Agriculture et Agroalimentaire Canada

# **Residual Weed Population Shifts in Alberta – 1973 to 2017** Julia Y. Leeson<sup>1</sup>, Linda Hall<sup>2</sup> and Chris Neeser<sup>3</sup> <sup>1</sup>Agriculture and Agri-Food Canada, Saskatoon, SK, <sup>2</sup>University of Alberta, Edmonton, AB, <sup>3</sup>Alberta Agriculture and Forestry, Brooks, AB

## **Objectives**

- Present the top 25 species in the 2017 Alberta provincial weed survey
- Compare the density and relative abundance of weeds in Alberta in 2017 with results from past provincial surveys

### **Methods**

- Used a stratified random sampling procedure to select fields in ecodistricts shown on map
- Surveyed 1236 fields of canola, spring wheat, durum, barley, oat, peas and lentil
- Counted weeds in 20 quadrats (50 by 50 cm) per field in late summer
- Summarized weed data using a relative abundance index based on frequency, field uniformity and density
- Frequency = Percent of fields in which species occurred
- Uniformity = Percent of quadrats in which species occurred
- Density = Average density of species in all fields
- Compared top 25 species from surveys of:
  - 1333 fields in 2010 (2009-2010)
  - 1153 fields in 2001
  - 684 fields in 1997
  - 1086 fields in 1980's (1987-1989)
  - 3109 fields in 1970's (1973-1977)
- Data weighted based on distribution of surveyed crops in 2011 census • 2009 irrigated field data down-weighted to reflect the relative area under irrigation

### Sources

- Thomas, A.G. and R.F. Wise. 1985. Dew's Alberta Weed Survey 1973-1977. Agriculture Canada Weed Survey Series Publication 85-3
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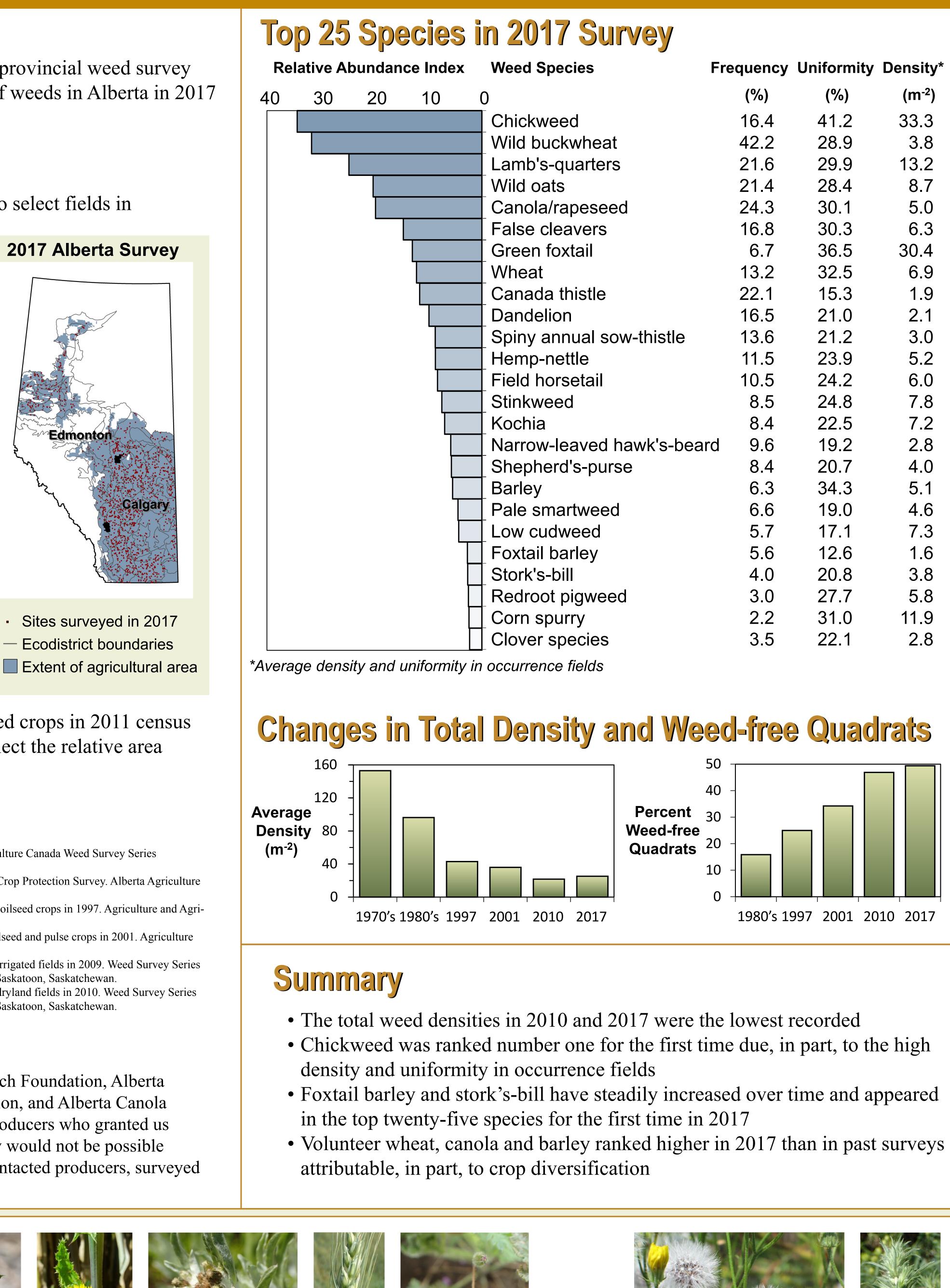
# Acknowledgements

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equency	Uniformity	Density*			
(%)	(%)	(m <sup>-2</sup> )			
16.4	41.2	33.3			
42.2	28.9	3.8			
21.6	29.9	13.2			
21.4	28.4	8.7			
24.3	30.1	5.0			
16.8	30.3	6.3			
6.7	36.5	30.4			
13.2	32.5	6.9			
22.1	15.3	1.9			
16.5	21.0	2.1			
13.6	21.2	3.0			
11.5	23.9	5.2			
10.5	24.2	6.0			
8.5	24.8	7.8			
8.4	22.5	7.2			
9.6	19.2	2.8			
8.4	20.7	4.0			
6.3	34.3	5.1			
6.6	19.0	4.6			
5.7	17.1	7.3			
5.6	12.6	1.6			
4.0	20.8	3.8			
3.0	27.7	5.8			
2.2	31.0	11.9			
3.5	22 1	2.8			

# **Species Shifts**

Weed Species1970's1980's1997200120102017ChangeFoxtail barley943932262173*False cleavers41288756635Spiny annual sow-thistle38281391127Low cudweed452438152025Wheat30222218822Stork's-bill373230292822Stork's-bill373230292822Stork's-bill373230191715Canola/rapeseed13192016658Narrow-leaved hawk's-beard2315121812167Kochia22182310104105Dandelion152010104105Shepherd's-purse219612411Lamb's-quarters5776832Wild buckwheat31311211Canada thistle912543900Wild buckwheat31311242Green foxtail44178197-3Hemp-nettle88		Relative Abundance Rank							
False cleavers 41 28 8 7 5 6 35   Spiny annual sow-thistle 38 28 13 9 11 27   Low cudweed 45 24 38 15 20 25   Wheat 30 22 22 18 8 22   Stork's-bill 37 32 30 29 28 22   Canola/rapeseed 13 19 20 16 6 5 8   Narrow-leaved hawk's-beard 23 15 12 18 12 16 7   Kochia 22 18 23 19 17 15 7   Barley 25 25 26 30 18 7   Chickweed 6 5 2 3 7 1 5   Dandelion 15 20 10 10 4 10 5   Shepherd's-purse 21 9 6 12 16 17 4   Lamb's-quarters 5	Weed Species	1970's	1980's	1997	2001	2010	2017	Change	
Spiny annual sow-thistle 38 28 13 9 11 27   Low cudweed 45 24 38 15 20 25   Wheat 30 22 22 18 8 22   Stork's-bill 37 32 30 29 28 22 15   Canola/rapeseed 13 19 20 16 6 5 8   Narrow-leaved hawk's-beard 23 15 12 18 12 16 7   Kochia 22 18 23 19 17 15 7   Barley 25 25 26 30 18 7   Chickweed 6 5 2 3 7 1 5   Dandelion 15 20 10 10 4 10 5   Shepherd's-purse 21 9 6 12 16 17 4   Lamb's-quarters 5 7 7 6 8 3 2   Wild buckwheat <t< td=""><td>Foxtail barley</td><td></td><td>94</td><td>39</td><td>32</td><td>26</td><td>21</td><td>73*</td></t<>	Foxtail barley		94	39	32	26	21	73*	
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Shepherd's-purse $21$ $9$ $6$ $12$ $16$ $17$ $4$ Lamb's-quarters $5$ $7$ $7$ $6$ $8$ $3$ $2$ Wild buckwheat $3$ $1$ $3$ $1$ $1$ $2$ $1$ Field horsetail $14$ $11$ $11$ $14$ $14$ $13$ $1$ Canada thistle $9$ $12$ $5$ $4$ $3$ $9$ $0$ Wild oats $2$ $3$ $1$ $2$ $2$ $4$ $-2$ Green foxtail $4$ $4$ $17$ $8$ $19$ $7$ $-3$ Hemp-nettle $8$ $8$ $9$ $9$ $10$ $12$ $-4$ Pineappleweed $34$ $29$ $19$ $23$ $25$ $40$ $-6$ Quack grass $24$ $22$ $16$ $15$ $22$ $31$ $-7$ Clover species $16$ $27$ $25$ $24$ $25$ $-9$ Perennial sow-thistle $17$ $17$ $13$ $17$ $13$ $28$ $-11$ Common groundsel $32$ $14$ $14$ $24$ $35$ $43$ $-11$ Pale smartweed $7$ $10$ $15$ $11$ $23$ $19$ $-12$ Corn spury $12$ $23$ $21$ $27$ $20$ $24$ $-12$ Stinkweed $1$ $2$ $4$ $5$ $11$ $14$ $-13$ Redroot pigweed $10$ $13$ $18$ $21$ $21$ $23$ $-13$	Chickweed	6	5	2	3	7	1	5	
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Tartary buckwheat 20 27 38 69 33 63 -43		-				_			
Bluebur 19 21 29 28 42 65 -46	-	-						_	
	Bluebur	19	21	29	28	42	65	-46	

\*Numbers in italics are changes from the 1980's surveys to 2017; these species were not included in the 1970's surveys

- Other species that ranked higher in 2017 than any previous survey include lamb's-quarters and kochia
- False cleavers, spiny annual sow-thistle and low cudweed were ranked highest in 2010; dry conditions in the south-east may have contributed to the slightly reduced relative abundance of these species in 2017
- Of the twelve species with the largest decline, only wild mustard, Russian thistle and pale smartweed did not decrease further in 2017



Weeds that have increased the most since the 1970's. Left to right: Foxtail barley, false cleavers, spiny annual sow-thistle, low cudweed, wheat, stork's-bill, canola, narrow-leaved hawk'sbeard, kochia, barley, chickweed and dandelion

