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# Quality of western Canadian peas

## 2018

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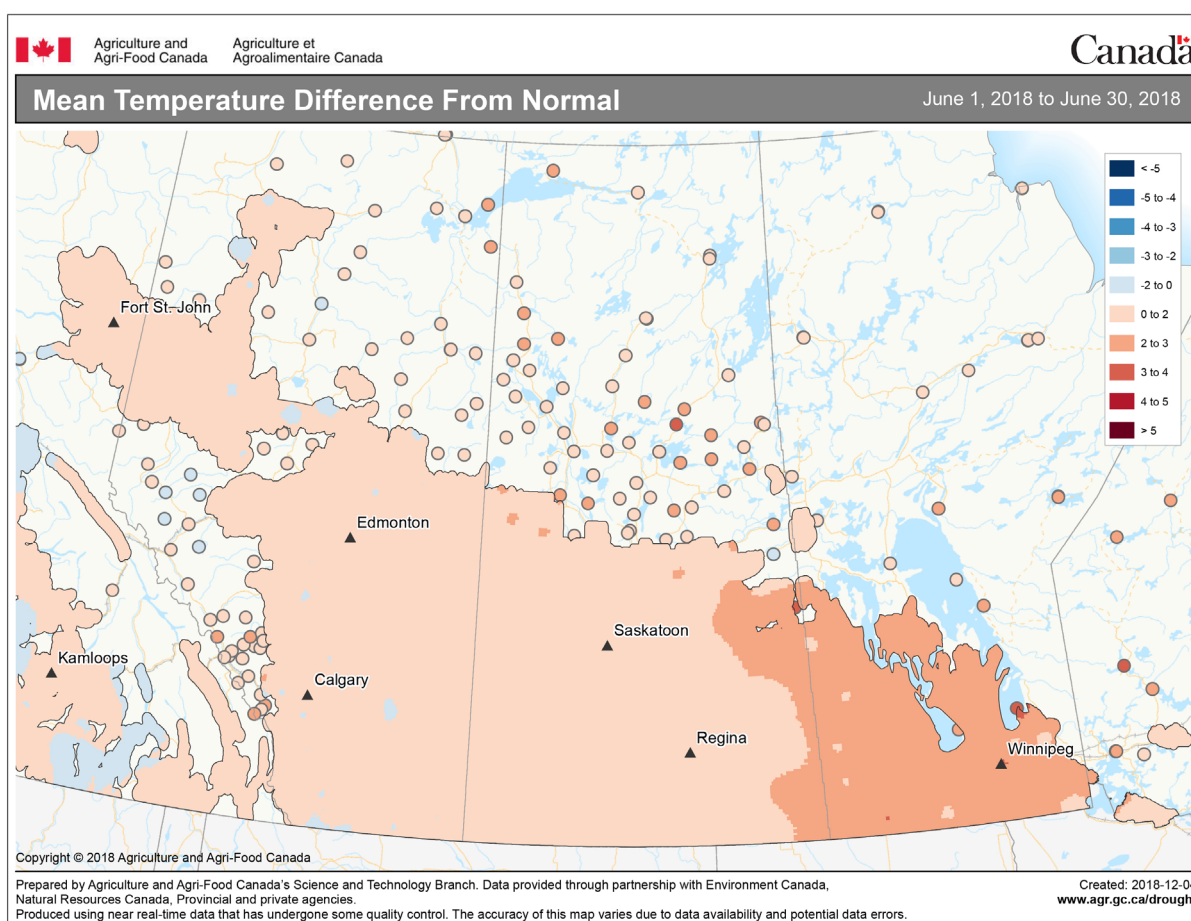
# Introduction

This report presents quality data for 2018 western Canadian peas from Canadian Grain Commission's Harvest Sample Program. Samples were submitted by western Canadian producers to the Canadian Grain Commission's Grain Research Laboratory for analysis.

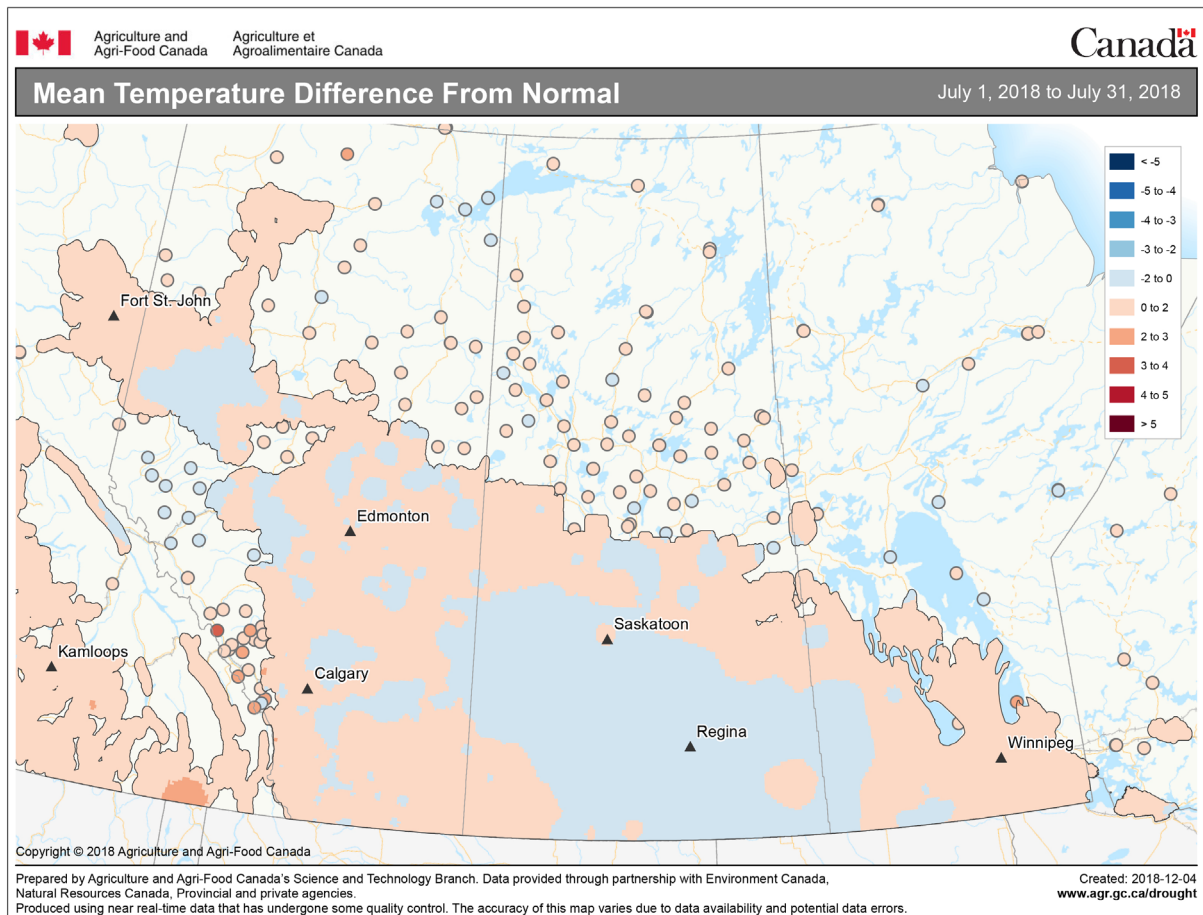
## Growing and harvesting conditions

Figures 1a and 1b show monthly mean temperature difference from normal (Prairie Region) during 2018 growing season (June and July). Figure 2 displays total precipitation (Prairie Region) from April 1 to October 31, 2018.

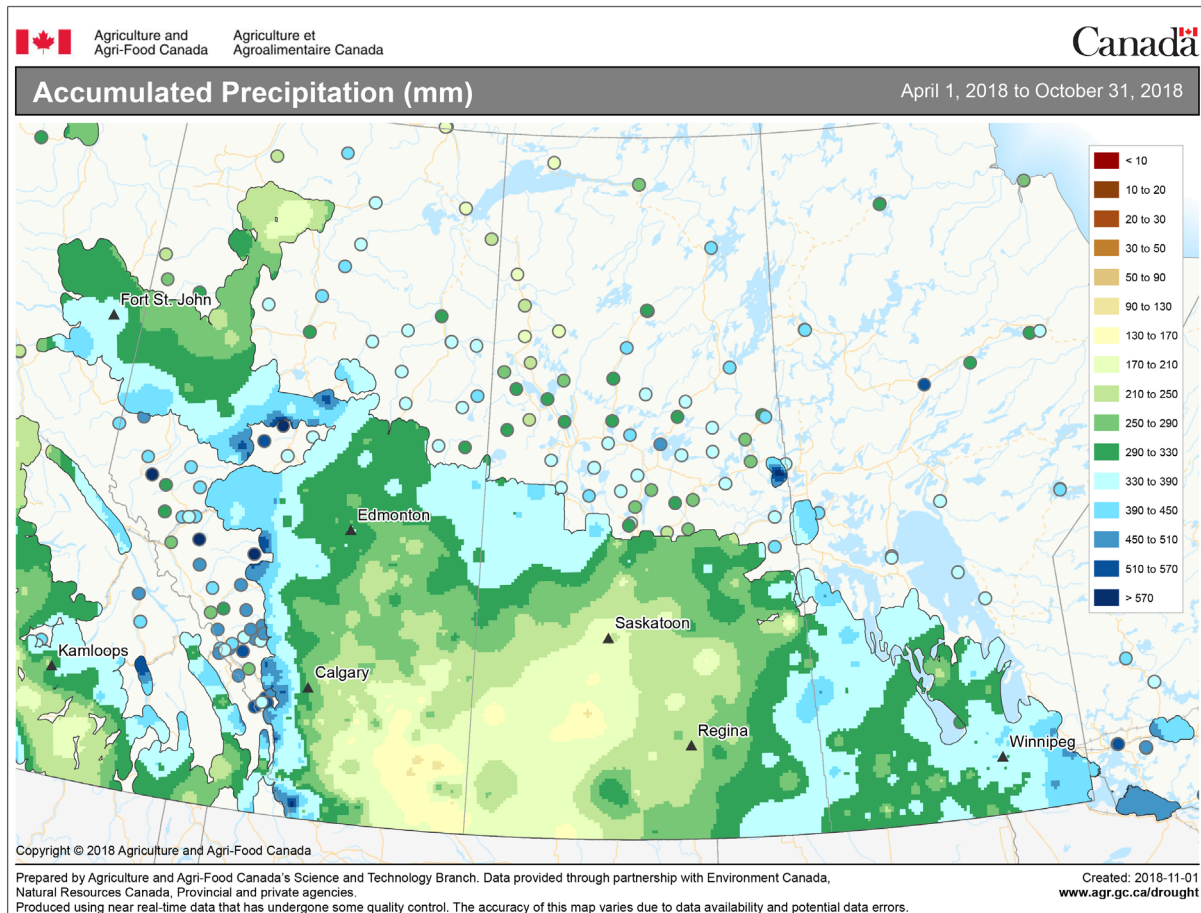
**Figure 1a – Monthly mean temperature difference from normal (Prairie Region) during growing season (June 2018)**



**Figure 1b – Monthly mean temperature difference from normal (Prairie Region) during growing season (July 2018)**



**Figure 2 – Total precipitation (Prairie Region) during 2018 growing season (April 1 to October 31, 2018)**



Dry field conditions in early May allowed seeding operations to get underway in most areas of Manitoba, and by early June, seeding estimated at 99% completion across Manitoba. Rainfall in late May combined with warm temperatures resulted in rapid germination and crop growth. Warm weather and precipitation were norm in June throughout Manitoba. Hot temperatures during the first two weeks of July helped crop development. Warm and dry conditions in late July and early August caused some stress in many crops, and rainfall was needed to help with grain fill. Crops advanced quickly due to warm temperatures in late July, and harvest was underway in most areas of Manitoba in early August. By the end of August, field pea harvest was complete with reported average yields and good quality. Rainfall and below than normal temperatures in September and early October caused the significant delay in harvest and some damage in some crops, but most of pulse crops were harvested, so damage is minimal.

Seeding was underway in early May across Saskatchewan due to good weather conditions, and by early June seeding operations were nearing completion, although the rain delayed progress in some areas. Rain across most of the province helped to alleviate dry topsoil moisture conditions during the first two weeks of June. The majority of crops were in good condition and at their normal stages of development for this time of year. Crops across the province advanced quickly during the month of July due to good growing conditions. Pulse crops in drier areas were rapidly drying down in the last week of July. Harvest



was underway in the province, due to the hot and dry weather in the first two weeks of August. By the end of August, 96% of the lentils and 94% of the field peas were combined. In early September, most areas of the province were reported frost. Wet and cool weather slowed harvest operations in much of the province during the month of September. Warm and sunny weather in mid-to-late October allowed harvest to be complete. Crops harvested prior to the rain and snow in September were graded in the top two grades, while some crops harvested in the month of September and October were downgraded due to weather-related factors such as sprouting, bleaching, staining and frost.

Warm and dry weather throughout Alberta in May provided favorable conditions for seeding operations, and by early June, seeding was 99% completion. In the month of June, most areas of the province received timely rains, and crop growing conditions were good for crop development. Variable weather conditions across the province were reported in July. Most areas in the Peace, North East and North West region and in some parts of the Central region received needed rain, which was adequate for sustainable crop growth. Hot and dry weather in the late July to Mid August added to the stress on crops in dry areas, causing heat stress and pushing maturity quickly, resulting in lower than normal yields. Harvest begun in the middle of August mostly for dry peas in the Southern region. Unsettled weather conditions in Alberta during the harvest season affected harvesting operations. Wet weather in the end of August slowed down harvest in most areas across the province, especially in the North East, North West and Peace regions. Favourable weather conditions at the beginning of the September led to harvest progress, and nearly 80% dry pea were in the bin. However, cold and wet weather in late September in almost all areas of the province halted harvest progress. In addition to the rain/snow mix, frost was reported in some areas of the province. The cool and wet weather affected crop quality. Since mid October, the warmer than average temperatures had allowed harvest operations to progress. At the end of October, nearly 95% crops were in the bin.

## Production

Pea production for 2018 was estimated to be 3.6 million tonnes, which was down approximately 13% from 2017, but 3.0% higher than the 10-year average of 3.5 million tonnes (Table 1). The decrease in production was the result of 13% reduction in harvested area from 2017. Saskatchewan accounted for 50% of Canadian pea production, while Alberta accounted for 47% and Manitoba accounted for 3%.

**Table 1 – Production statistics for western Canadian peas<sup>1</sup>**

	Harvested area		Production		Yield		Mean production
Province	2018	2017	2018	2017	2018	2017	2008–2017
	thousand hectares		thousand tonnes		kg/ha		thousand tonnes
Peas							
Manitoba	33	25	105	80	3200	3200	80
Saskatchewan	768	867	1781	1974	2300	2300	2120
Alberta <sup>2</sup>	625	749	1682	2058	2700	2748	1265
Western Canada	1426	1641	3568	4112	2500	2500	3465

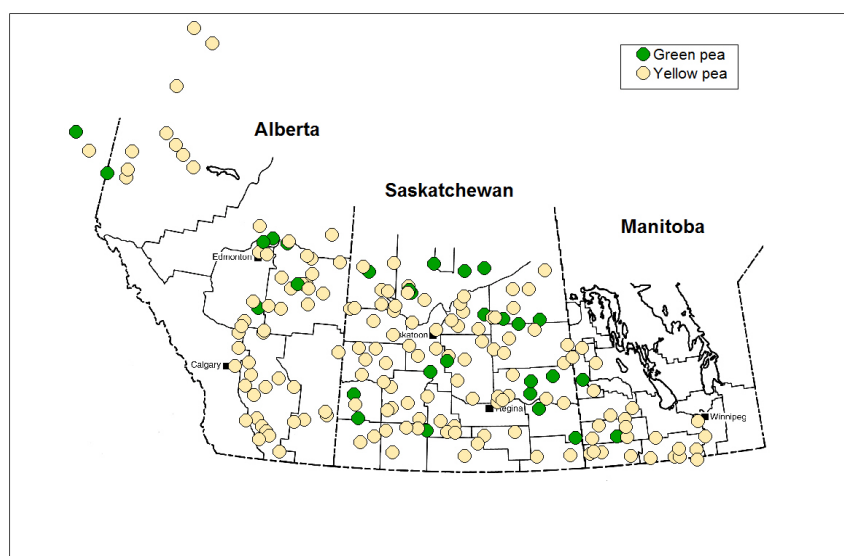
<sup>1</sup>Statistics Canada.

<sup>2</sup>Includes the Peace River area of British Columbia.

## Pea samples

Samples for the Canadian Grain Commission's Harvest Sample Program were collected from producers across western Canada (Figure 3). The Canadian Grain Commission received 595 pea samples consisting of 514 yellow pea samples and 81 green pea samples. All samples were graded and tested for protein content. Composite samples were prepared based on class (yellow and green), crop region and grade (No. 1 and No. 2). All composites were tested for chemical composition (moisture, protein, starch, total dietary fiber and ash content), mineral content, functional properties (water holding capacity and emulsifying capacity), and physical and cooking characteristics (100-seed weight, water absorption, cooking time and firmness of cooked peas). It is important to note that the samples reported by grade do not necessarily represent the actual distribution of grade.

**Figure 3 – Map of western Canada showing origin of 2018 pea samples from CGC's Harvest Sample Program**



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## Quality of 2018 western Canadian peas

Protein content for yellow and green peas ranged from 16.8% to 30.5% (Table 2). The mean protein content for western Canadian peas was 23.1%, which was higher than both the mean of 22.6% for 2017 and the ten-year mean of 22.8% (Figure 4). Table 3 represents the mean protein and starch content for yellow and green peas by crop region (Figure 5).

Table 4 shows the quality data for 2018 yellow peas. Mean protein content for No. 1 Canada Yellow peas was 23.4%, which was the same as the mean for 2017 (23.4%). Mean protein content for No. 2 Canada Yellow peas was 23.5%, which was higher than the mean for 2017 (22.8%). Mean starch content for No. 1 Canada Yellow peas was 47.3%, slightly lower than the mean for No. 1 Canada Yellow peas in 2017 (47.6%). The mean starch content for No. 2 Canada was 48.1%, higher than the mean for 2017. Mean total dietary fiber content for No.1 Canada Yellow peas was 17.6%, higher than the mean for No.1 Canada Yellow peas in 2017. Mean total dietary fiber for No. 2 Canada Yellow peas was 17.0%, higher than the mean for No. 2 in 2017. Mean ash contents in both grades were the same as that for 2017.

Potassium (K) was the most abundant macroelement present in yellow peas, followed by phosphorus (P), magnesium (Mg) and calcium (Ca) (Table 4). Among microelements, iron (Fe) was the highest, followed by zinc (Zn), manganese (Mn), and copper (Cu).

Mean water holding capacity for No. 1 Canada Yellow peas was 0.96 g H<sub>2</sub>O per g sample, which was higher than the mean value for 2017 (Table 4). Mean water holding capacity for No. 2 Canada Yellow was 0.91 g H<sub>2</sub>O per g sample, which was higher than the mean value for 2017. The emulsifying capacity of No. 1 Canada Yellow peas was 258.6 mL oil per g sample, which was lower than that for 2017. The emulsifying capacity of No. 2 Canada Yellow peas was 257.1 mL oil per g sample, which was lower than the value for 2017.

Mean 100-seed weight for No. 1 Canada Yellow peas was 22.4 g (Table 4), while mean 100-seed weight for No. 2 Canada Yellow peas was 22.5 g. Mean 100-seed weights for both grades of peas were higher than that in 2017. The water absorption value for No. 1 Canada Yellow peas was 0.92 g H<sub>2</sub>O per g seeds. For No. 2 Canada Yellow peas, the water absorption value was 0.90 g H<sub>2</sub>O per g seeds. Water absorption values for both grades were close to the values in 2017.

Mean cooking time for No. 1 Canada Yellow peas was 22.9 min, longer than that in 2017 (Table 4). Mean cooking time for No. 2 Canada Yellow peas was 25.9 min, which was longer than that in 2017. For both No. 1 and No. 2 grades, mean firmness values of cooked peas were lower than the values in 2017.

Table 5 shows the 2018 quality data for No. 1 Canada and No. 2 Canada Green peas. Mean protein content for No. 1 Canada Green peas was 24.3%, which was higher than the mean for 2017. Mean protein content for No. 2 Canada Green peas was 24.1%, which was higher than the mean in 2017. Mean starch content was 48.0% for No. 1 Canada Green peas, higher than the mean for 2017, and 46.1% for No. 2 Canada Green peas, slightly lower than the mean for 2017. Mean total dietary fiber content for No. 1 Canada Green peas was 16.4%, slightly higher than the mean for No. 1 Canada Green peas (16.0%) for 2017. Mean total dietary fiber content for No. 2 Canada Green pea was 16.5%, slightly higher than that for No. 2 Canada Green peas for 2017. Ash content values for No. 1 and No. 2 Canada Green peas were similar to the values in 2017.



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Similar trends to yellow peas for both macroelements and microelements in green peas were noted (Table 5).

Mean water holding capacity for No. 1 Canada Green peas (0.86 g H<sub>2</sub>O per g sample) was the same as the mean for No. 2 Canada Green peas (Table 5). The means for both grades were similar to the means for 2017. Mean emulsifying capacity was 255.7 mL oil per g sample for No. 1 Canada Green peas and 251.3 mL oil per g sample for No. 2 Canada Green peas. The means for both grades were lower than the means for 2017.

Mean 100-seed weight for No. 1 Canada Green peas was 22.9 g, higher than that in 2017 (Table 5). Mean 100-seed weight for No. 2 Canada Green peas was 22.2 g, higher than that for 2017. Mean water absorption values for No. 1 Canada Green peas and No. 2 Canada Green peas were slightly higher than that in 2017.

Mean cooking time for No. 1 Canada Green peas was longer than that for No. 2 Canada Green peas. Mean firmness values for cooked green peas for both grades were slightly lower than the values for 2017.

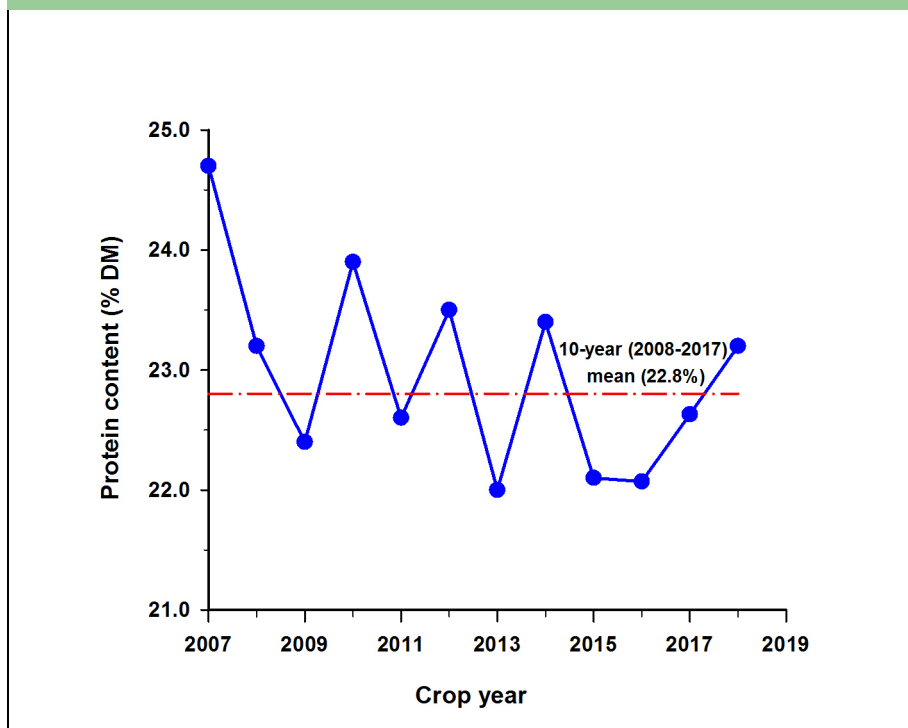
**Table 2 – Mean protein content for 2018 western Canadian peas (yellow and green combined) by grade<sup>1</sup>**

Grade	Protein content, % dry basis			
	2018			2017
	Mean	Min.	Max.	Mean
<b>Manitoba</b>				
Peas, No. 1 Canada	22.4	20.9	23.8	22.6
Peas, No. 2 Canada	22.8	21.8	24.9	22.5
Peas, No. 3 Canada	22.6	22.5	22.7	NS <sup>2</sup>
<b>All grades</b>	<b>22.6</b>	<b>20.9</b>	<b>24.9</b>	<b>22.7</b>
<b>Saskatchewan</b>				
Peas, No. 1 Canada	23.2	19.1	28.0	22.5
Peas, No. 2 Canada	23.2	19.4	27.4	22.2
Peas, No. 3 Canada	23.5	20.3	26.5	22.7
<b>All grades</b>	<b>23.3</b>	<b>19.1</b>	<b>28.0</b>	<b>22.4</b>
<b>Alberta</b>				
Peas, No. 1 Canada	23.2	17.5	30.5	23.3
Peas, No. 2 Canada	23.0	16.8	29.0	22.7
Peas, No. 3 Canada	22.9	17.3	26.7	22.5
<b>All grades</b>	<b>23.0</b>	<b>16.8</b>	<b>30.5</b>	<b>23.0</b>
<b>Western Canada</b>				
Peas, No. 1 Canada	23.1	17.5	30.5	22.8
Peas, No. 2 Canada	23.1	16.8	29.0	22.4
Peas, No. 3 Canada	23.2	17.3	26.7	22.6
<b>All grades</b>	<b>23.1</b>	<b>16.8</b>	<b>30.5</b>	<b>22.6</b>

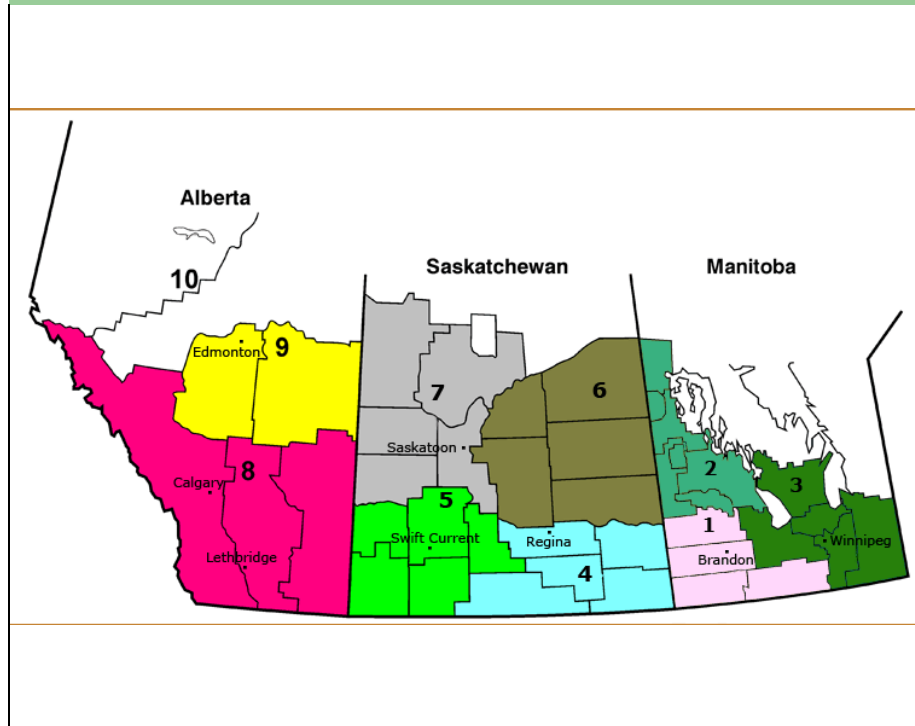
<sup>1</sup>Protein content (N x 6.25) is determined by near infrared measurement calibrated against the Combustion Nitrogen Analysis reference method.

<sup>2</sup>NS=insufficient number of samples to generate a representative value.

Figure 4 – Mean protein content of western Canadian peas



**Figure 5 – Crop regions in western Canada**



**Table 3 – Mean protein and starch content for 2018 western Canadian peas (yellow and green combined) by crop region**

Crop region <sup>1</sup>	Protein content, % dry basis		Starch content, % dry basis	
	2018	2017	2018	2017
1	22.8	22.6	47.8	46.9
2	23.1	23.1	46.7	47.3
3	22.9	23.1	48.1	46.7
4	23.7	22.8	47.7	48.1
5	24.3	22.8	48.1	47.6
6	22.8	22.4	48.4	47.8
7	23.1	22.4	47.2	48.1
8	24.8	24.8	47.1	47.0
9	23.1	22.4	47.7	47.2
10	21.3	22.3	48.4	47.3

<sup>1</sup>Manitoba crop regions (Figure 3): 1 (Southwest Manitoba); 2 (Northwest Manitoba); 3 (Eastern Manitoba); Saskatchewan crop regions: 4 (South East Saskatchewan), 5 (South West Saskatchewan), 6 (North East Saskatchewan), and 7 (North West Saskatchewan); Alberta crop regions: 8 (Southern Alberta), 9 (Central Alberta), and 10 (Northern Alberta).

**Table 4 – Quality data for 2018 western Canadian yellow pea composite by grade**

Quality parameter	Peas, No. 1 Canada Yellow		Peas, No. 2 Canada Yellow	
	2018	2017	2018	2017
<b>Chemical composition</b>				
Moisture content, %	10.4	10.6	10.3	10.6
Protein content, % dry basis	23.4	23.4	23.5	22.8
Starch content, % dry basis	47.3	47.6	48.1	46.9
Total dietary fiber, % dry basis	17.6	15.0	17.0	15.7
Ash content, % dry basis	2.6	2.6	2.6	2.6
<b>Mineral (mg/100 g dry basis)</b>				
Calcium (Ca)	85.5	89.2	91.8	88.4
Copper (Cu)	0.78	0.86	0.76	0.84
Iron (Fe)	5.2	5.1	5.4	5.2
Potassium (K)	979.8	940.7	966.7	965.9
Magnesium (Mg)	135.4	132.6	132.4	137.8
Manganese (Mn)	1.1	1.1	1.3	1.2
Phosphorus (P)	338.7	323.7	330.2	326.4
Zinc (Zn)	3.5	3.6	3.7	3.8
<b>Functional property</b>				
Water holding capacity, g H <sub>2</sub> O/g sample	0.96	0.85	0.91	0.84
Emulsifying capacity, mL oil/g sample	258.6	269.5	257.1	268.1
<b>Physical characteristic</b>				
100-seed weight, g/100 seeds	22.4	20.6	22.5	21.0
Water absorption, g H <sub>2</sub> O/g seeds	0.92	0.89	0.90	0.87
<b>Cooking characteristic</b>				
Cooking time, min	22.9	12.9	25.9	18.5
Firmness, N/g cooked seeds	23.6	29.0	24.4	27.6



**Table 5 – Quality data for 2018 western Canadian green pea composite by grade**

Quality parameter	Peas, No. 1 Canada Green		Peas, No. 2 Canada Green	
	2018	2017	2018	2017
<b>Chemical composition</b>				
Moisture content, %	10.3	10.7	10.0	10.7
Protein content, % dry basis	24.3	22.8	24.1	23.3
Starch content, % dry basis	48.0	46.9	46.1	46.6
Total dietary fiber, % dry basis	16.4	16.0	16.5	15.9
Ash content, % dry basis	2.6	2.6	2.7	2.7
<b>Mineral (mg/100 g dry basis)</b>				
Calcium (Ca)	77.0	82.2	75.2	82.3
Copper (Cu)	0.71	0.75	0.78	0.74
Iron (Fe)	5.3	4.8	5.2	4.9
Potassium (K)	1032.7	982.9	979.8	992.6
Magnesium (Mg)	124.1	128.8	135.4	127.2
Manganese (Mn)	1.1	1.0	1.1	1.1
Phosphorus (P)	340.1	322.3	338.7	322.2
Zinc (Zn)	3.5	4.2	3.5	3.7
<b>Functional property</b>				
Water holding capacity, g H <sub>2</sub> O/g sample	0.86	0.85	0.86	0.83
Emulsifying capacity, mL oil/g sample	255.7	270.0	251.3	267.7
<b>Physical characteristic</b>				
100-seed weight, g/100 seeds	22.9	21.6	22.2	21.0
Water absorption, g H <sub>2</sub> O/g seeds	0.84	0.75	0.87	0.83
<b>Cooking characteristic</b>				
Cooking time, min	17.9	13.1	13.5	13.3
Firmness, N/g cooked seeds	24.2	26.7	21.5	26.5