

# Potato Variety Performance, Alaska 1997

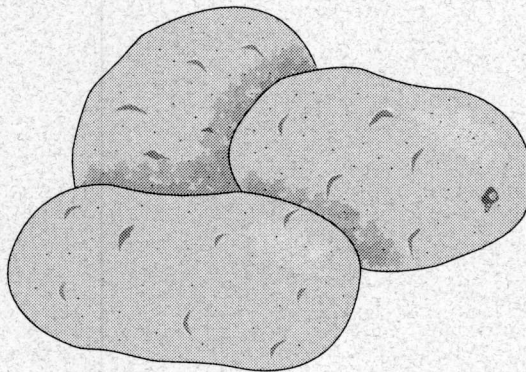
Property of  
Elmer F.asmuson Library  
University of Alaska Fairbanks

by

D.E. Carling  
Professor of Horticulture  
Palmer Research Center

and

M. A. Boyd  
Horticulture Technician  
Palmer Research Center



ALASKA  
S  
33  
E22  
10.112

Circular 112

January 1998

Agricultural & Forestry Experiment Station; University of Alaska Fairbanks

# POTATO VARIETY PERFORMANCE—1997

## INTRODUCTION

A yield trial comparing 45 cultivars of potatoes (*Solanum tuberosum* L.) was conducted during the 1997 growing season at the University of Alaska Fairbanks, Agricultural and Forestry Experiment Station's (AFES) Palmer Research Center, Matanuska Farm, located six miles west of Palmer, Alaska. Varieties with a history of commercial production in the Matanuska Valley (Alaska 114, Bake-King, Green Mountain, and Superior) were included to serve as a comparative base for newly developed varieties or older named varieties that have not been tested at this location. Russet Burbank, the variety most widely grown in the United States, also was included to broaden the base of comparison although past trials have demonstrated its unsuitability for this area. Varieties that compare favorably with the above listed local standards may warrant consideration by commercial growers. Nonirrigated trials have been conducted annually since 1982 whereas irrigated trials were initiated in 1985. Results of these trials were published in AFES Circulars and are available at AFES offices.

## MATERIALS AND METHODS

Irrigated and nonirrigated field trials were planted at the Matanuska Farm on May 8 and May 7 respectively, approximately the same planting dates as in 1996. Seedbed preparation included moldboard plowing to a depth of 10 to 12 inches followed by disking and packing. Potatoes were planted as soon as possible after tilling to minimize loss of early spring moisture. Soil

moisture was low at planting time because of the small amount of snowmelt and typically low rainfall in April and early May. Four replicates of each variety, with 15 individual plants per replicate, were planted in rows 36 inches apart in a randomized complete block design. Seed used in these trials was produced on the Matanuska Farm from stocks acquired from the Alaska Division of Agriculture or from stocks acquired from various certification agencies in the contiguous 48 states and Canada. Some of the varieties may have contained certain latent viruses. Seed pieces were planted approximately 11 inches apart in the row and covered with 2-3 inches of packed soil with a single row Iron Age assist feed planter. Granular fertilizer (10-20-20) was applied at the rate of 120 pounds N, 240 pounds P205 and 240 pounds of K20 per acre by the planter in bands two inches to the side and two inches below the seed. The fertilizer was composed of monoammonium phosphate (11-51-0), muriate of potash (0-0-60), urea (45-0-0), and a limestone filler. Water was applied as needed to the irrigated plots through overhead sprinklers. Weeds were controlled by a pre-emergent application of Linuron (Lorox) supplemented by cultivation and hand weeding where necessary. Plants were hilled during the last week of June and all plots were harvested on September 10. Harvest was completed prior to any freezing temperatures in the area and the harvested crop went into cold storage in very good condition.

## RESULTS AND DISCUSSION

The 1997 growing season began typically dry

Table 1. Climatic data for Matanuska Farm during the 1997 growing season.<sup>1</sup>

	April	May	June	July	August	September
Temp. (°F)						
Air						
Daily max.	50.2 (46.4)	60.1 (57.9)	68.4 (65.4)	70.5 (67.5)	66.9 (65.0)	59.6 (56.4)
Daily min.	31.2 (27.4)	37.5 (36.4)	46.6 (44.4)	51.9 (48.0)	48.8 (45.9)	41.3 (38.6)
Daily mean	40.7 (36.9)	48.8 (47.2)	57.5 (54.9)	61.2 (57.8)	57.8 (55.5)	50.4 (47.5)
Soil (4" depth)						
Fallow	36.7	51.9	61.7	66.2	61.0	51.2 <sup>1</sup>
Sod	33.8	48.9	61.3	66.0	61.4	52.7
Precip. (in.)	0.39 (0.45)	2.32 (0.75)	1.10 (1.47)	1.95 (2.28)	5.03 (2.50)	1.26 (2.39)

<sup>1</sup>Values in parentheses represent 62-year averages.

Table 2. Irrigated yield trial summary, Matanuska Farm-1997.

Variety	Skin <sup>2</sup>	US#1 <sup>3</sup>	Small <sup>4</sup>	Other <sup>5</sup>	Total	Percent US#1	Tuber Weight <sup>6</sup>	Specific Gravity
Green Mountain	W	23.0	1.0	0.5	24.4	94	6.9	1.087
Gold Coin	W	20.6	0.9	0.5	22.0	94	6.9	1.086
Norland	R	19.4	0.7	0.9	20.9	92	6.3	1.067
Red La Soda	R	19.2	0.5	2.3	22.1	87	7.1	1.066
Red Warba	R	18.4	0.6	5.1	24.2	76	7.4	1.070
Allagash Russet	Ru	18.1	0.8	0.1	19.1	95	6.7	1.073
Chieftain	R	17.9	0.8	0.9	19.6	91	6.2	1.070
Hilite Russet	Ru	17.6	1.0	0.0	18.6	94	7.0	1.075
Superior	W	17.2	0.6	1.2	19.0	91	6.9	1.074
Ranger Russet	Ru	17.1	0.9	1.3	19.3	89	6.9	1.087
Sangre	R	17.1	1.5	1.3	19.9	86	6.5	1.073
Kennebec	W	16.9	0.6	4.0	21.5	79	8.4	1.081
IditaRed	R	16.9	0.8	3.1	20.9	81	7.7	1.068
Atlantic	W	16.9	0.8	1.4	19.2	88	6.2	1.087
Yukon Gold	W	16.5	0.5	2.5	19.5	84	8.3	1.080
Goldrush Russet	Ru	16.4	1.0	0.4	17.8	92	6.2	1.076
Butte	Ru	16.3	0.7	1.3	18.3	89	7.1	1.084
Nipigon	W	16.2	0.7	2.5	19.5	83	8.3	1.073
Russet Burbank	Ru	16.0	1.2	2.0	19.3	83	6.6	1.088
Avon	W	15.6	0.6	2.3	18.6	84	6.8	1.075
Bake-King	W	15.6	0.8	0.2	16.6	94	7.0	1.078
Frontier Russet	Ru	15.6	1.2	2.0	18.8	83	7.8	1.079
Norgold Russet	Ru	15.5	1.4	0.5	17.4	89	5.8	1.076
Acadia Russet	Ru	15.5	1.6	0.6	17.6	88	6.5	1.079
Denali	W	15.1	0.8	0.6	16.5	91	6.4	1.090
Alaska 114	W	15.0	2.1	0.4	17.5	86	5.5	1.074
Tolaas	Ru	15.0	0.7	3.1	18.8	80	7.6	1.070
Alaska Sweetheart	R	14.8	2.5	1.2	18.5	80	5.0	1.088
Q2877 USDA	W	14.6	2.7	2.5	19.8	74	4.8	1.067
FL 795	W	14.4	0.4	3.2	18.0	80	8.2	1.081
Red Beauty	R	14.2	0.8	2.6	17.6	80	6.0	1.074
Norwis	W	14.1	0.3	3.4	17.8	79	7.7	1.073
FL 1533	W	13.9	0.5	2.6	17.0	82	7.9	1.073
Eide Russet	Ru	13.8	1.5	0.1	15.4	90	6.1	1.079
Russet Bake-King	Ru	13.5	1.1	0.5	15.1	90	5.9	1.094
Shepody	W	13.1	0.4	3.0	16.5	79	9.1	1.082
Yellow Finn	W	12.9	0.9	0.2	14.0	92	5.4	1.079
Rote Erstling	R	12.5	2.0	0.6	15.1	82	5.2	1.073
FL 1625	W	12.3	1.0	0.1	13.5	92	6.0	1.094
Lemhi Russet	Ru	12.2	1.1	1.6	14.9	82	6.8	1.082
White Rose	W	11.5	0.9	3.9	16.3	71	7.6	1.076
Belrus	Ru	11.2	1.1	0.3	12.6	89	5.8	1.085
Russet Nugget	Ru	11.0	0.7	0.4	12.1	91	6.6	1.094
Russet Norkotah	Ru	10.0	2.0	0.7	12.8	78	6.0	1.072
Nooksack	Ru	7.7	0.5	1.2	9.4	82	7.1	1.087
Average		15.3	1.0	1.5	17.9	86	6.8	1.078
LSD 5% <sup>7</sup>		2.7			2.7			

<sup>1</sup> Yields expressed in tons per acre.

<sup>2</sup> (R) = red skin, (Ru) = russet skin, (W) = white skin.

<sup>3</sup> #1 market grade as defined by the USDA.

<sup>4</sup> Tubers less than 1.88 inches in diameter.

<sup>5</sup> Includes oversize, shatter or growth crack, second growth, green, etc.

<sup>6</sup> Average weight of #1 tubers in ounces.

<sup>7</sup>LSD:Least significant difference.

Table 3. Nonirrigated yield trial summary, Matanuska Farm-1997.

Variety	Skin <sup>2</sup>	US#1 <sup>3</sup>	Small <sup>4</sup>	Other <sup>5</sup>	Total	Percent US#1	Tuber Weight <sup>6</sup>	Specific Gravity
Green Mountain	W	18.2	0.7	1.2	20.1	91	6.9	1.082
Kennebec	W	16.4	0.6	1.2	18.1	90	8.2	1.079
Russet Burbank	Ru	16.0	1.8	1.9	19.7	81	6.7	1.082
Gold Coin	W	15.9	1.1	1.8	18.8	84	6.6	1.088
Red La Soda	R	15.7	0.7	1.9	18.3	86	6.6	1.070
Atlantic	W	15.5	0.7	1.1	17.3	89	6.2	1.091
Nipigon	W	15.0	0.5	2.9	18.4	82	8.6	1.084
IditaRed	R	15.0	0.7	2.9	18.6	80	7.3	1.068
Yellow Finn	W	14.8	0.9	0.4	16.0	92	5.3	1.088
Sangre	R	14.7	1.0	0.4	16.1	91	5.9	1.098
Ranger Russet	Ru	14.4	0.6	0.8	15.9	91	6.8	1.087
FL 795	W	14.2	0.5	1.0	15.7	91	8.0	1.080
Goldrush Russet	Ru	13.9	1.5	0.3	15.7	88	5.5	1.094
Allagash Russet	Ru	13.8	1.1	1.0	15.9	87	6.4	1.075
White Rose	W	13.6	0.9	3.0	17.5	78	7.7	1.087
Acadia Russet	Ru	13.6	1.0	0.1	14.7	93	6.6	1.087
Bake-King	W	13.2	0.8	0.1	14.1	94	6.4	1.090
Chieftain	R	13.0	1.0	3.0	17.1	76	5.3	1.069
Shepody	W	13.0	0.3	1.6	14.9	87	9.4	1.092
Hilite Russet	Ru	12.9	1.4	0.1	14.5	89	5.6	1.088
Alaska 114	W	12.8	2.3	0.5	15.6	82	4.7	1.095
Tolaas	Ru	12.5	0.6	0.7	13.8	90	6.6	1.073
FL 1533	W	12.5	0.4	3.6	16.6	75	7.2	1.084
Superior	W	12.3	0.6	1.7	14.6	84	6.3	1.104
Red Warba	R	12.1	0.7	6.5	19.3	63	7.0	1.070
Avon	W	12.0	0.5	2.7	15.2	79	6.4	1.074
Butte	Ru	12.0	0.9	2.1	14.9	80	7.0	1.102
Russet Nugget	Ru	11.9	0.7	0.6	13.2	90	6.5	1.089
Norland	R	11.5	1.0	2.8	15.3	75	4.9	1.091
Denali	W	11.4	1.0	1.5	13.8	82	5.6	1.085
Frontier Russet	Ru	11.3	1.3	0.5	13.1	86	6.3	1.080
Alaska Sweetheart	R	11.3	2.6	1.8	15.7	72	4.8	1.092
Belrus	Ru	11.1	1.0	0.0	12.1	91	5.6	1.088
Norgold Russet	Ru	11.1	1.3	2.2	14.6	76	5.6	1.077
Norwis	W	10.9	0.4	4.2	15.4	71	7.6	1.096
Russet Bake-King	Ru	10.8	1.1	1.3	13.2	82	5.5	1.088
Q2877 USDA	W	10.7	3.2	1.3	15.2	70	4.4	1.071
Eide Russet	Ru	10.5	1.2	0.4	12.1	87	5.9	1.076
FL 1625	W	10.5	0.7	0.6	11.8	89	6.1	1.081
Rote Erstling	R	10.1	2.4	0.7	13.3	76	4.2	1.090
Lemhi Russet	Ru	8.9	0.8	2.9	12.7	71	6.0	1.079
Yukon Gold	W	8.6	0.5	4.3	13.4	64	6.0	1.088
Nooksack	Ru	8.5	0.4	1.4	10.4	82	8.2	1.092
Red Beauty	R	7.8	0.8	3.8	12.4	63	4.8	1.087
Russet Norkotah	Ru	6.8	1.8	0.5	9.1	75	5.3	1.075
Average		12.5	1.0	1.7	15.2	82	6.3	1.085
LSD 5% <sup>7</sup>		2.3			2.0			

1 Yields expressed in tons per acre.

2 (R) = red skin, (Ru) = russet skin, (W) = white skin.

3 #1 market grade as defined by the USDA.

4 Tubers less than 1.88 inches in diameter.

5 Includes oversize, shatter or growth crack, second growth, green, etc.

6 Average weight of #1 tubers in ounces.

7 LSD: Least significant difference.

and at planting time soil moisture was far below adequate levels. Beginning shortly after planting, however, rain began to fall and this continued periodically through the month of May. By the end of May 2.32 inches of rain had fallen, more than three times the long term average for May (Table 1). This May rainfall boosted soil moisture to a level adequate for rapid plant development in both irrigated and nonirrigated plots. The rate of rainfall tapered off in June and temperatures rose above seasonal levels. The combination of these factors resulted in rapid drying of soil and visible moisture stress was present on plants in the nonirrigated plots by early July. Rain began to fall again after mid-July, but by this time plants in nonirrigated plots were smaller and remained smaller than their counterparts in the irrigated plots for the remainder of the growing season. More than 5 inches of rain fell in August, twice the long term average, providing ample water to the nonirrigated crop in the final stages of development.

This growing season was warmer and wetter than recent seasons and comparatively warm temperatures continued into September. Because of the prolonged season, harvesting was postponed until September 10. In irrigated trials (Table 2) the average yield of US #1 tubers across all varieties was 15.3 tons per acre and average total yield was 17.9 tons per acre. This is somewhat higher than 1996 and probably reflects the longer growing season in 1997. In the nonirrigated trial (Table 3) the average yield of US #1 tubers across varieties was 12.5 tons per acre and total yield

averaged 15.2 tons per acre. These yields averages are more than three times those from the nonirrigated trials in 1996 and dramatically illustrates the importance of early and mid-season rainfall on nonirrigated potato crops.

Varieties, such as Green Mountain that typically are top yielders again were found to be the highest yielding varieties in both irrigated and nonirrigated trials. Somewhat surprising was the relatively high yield of Russet Burbank in the nonirrigated trial, although its past performance has illustrated superior yields when seasons are longer and warmer than average.

When selected irrigated varieties are compared over the past five years (Table 4), it can be seen that 1997 average yields were somewhat higher than in the previous three years. The trend of relatively stable yields from year to year continues as expected. In the nonirrigated trial comparisons (Table 5), however, the extreme variability in yields from year to year once again is illustrated.

Percentages of total yield in the US #1 category (Table 6) tended to be somewhat higher than in previous years and gradeout tended to follow expected patterns. For example, Superior and Lemhi Russet had relatively high percentages of gradeout due to shatter cracking whereas IditaRed and Shepody had high gradeout losses due to oversize. Typically, gradeout of Alaska 114 in the undersize category exceeded 10% in both the irrigated and nonirrigated trials.

The 1997 growing season represents the last time large numbers of potato varieties will be evaluated under irrigated and nonirrigated condi-

Table 4. Comparative summary of US #1 tuber yields of selected varieties in irrigated trials conducted from 1993 through 1997.<sup>1</sup>

Variety	1993	1994	1995	1996	1997	Average <sup>2</sup>
Allagash Russet	16.6	15.9	15.7	15.9	18.1	16.4
Alaska 114	19.3	13.6	18.8	15.9	15.0	16.5
Bake-King	15.9	15.4	11.7	18.0	15.6	15.3
Denali	17.5	12.3	14.9	12.2	15.1	14.4
Green Mountain	19.5	18.5	13.5	20.0	23.0	18.9
IditaRed	18.1	14.8	20.2	13.8	16.9	16.8
Kennebec	18.8	22.8	17.1	14.9	16.9	18.1
Lemhi Russet	17.3	12.9	12.1	12.3	12.2	13.4
Russet Burbank	13.4	12.1	12.1	16.1	16.0	13.9
Shepody	15.4	15.7	11.4	8.3	13.1	12.8
Superior	16.6	17.6	16.4	6.6	17.2	14.9
Average	17.1	15.6	14.9	14.0	16.3	15.6
LSD 5% <sup>3</sup>	2.4	4.5	3.3	3.4	2.7	

<sup>1</sup> Yields expressed in tons per acre. #1 market grade as defined by the US Department of Agriculture.

<sup>2</sup> Average calculated on yields from 1993-1997.

<sup>3</sup> Least significant difference.

Table 5. Comparative summary of US #1 tuber yields of selected varieties in nonirrigated trials conducted from 1993 through 1997.

Variety	1993	1994	1995	1996	1997	Average <sup>2</sup>
Allagash Russet	7.3	5.0	11.7	4.7	13.8	8.5
Alaska 114	6.1	5.1	15.4	2.7	12.8	8.4
Bake-King	6.3	6.1	8.1	5.1	13.2	7.8
Denali	3.1	5.8	14.0	4.9	11.4	7.8
Green Mountain	9.5	5.0	15.0	6.1	18.2	10.8
IditaRed	5.0	6.2	18.9	5.3	15.0	10.1
Kennebec	8.4	6.6	15.6	4.1	16.4	10.2
Lemhi Russet	4.7	4.0	13.5	2.1	8.9	6.6
Russet Burbank	8.4	3.2	10.6	8.4	16.0	9.3
Shepody	7.5	8.6	11.4	4.0	13.0	8.9
Superior	5.8	4.8	11.9	2.6	12.3	7.5
Average	6.6	5.5	13.3	4.5	13.7	8.7
LSD 5% <sup>3</sup>	1.8	2.0	2.2	1.7	2.3	

<sup>1</sup> Yields expressed in tons per acre. #1 market grade as defined by the US Department of Agriculture.  
<sup>2</sup> Average calculated on yields from 1993-1997.  
<sup>3</sup> Least significant difference.

tions. In future years, a smaller number of selected varieties will be compared under irrigated conditions only.

### ACKNOWLEDGMENTS

We acknowledge the help of: Kate Brainard, Tim Evers, Kent Harris, Roseann Leiner, June Muniz, John Muth and Jim Walworth.

### DISCLAIMER

The University of Alaska Fairbanks provides equal education and employment opportunities for

all, regardless of race, color, religion, national origin, sex, age, disability, status as a Vietnam era or disabled veteran, marital status, changes in marital status, pregnancy, or parenthood pursuant to applicable state and federal laws. Material appearing herein may be reprinted provided no endorsement of a commercial product is stated or implied. Please credit the researchers involved and the Agricultural and Forestry Experiment Station, School of Agriculture and Land Resources Management, University of Alaska Fairbanks.

Table 6. Type and quantity of gradeout observed among selected varieties in irrigated and nonirrigated trials in 1997.

		Grade out in tons per acre							
		Total	#1	Under size	Over size	Shatter crack	Growth crack	Green	Other <sup>2</sup>
Acadia Russet	(NI) <sup>3</sup>	14.7	13.6(92.5)	1.0(6.8)	0.0(0.0)	0.1(0.3)	0.0(0.0)	0.0(0.0)	0.1(0.4)
	(I)	17.6	15.5(88.1)	1.6(9.1)	0.0(0.0)	0.3(1.7)	0.0(0.0)	0.0(0.0)	0.2(1.1)
Alaska 114	(NI)	15.6	12.8(82.1)	2.3(14.7)	0.0(0.0)	0.0(0.0)	0.2(1.3)	0.3(1.9)	0.0(0.0)
	(I)	17.5	15.0(85.7)	2.1(12.0)	0.0(0.0)	0.1(0.6)	0.1(0.6)	0.2(1.1)	0.0(0.0)
Allagash Russet	(NI)	15.9	13.8(86.8)	1.1(6.9)	0.7(4.4)	0.0(0.0)	0.0(0.0)	0.2(1.3)	0.1(0.6)
	(I)	19.1	18.1(94.8)	0.8(4.2)	0.0(0.0)	0.0(0.0)	0.1(0.5)	0.1(0.5)	0.0(0.0)
Bake-King	(NI)	14.1	13.2(93.6)	0.8(5.7)	0.0(0.0)	0.1(0.7)	0.0(0.0)	0.0(0.0)	0.0(0.0)
	(I)	16.6	15.6(94.0)	0.8(4.8)	0.2(1.2)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
Gold Coin	(NI)	18.8	15.9(84.6)	1.1(5.9)	0.7(3.7)	0.1(0.4)	0.1(0.4)	0.5(2.5)	0.5(2.5)
	(I)	22.0	20.6(93.6)	0.9(4.1)	0.2(0.9)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.3(1.4)
Green Mountain	(NI)	20.1	18.2(90.5)	0.7(3.5)	0.2(0.8)	0.1(0.3)	0.1(0.1)	0.5(2.4)	0.5(2.4)
	(I)	24.4	23.0(94.3)	1.0(4.1)	0.1(0.4)	0.0(0.0)	0.0(0.0)	0.3(0.8)	0.1(0.4)
IditaRed	(NI)	18.6	15.0(80.6)	0.7(3.8)	1.4(7.7)	1.4(7.3)	0.1(0.6)	0.0(0.0)	0.0(0.0)
	(I)	20.9	6.9(80.9)	0.8(4.0)	2.5(12.0)	0.2(1.0)	0.1(0.5)	0.0(0.0)	0.3(1.6)
Lemhi Russet	(NI)	12.7	8.9(70.1)	0.8(6.3)	0.6(4.7)	1.7(13.4)	0.2(1.6)	0.4(3.1)	0.1(0.8)
	(I)	14.9	12.2(81.9)	1.1(7.4)	0.2(1.3)	0.1(0.7)	0.4(2.6)	0.4(2.6)	0.5(3.5)
Sangre	(NI)	16.1	14.7(91.3)	1.0(6.2)	0.0(0.0)	0.2(1.2)	0.1(0.4)	0.1(0.3)	0.1(0.6)
	(I)	19.9	17.1(85.9)	1.5(7.5)	0.9(4.5)	0.1(0.5)	0.1(0.5)	0.1(0.5)	0.1(0.6)
Shepody	(NI)	14.9	13.0(87.4)	0.3(2.0)	0.9(5.8)	0.0(0.0)	0.0(0.0)	0.7(4.8)	0.0(0.0)
	(I)	16.5	13.1(79.4)	0.4(2.4)	2.2(13.3)	0.0(0.0)	0.1(0.6)	0.4(2.5)	0.3(1.8)
Superior	(NI)	14.6	12.3(84.2)	0.6(4.1)	0.2(1.2)	1.3(8.9)	0.0(0.0)	0.2(1.0)	0.1(0.6)
	(I)	19.0	17.2(90.5)	0.6(3.2)	0.7(3.7)	0.0(0.0)	0.1(0.5)	0.3(1.6)	0.1(0.5)

<sup>1</sup> Weights expressed in tons per acre. Values in parentheses indicate percent of total yield.

<sup>2</sup> Includes primarily second growth; also rotten, misshapen, etc.

<sup>3</sup> (NI) = not irrigated, (I) = irrigated.

AGRICULTURAL AND FORESTRY EXPERIMENT STATION  
UAF  
P. O. BOX 757200  
FAIRBANKS, AK 99775-7200

Non Profit  
Organizaiton  
U.S. Postage  
PAID  
Permit No. 2  
Fairbanks,  
Alaska