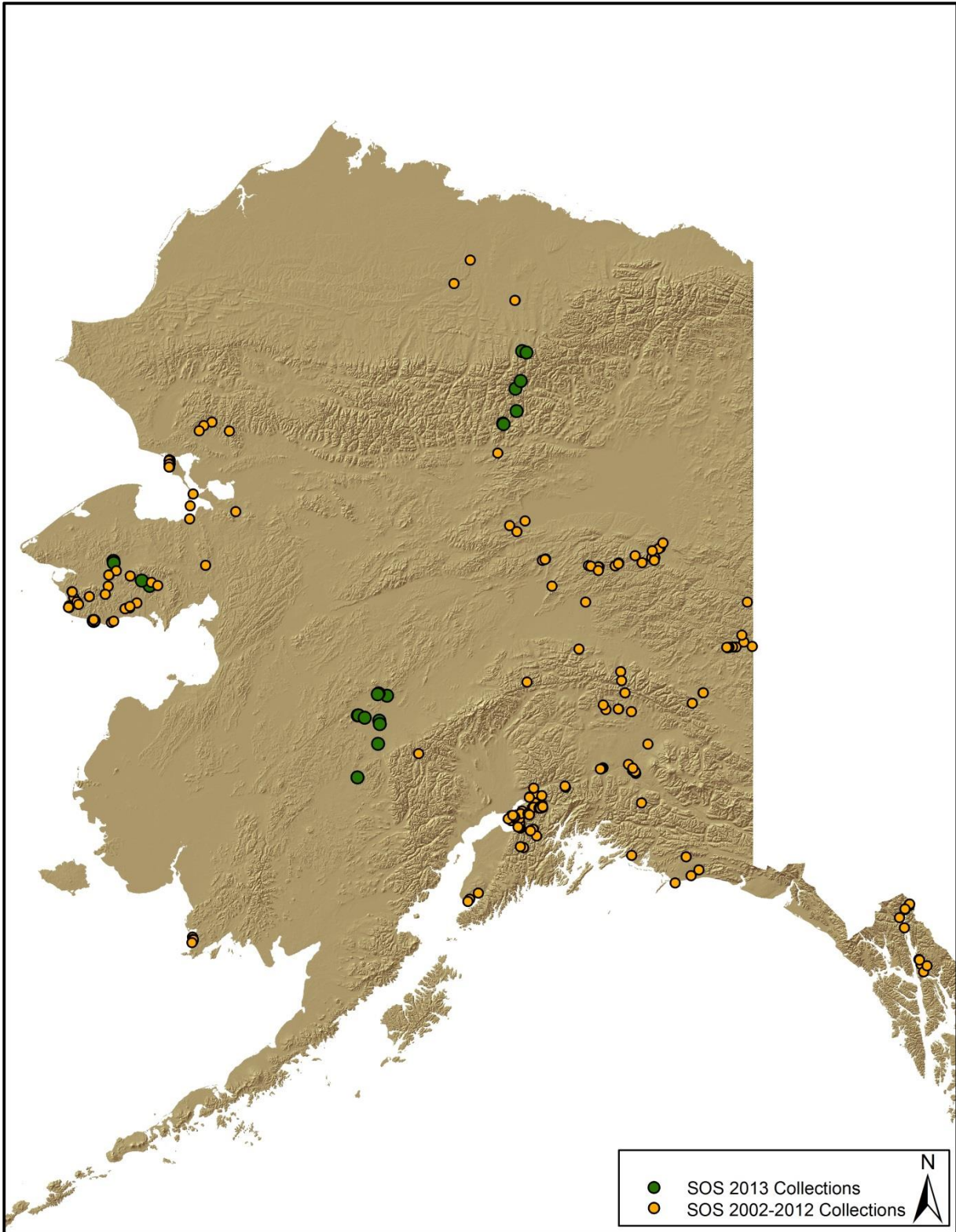


Figure 1. Seeds of Success collection sites since 2002

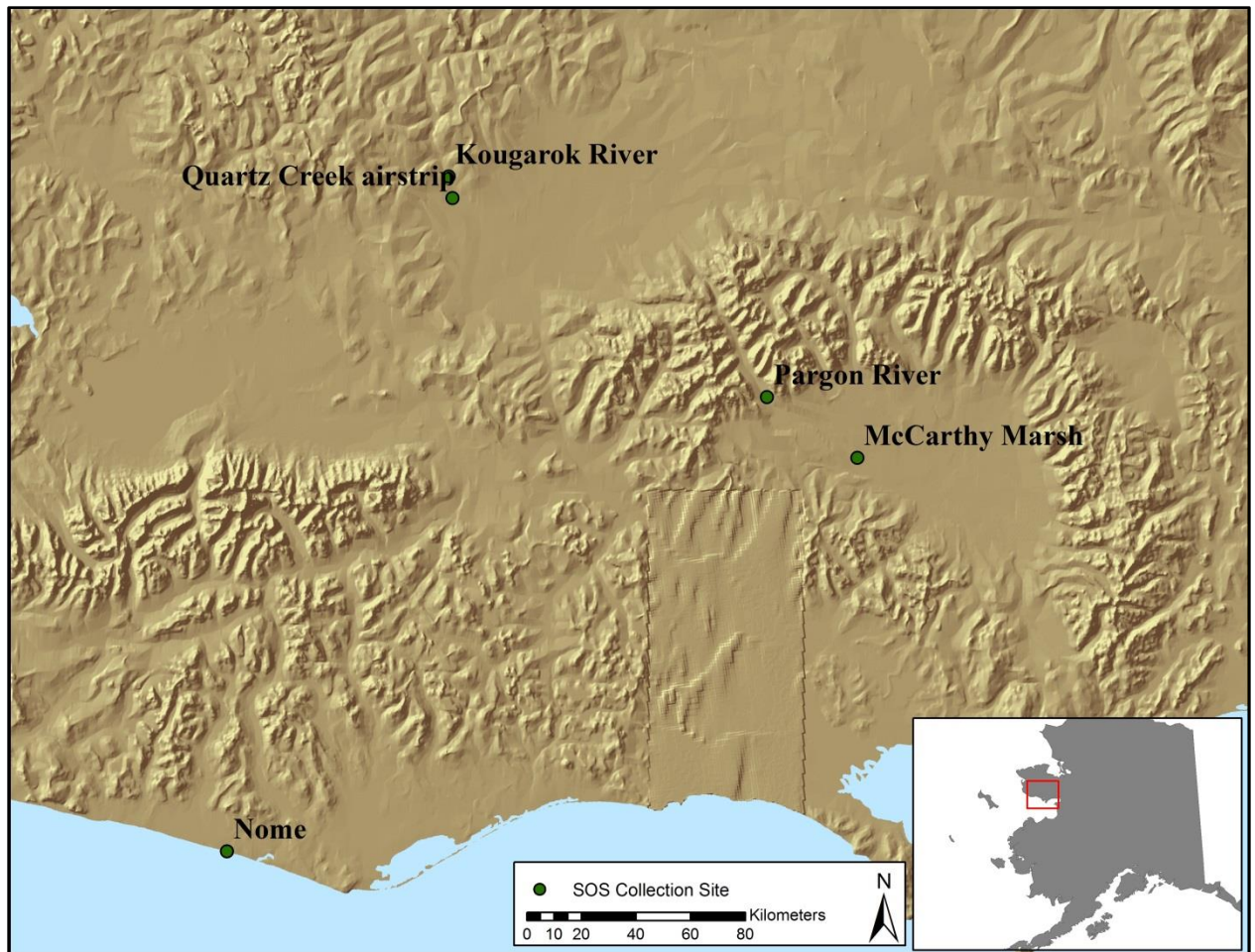


Figure 2. Seward Peninsula SOS collections sites for 2013.

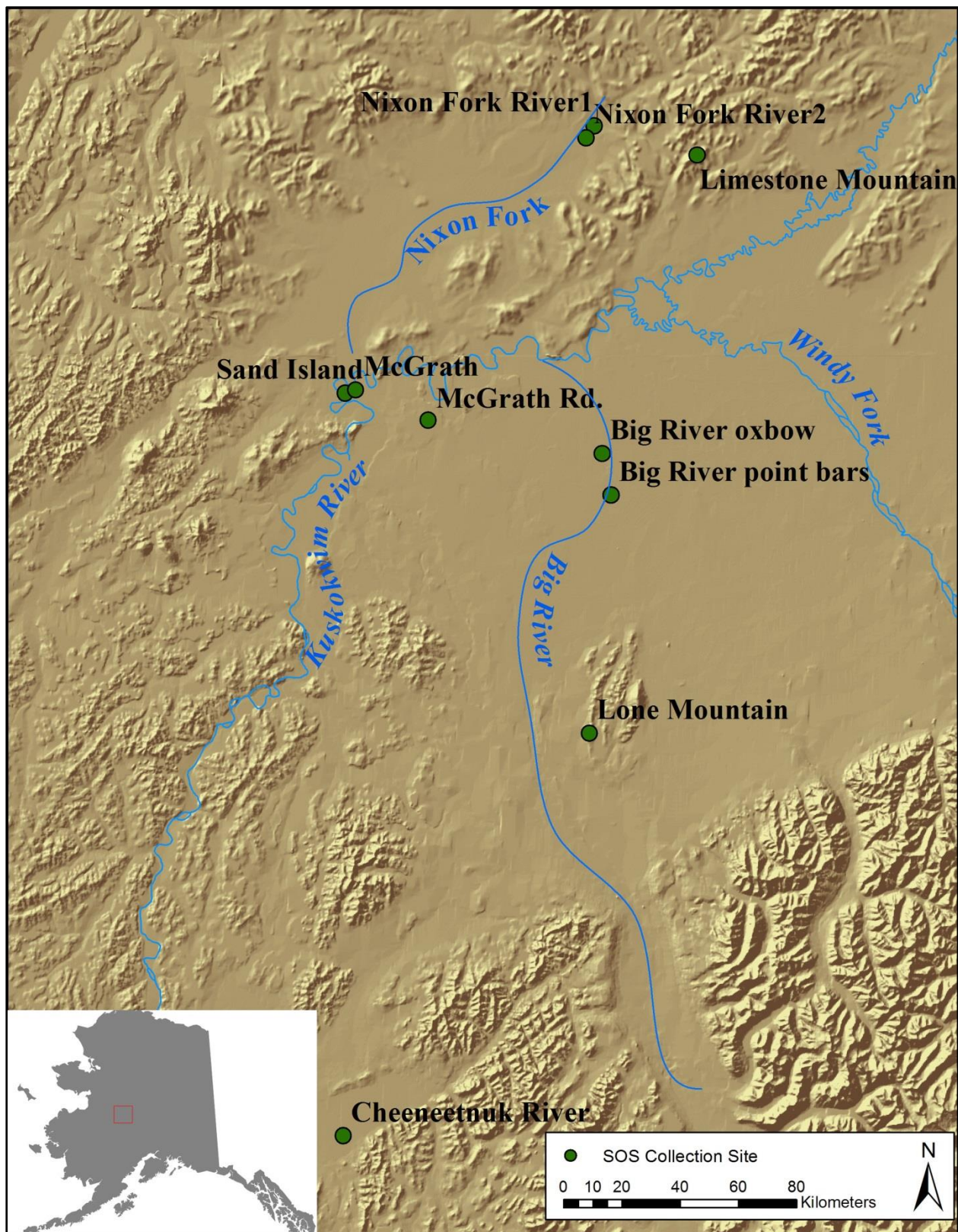


Figure 3. McGrath SOS collections sites for 2013.

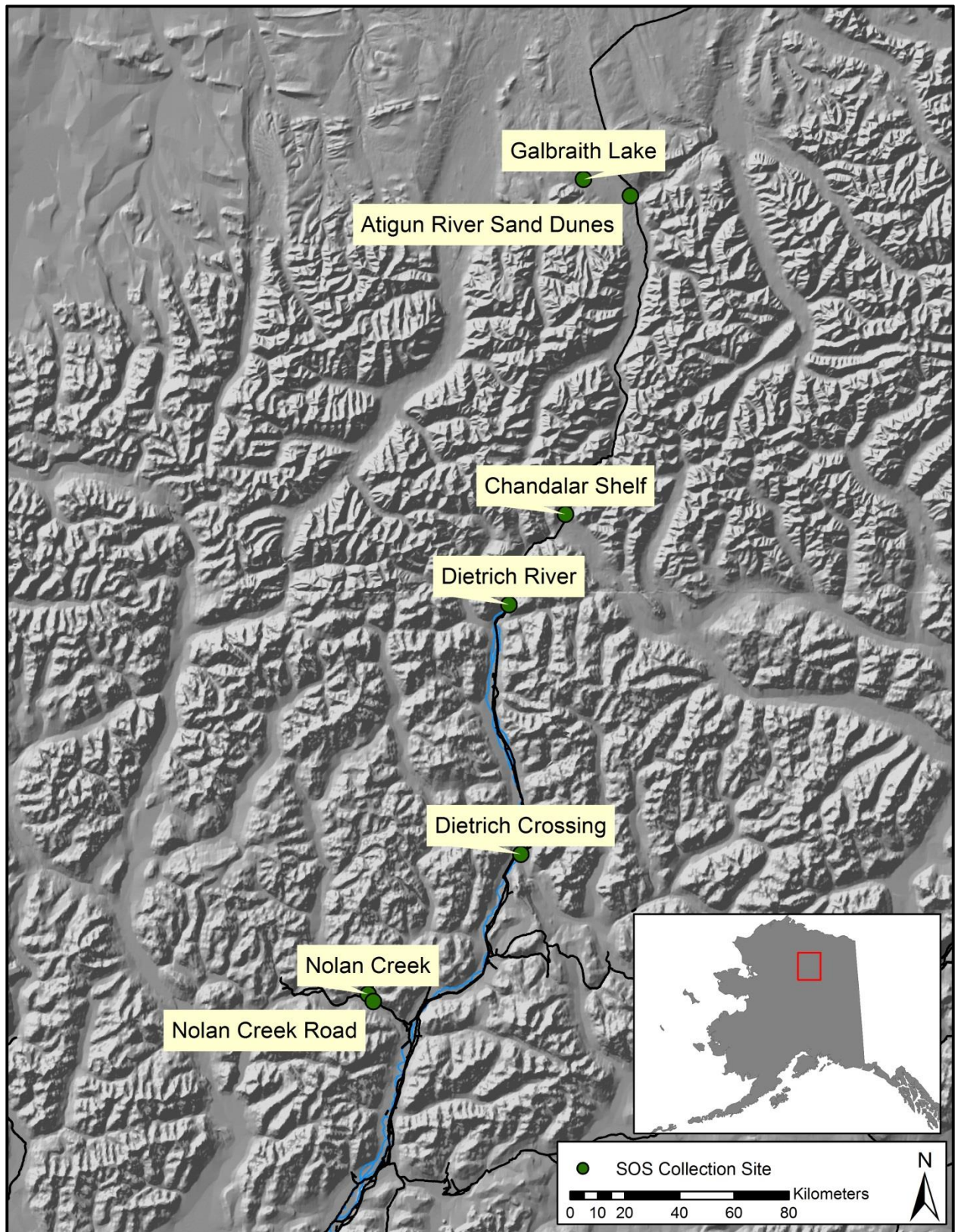


Figure 4. Coldfoot Highway SOS collections sites for 2013.

Appendix A. Photographs of SOS specimens (On CD)

Appendix B. Scanned SOS Data Forms and Spreadsheet (On CD)

Appendix C. Poster presented at the 2013 Native Seed Conference in New Mexico (On CD)