



Agriculture and
Agri-Food Canada

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Agroalimentaire Canada



2012 Weed Survey of Saskatchewan Canola Fields

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Saskatoon Research Centre

Canada 

Prairie Pest Surveys

- 2012 Weed Survey was one aspect of a much larger study funded through the Canola Agri-Science Cluster by the Canola Council of Canada and Agriculture and Agri-Food Canada led by Dr. Owen Olfert
- “Detection, surveillance and management of weed, insect and disease pests that threaten the economic viability of crop production and the environmental health of prairie agro-ecosystems”

Background and Objectives

2012 Weed Survey is part of series of surveys of annual crops (including canola) conducted in Saskatchewan

1976-79: 313 rapeseed fields

1986: 99 canola fields

1995: 216 canola fields (transition to HT)

2003: 344 canola fields (dry)

2012: 464 canola fields (wet)

Similar methodology allows for an assessment of changes:

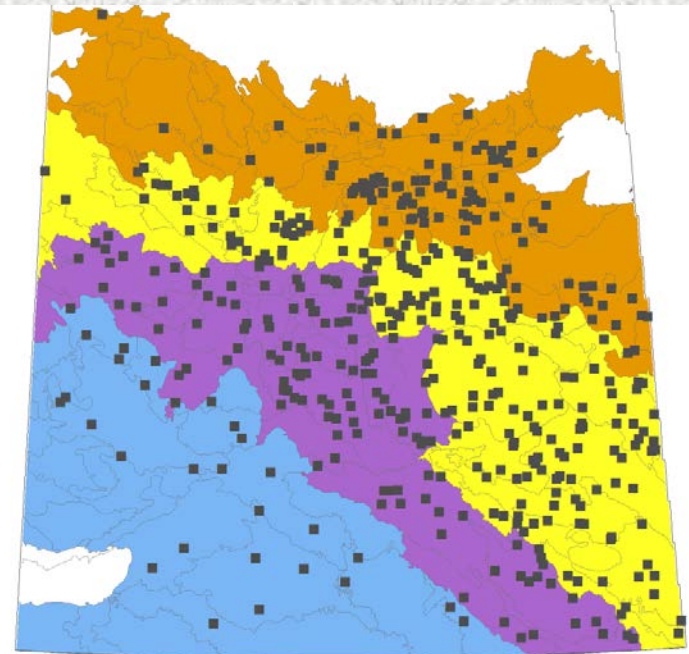
Identify weeds that have increased since 1970s

Influence of HT canola on weeds

Influence of weather on weeds in HT crops

Methodology - 2012 Site Selection

- Quarter sections located across Saskatchewan were selected using a stratified random sample based on canola acreage in ecodistricts reported in census
- Contacted owners for permission to survey their nearest canola field

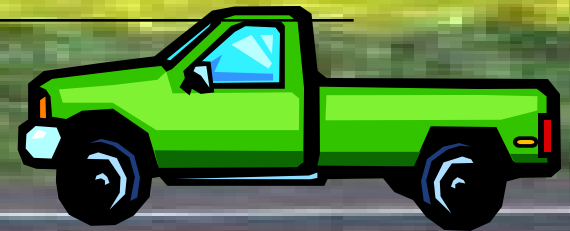
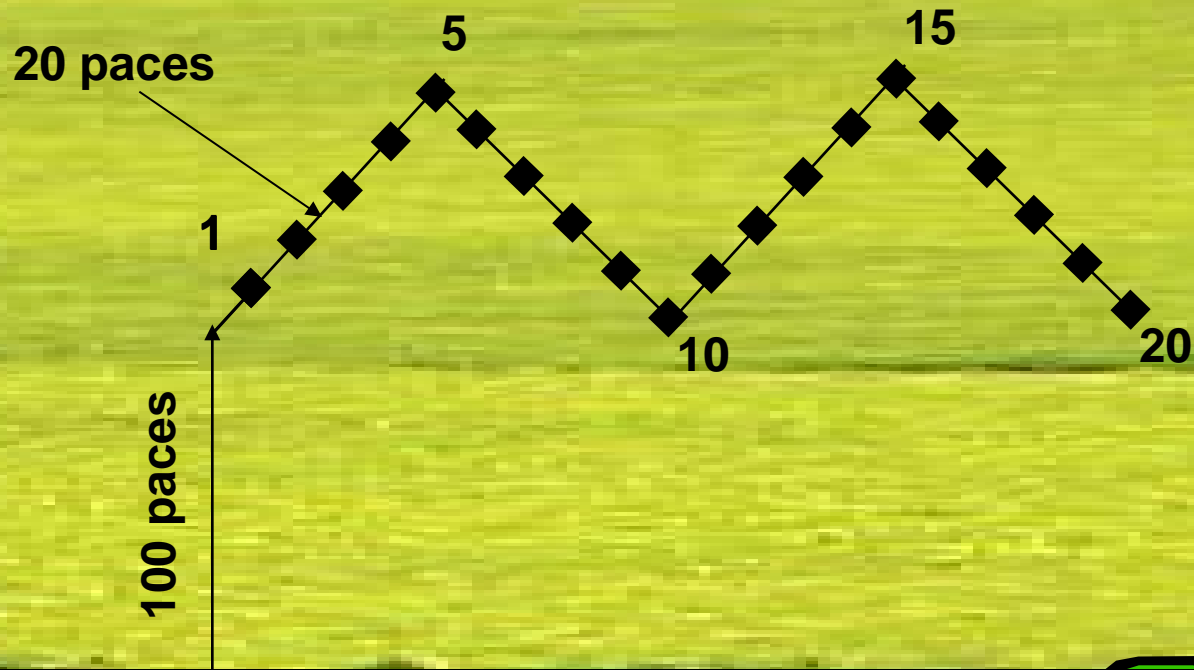


- Mixed Grassland
- Moist Mixed Grassland
- Aspen Parkland
- Boreal Transition

Methodology - Weed Sampling Pattern

Twenty 0.5 m² by 0.5 m² quadrats counted in July or August

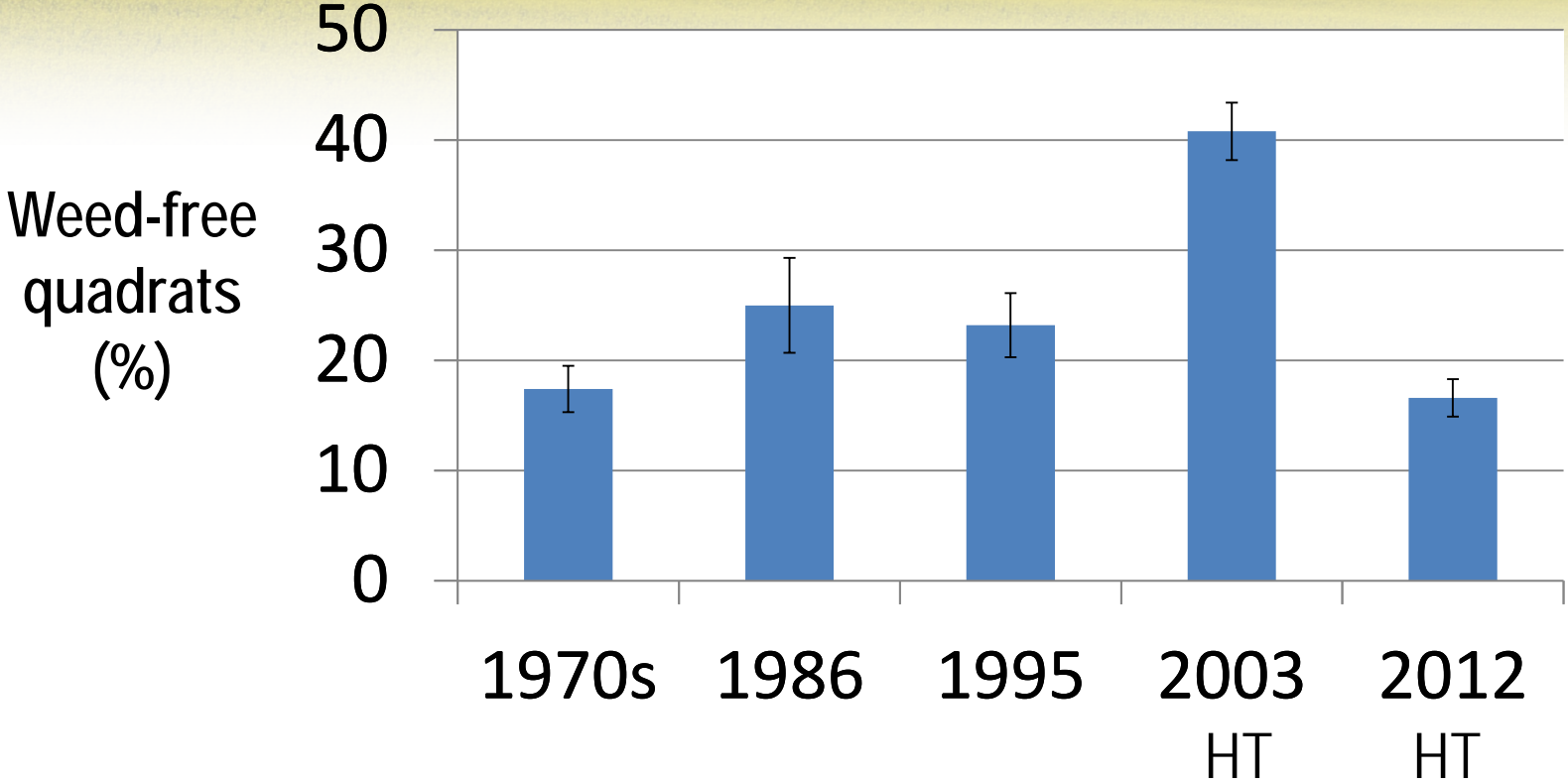
Pattern adjusted to avoid bluffs, sloughs and other wet areas



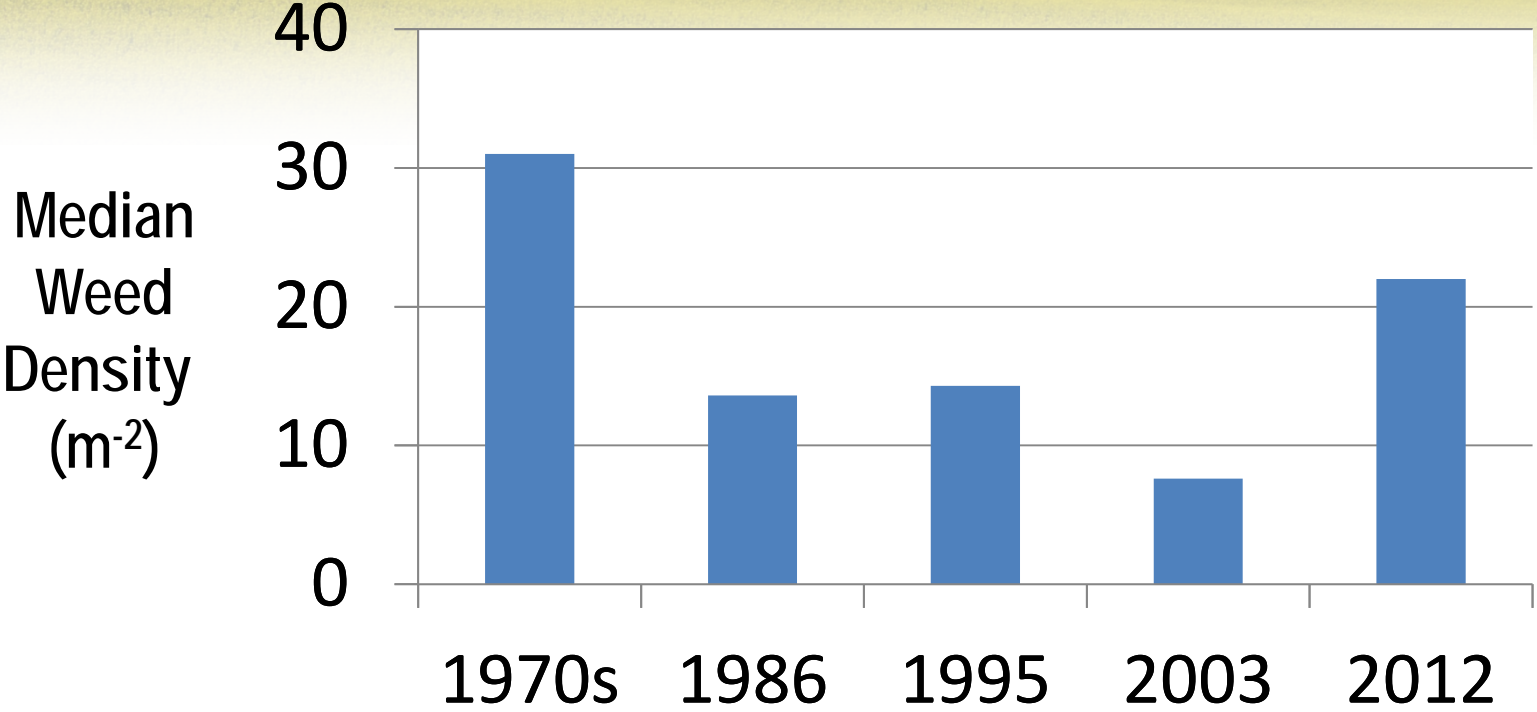


Weed Community Structure

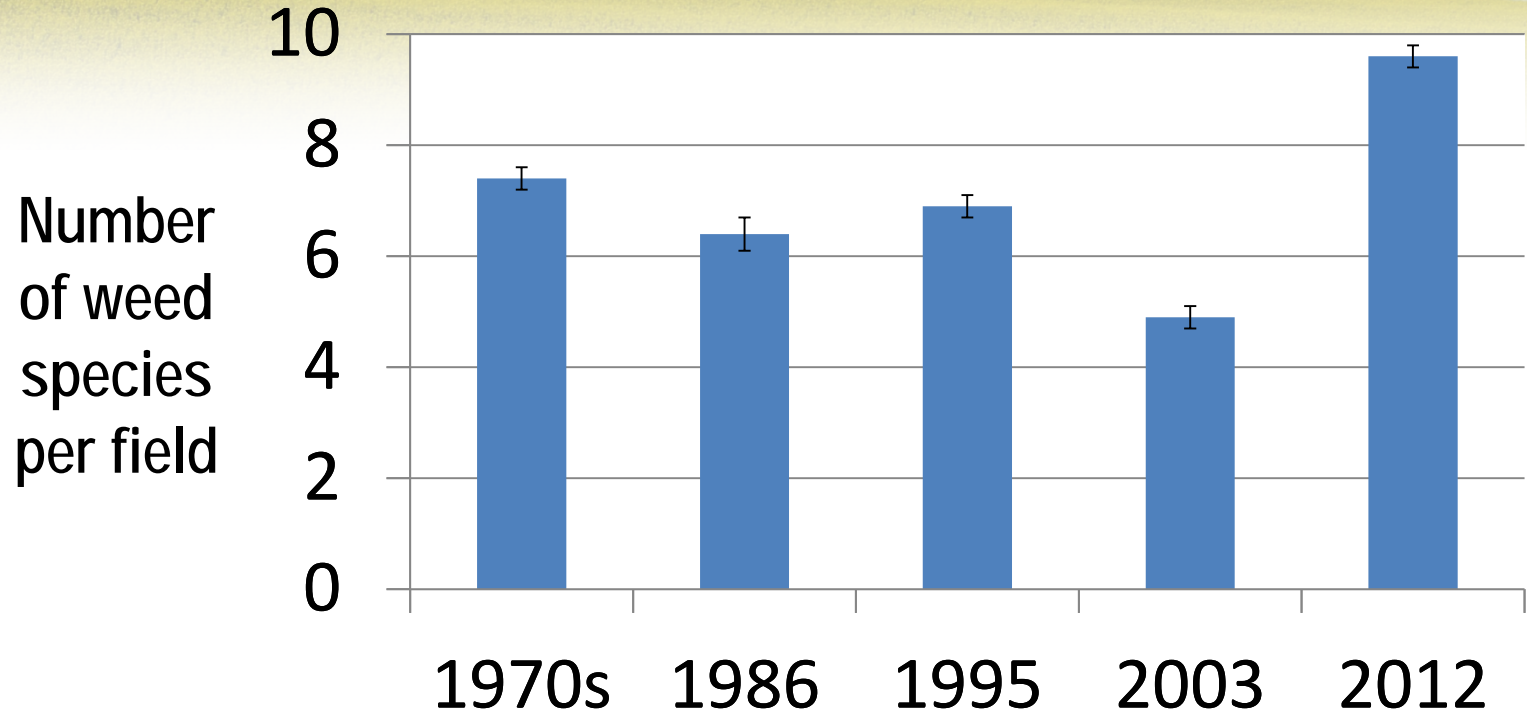
Weed-free Quadrats



Median Total Weed Density



Species Richness



- 130 weed species were identified in 2012

Top Species in 2012



Species Summary Table from 2012 Weed Survey

Rank	Species	Frequency (%)	Field Uniformity		Field Density (#/m ²)			Relative Abundance
			All	Occurrence	All	Occurrence	High	
1	Green foxtail	49.3	19.9	40.4	8.4	17.0	365.6	34.1
2	Wild buckwheat	74.8	26.5	35.5	2.5	3.4	42.2	25.4
3	Wild oats	47.7	17.9	36.0	3.7	7.4	140.4	21.8
4	Spring wheat	41.3	13.1	32.5	2.2	5.6	220.0	15.3
5	Spiny annual sow-thistle	30.1	2.3	5.5	167.0	15.1		
6	Cleavers	36.9	2.1	5.9	127.2	14.7		
7	Shepherd's-purse	28.8	1.8	4.3	59.0	14.1		
8	Barnyard grass species	20.3	6.3	30.9	2.6	12.8	286.2	11.1
9	Lamb's-quarters	41.8	27.9	1.1	2.7	69.0	10.9	
10	Narrow-leaved hawk's-beard	28.9	20.5	1.3	4.6	90.6	9.6	
11	Canada thistle	42.1	1.6	25.6	9.1			
12	Dandelion	43.1	1.2	22.4	8.9			
13	Willowherb	27.1	1.5	51.4	5.8			
14	Broad-leaved plantain	17.7	4.0	22.8	0.6	3.4	42.0	5.0
15	Biennial wormwood	21.7	3.9	17.8	0.4	2.0	30.6	5.0
16	Perennial sow-thistle	18.2	3.2	17.7	0.3	2.5	131.8	4.5
17	Redroot pigweed	13.8	3.3	23.7	0.3	5.1	51.4	4.1
18	Foxtail barley	15.0	3.1	20.9	4.1			
19	Low cudweed	16.0	2.6	16.3	4.1			
20	Round-leaved mallow	15.6	3.3	20.9	4.1			
21	Stinkweed	13.9	2.1	15.2	0.3	2.5	61.8	4.1
22	Chickweed	10.8	2.2	11.0	3.2	11.0	11.0	4.1
23	Night-flowering catchfly	12.9	2.8	12.9	3.2	11.0	11.0	4.1
24	Canola	13.0	2.1	16.3	0.4	2.8	69.8	3.2
25	Kochia	13.3	2.5	18.6	0.2	1.4	8.0	2.9

Frequency (%)

Field Uniformity

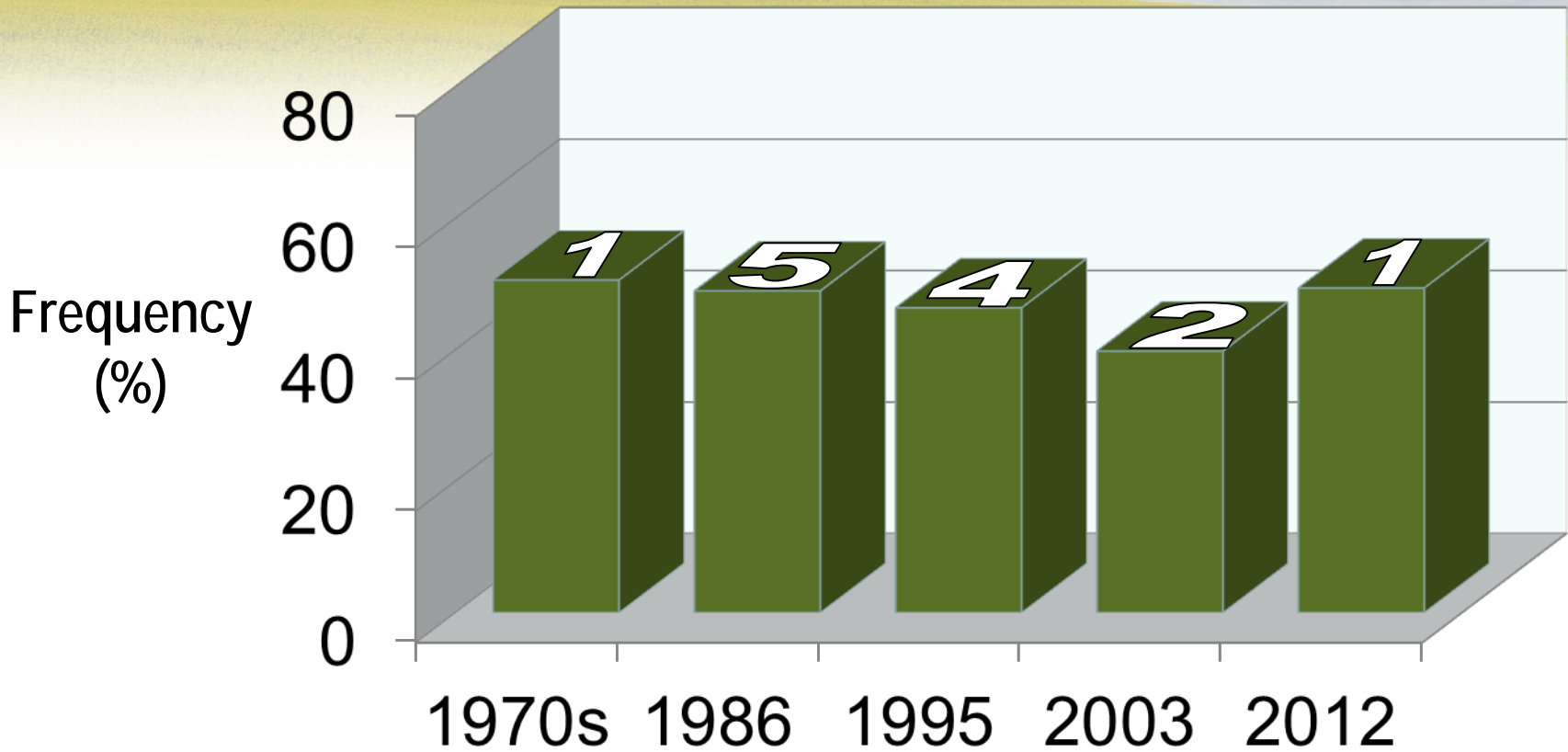
Field Density

Relative Abundance (RAI)

#1 Green Foxtail



#1 Green Foxtail













Rank based on:  Relative Abundance

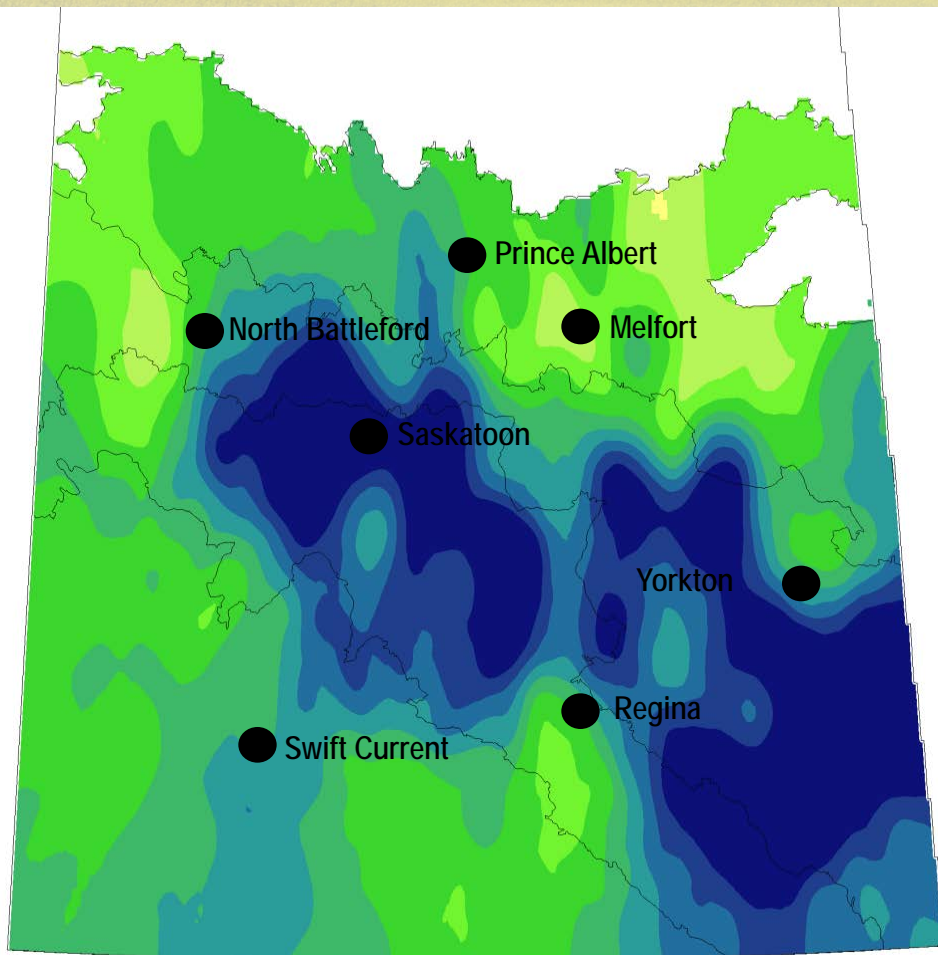
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2012

Frequency

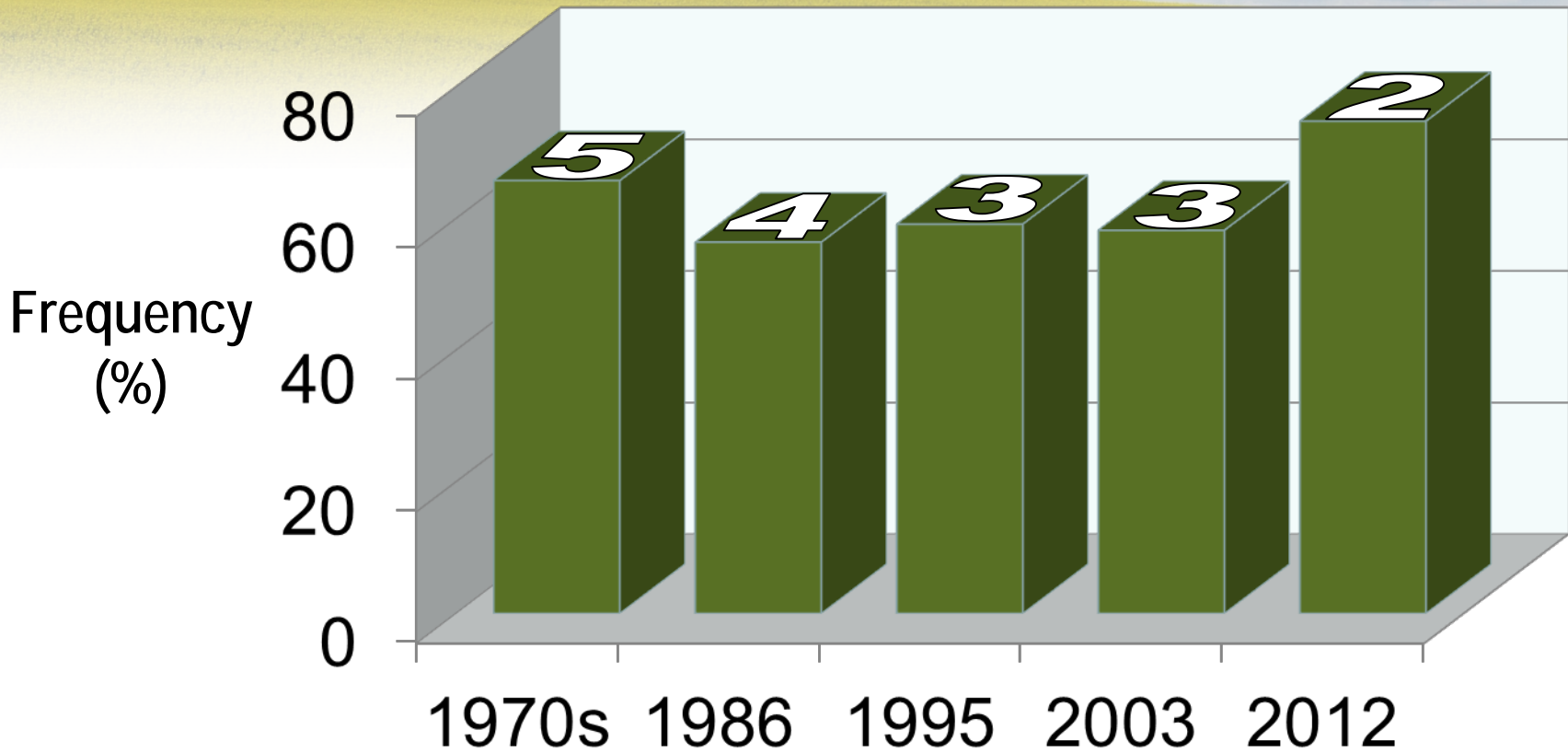
-  Not Surveyed
-  Absent
-  0.1 to 10.0%
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


#2 Wild Buckwheat

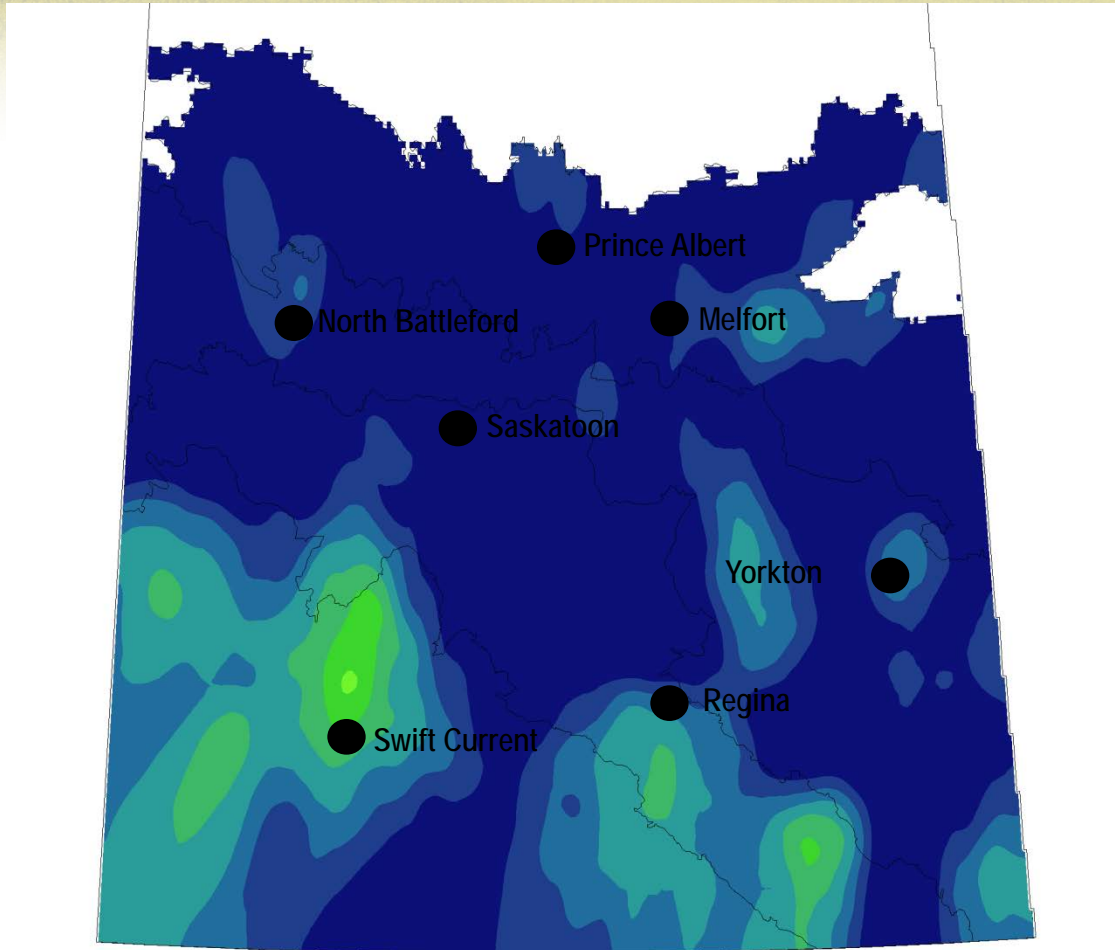


#2 Wild Buckwheat













Rank based on:  Relative Abundance

#2 Wild Buckwheat



2012

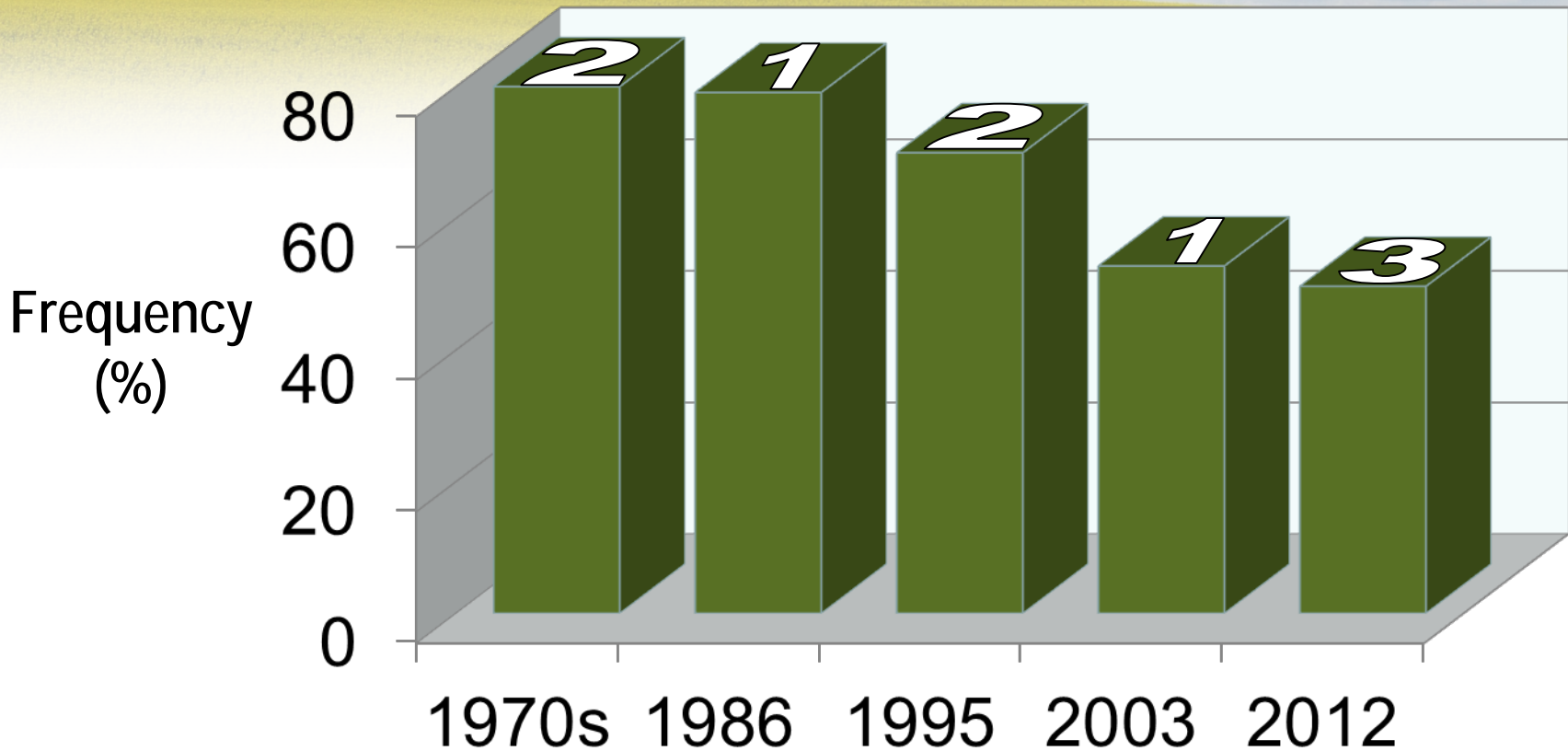
Frequency


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#3 Wild Oats



#3 Wild Oats

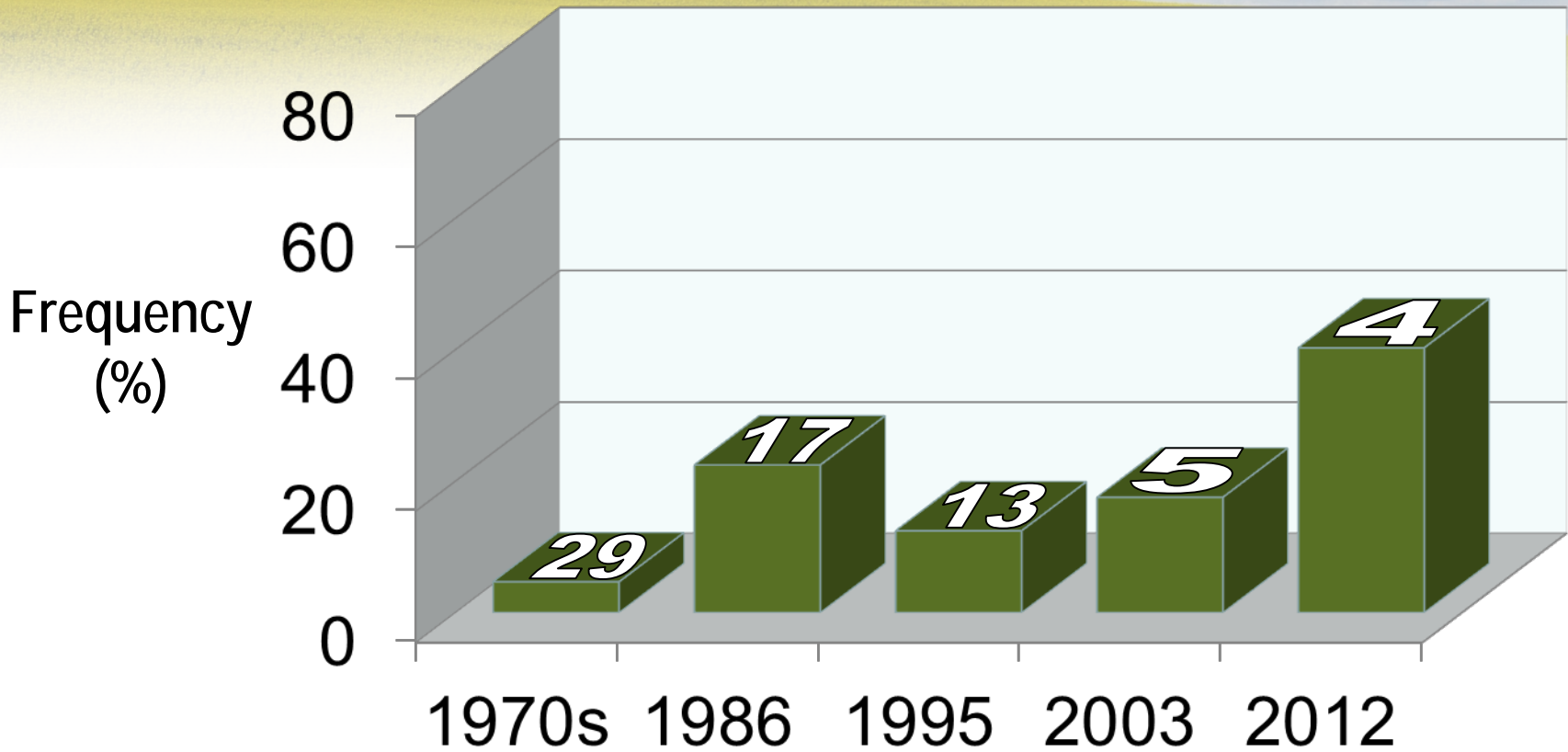


Rank based on:  Relative Abundance

#4 Volunteer Wheat



#4 Volunteer Wheat

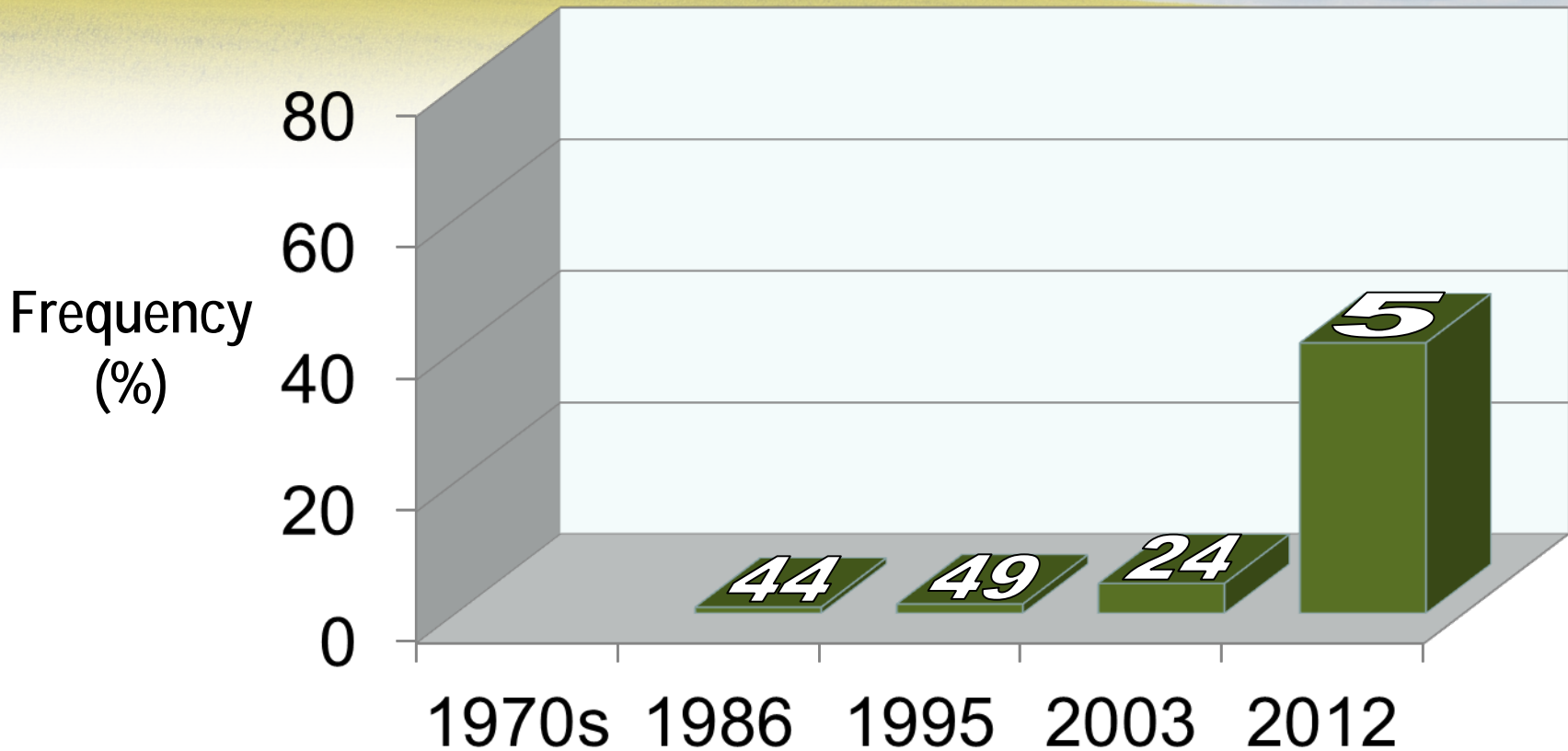


Rank based on:  Relative Abundance

#5 Spiny Annual Sow-thistle

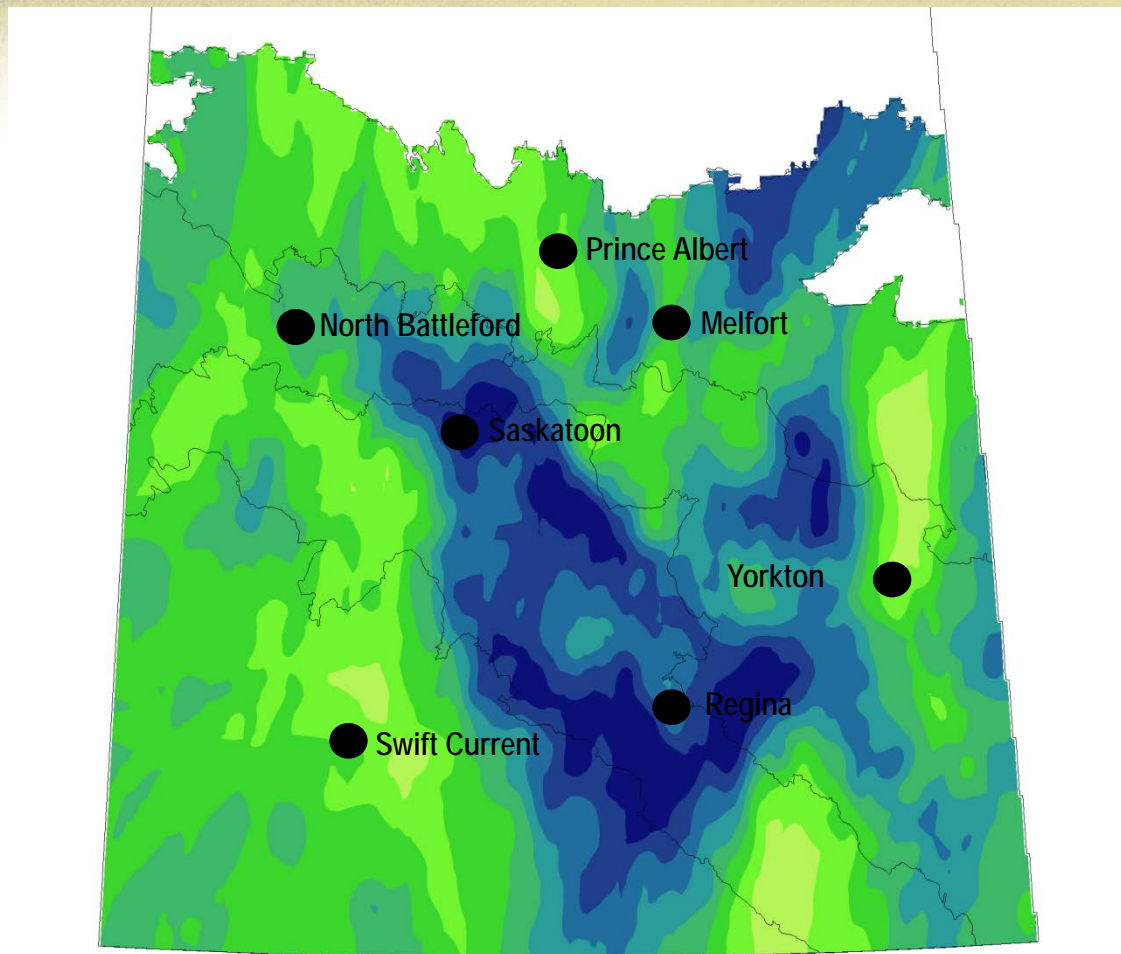


#5 Spiny Annual Sow-thistle













Rank based on: ~~Rank~~ Relative Abundance

#5 Spiny Annual Sow-thistle



2012

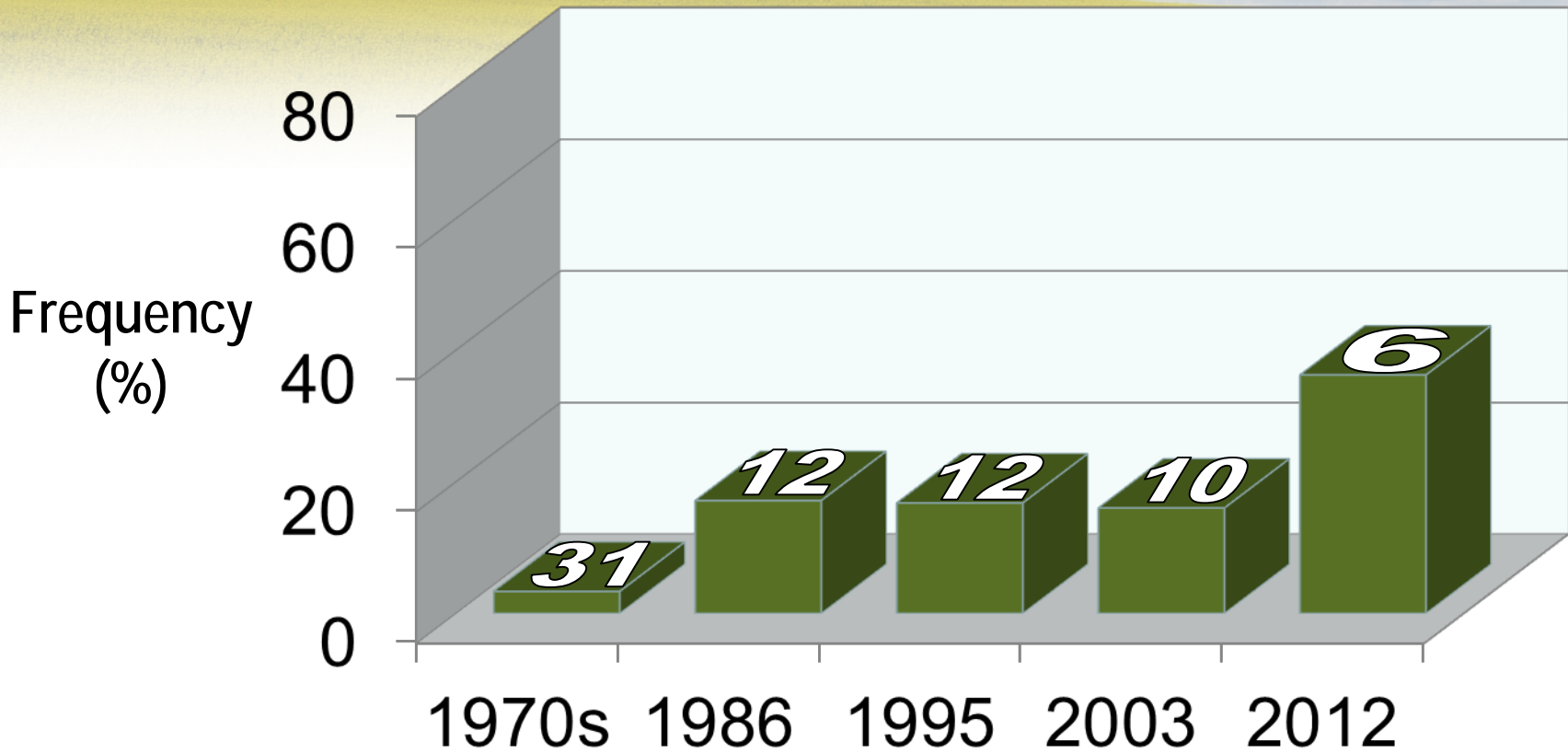
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#6 Cleavers

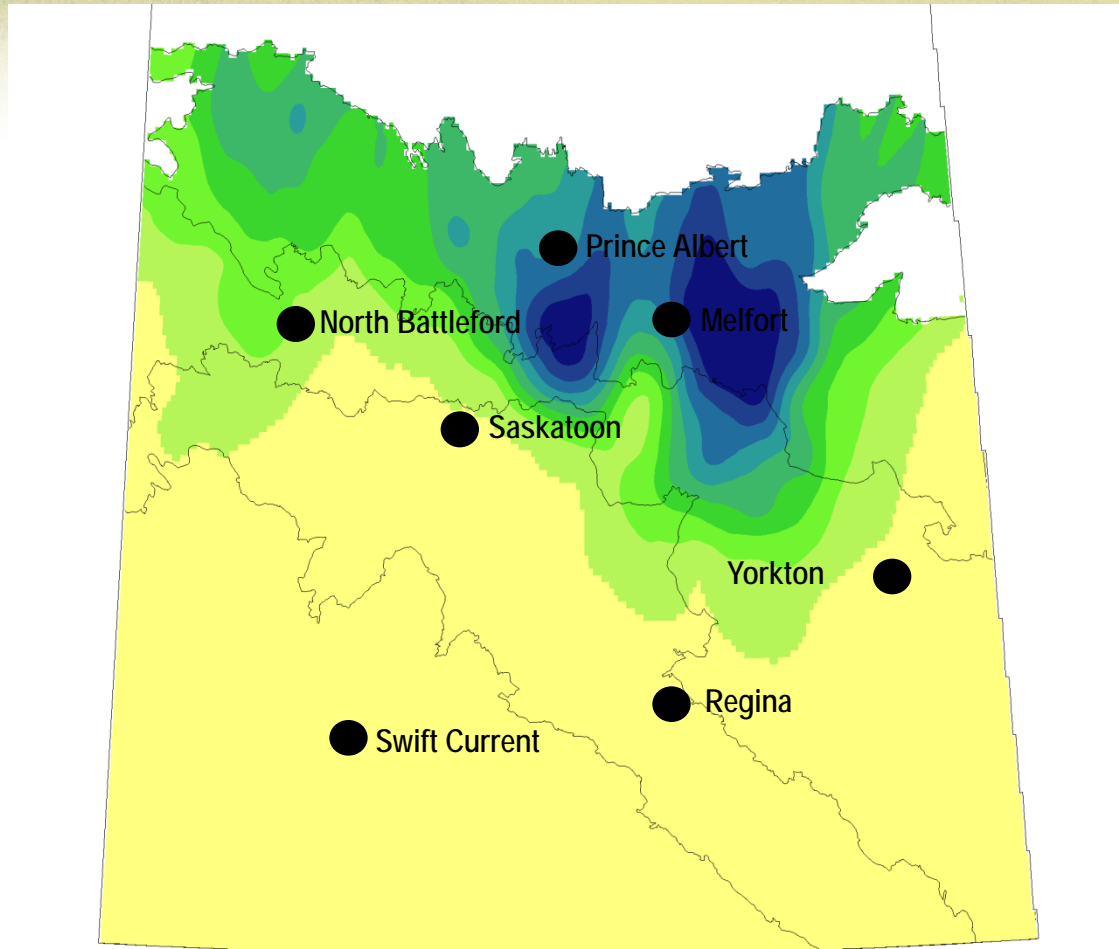


#6 Cleavers













Rank based on:  Relative Abundance

#6 Cleavers

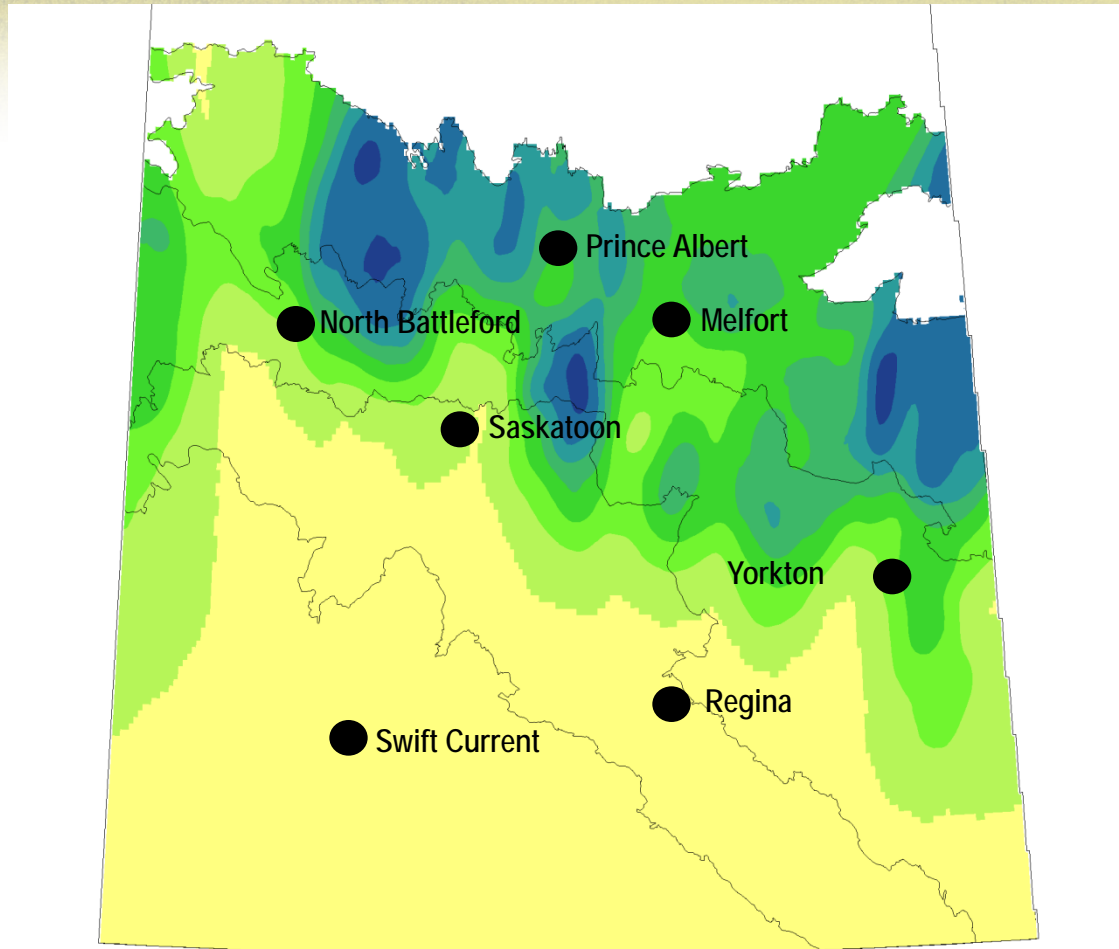


1995

Frequency

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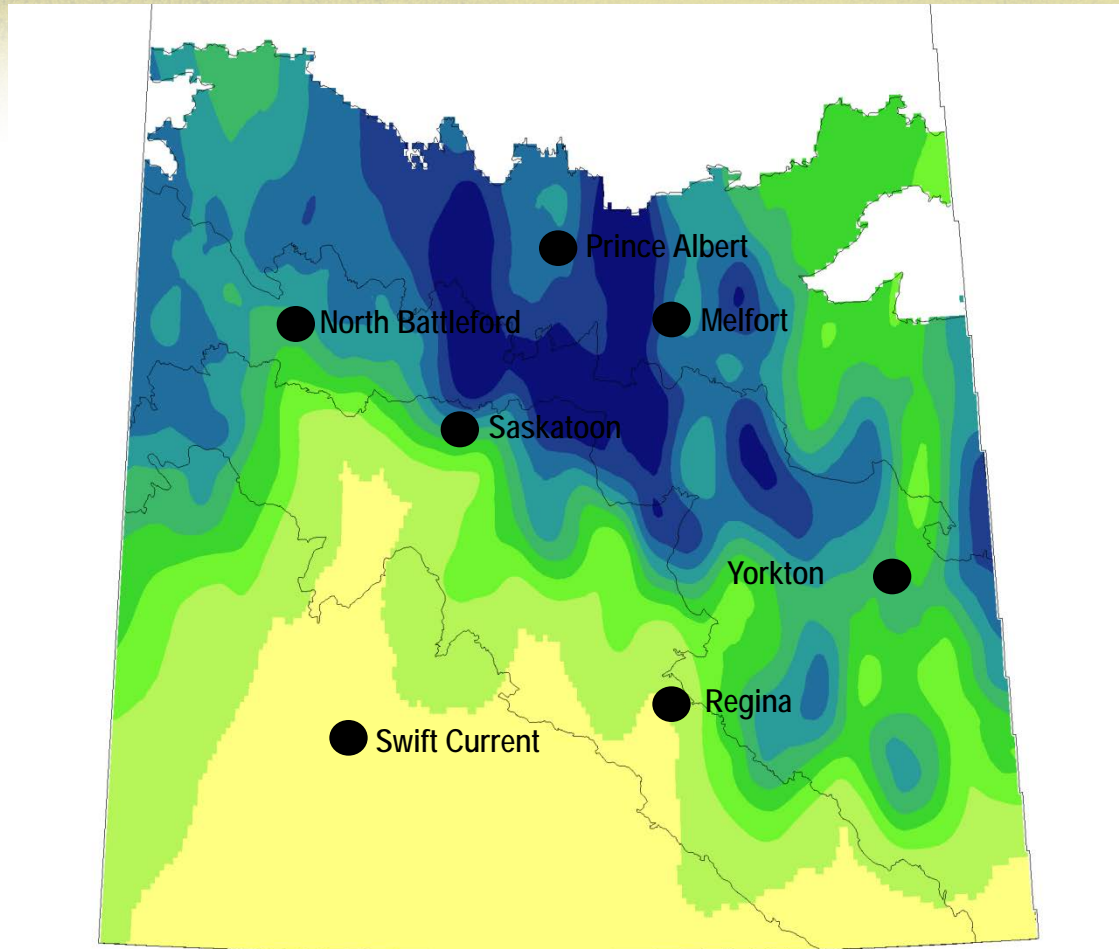


2003

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#6 Cleavers

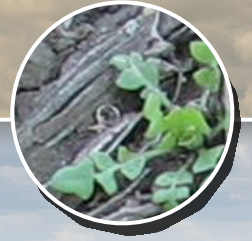


2012

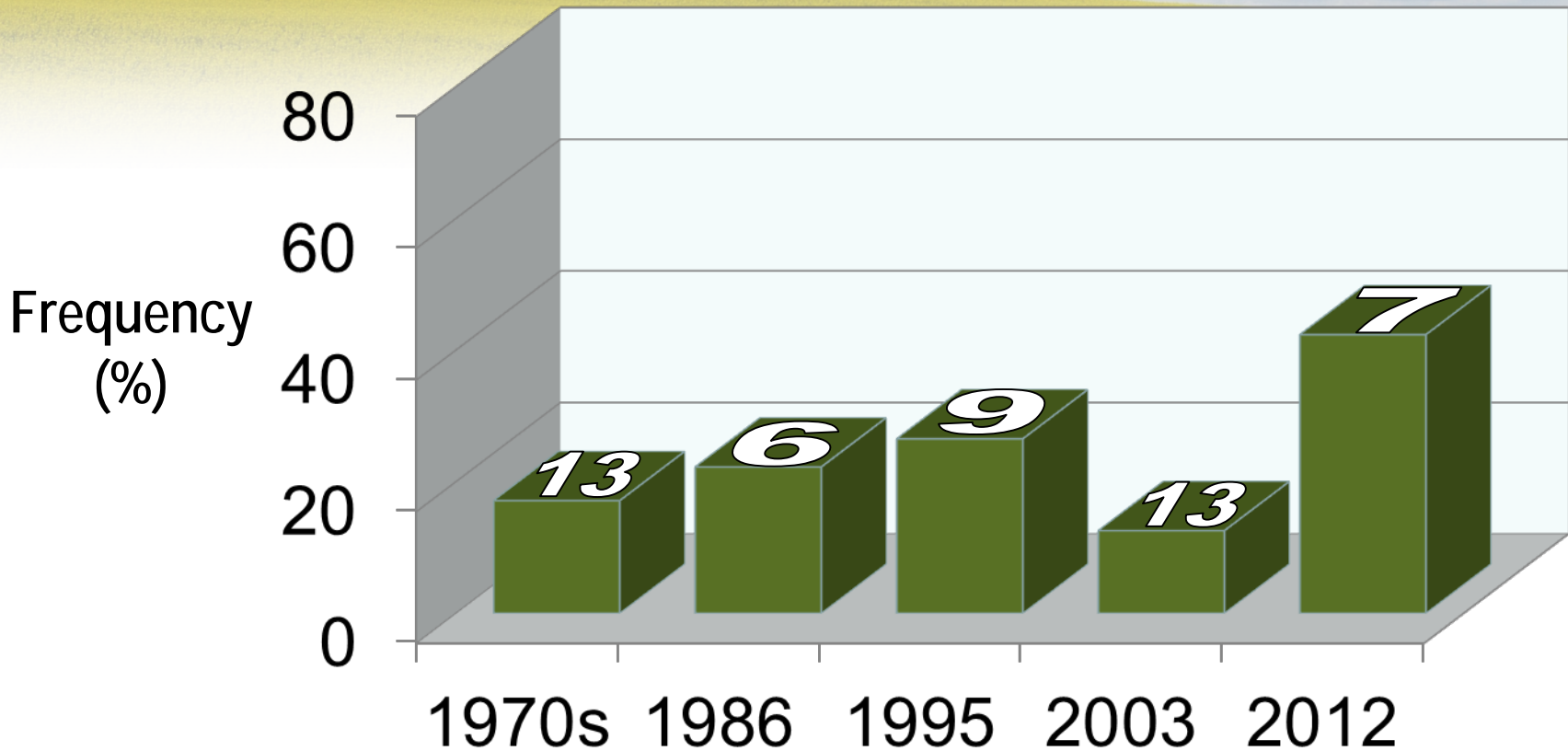
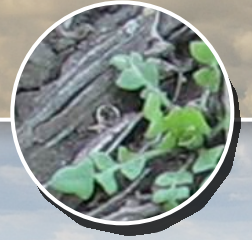
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#7 Shepherd's-purse

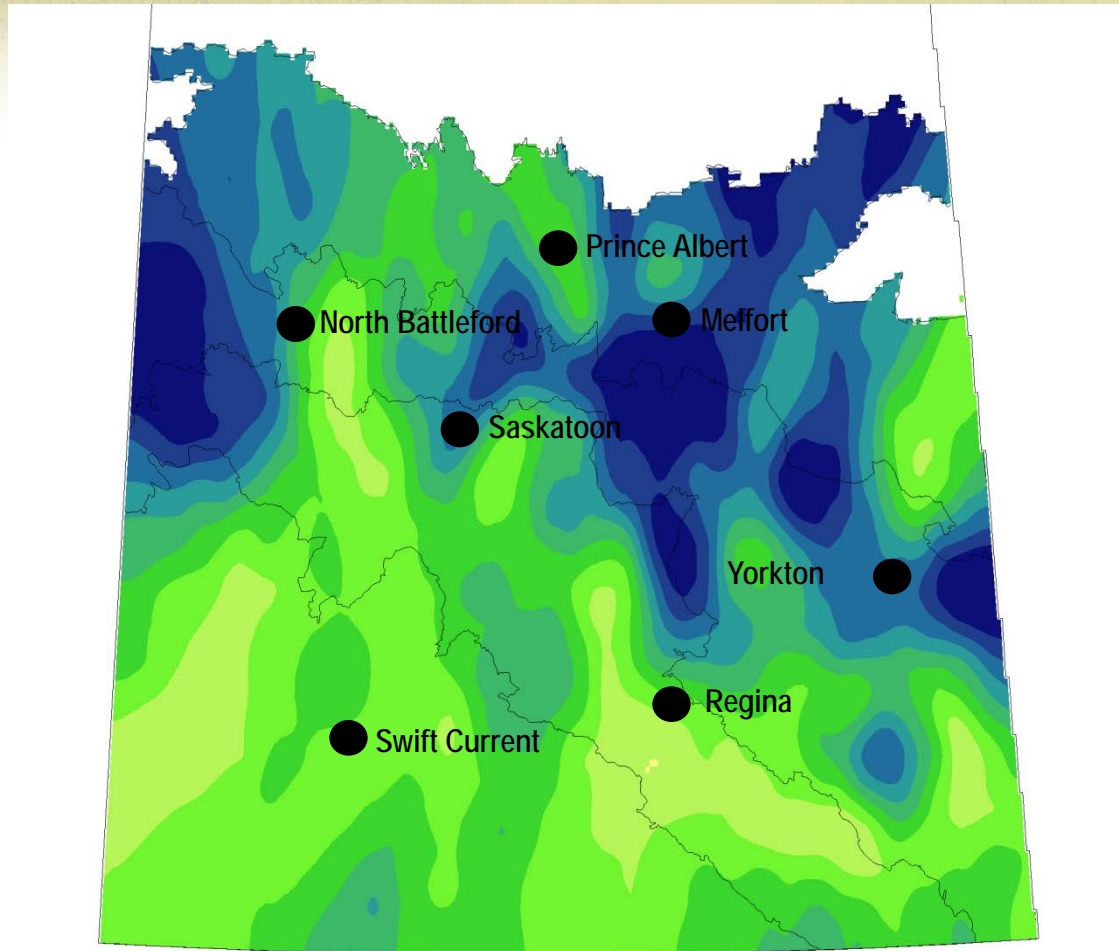
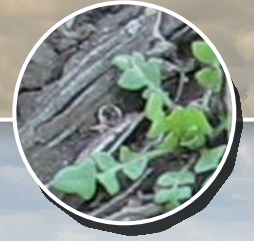


#7 Shepherd's-purse













Rank based on:  Relative Abundance

#7 Shepherd's-purse



2012

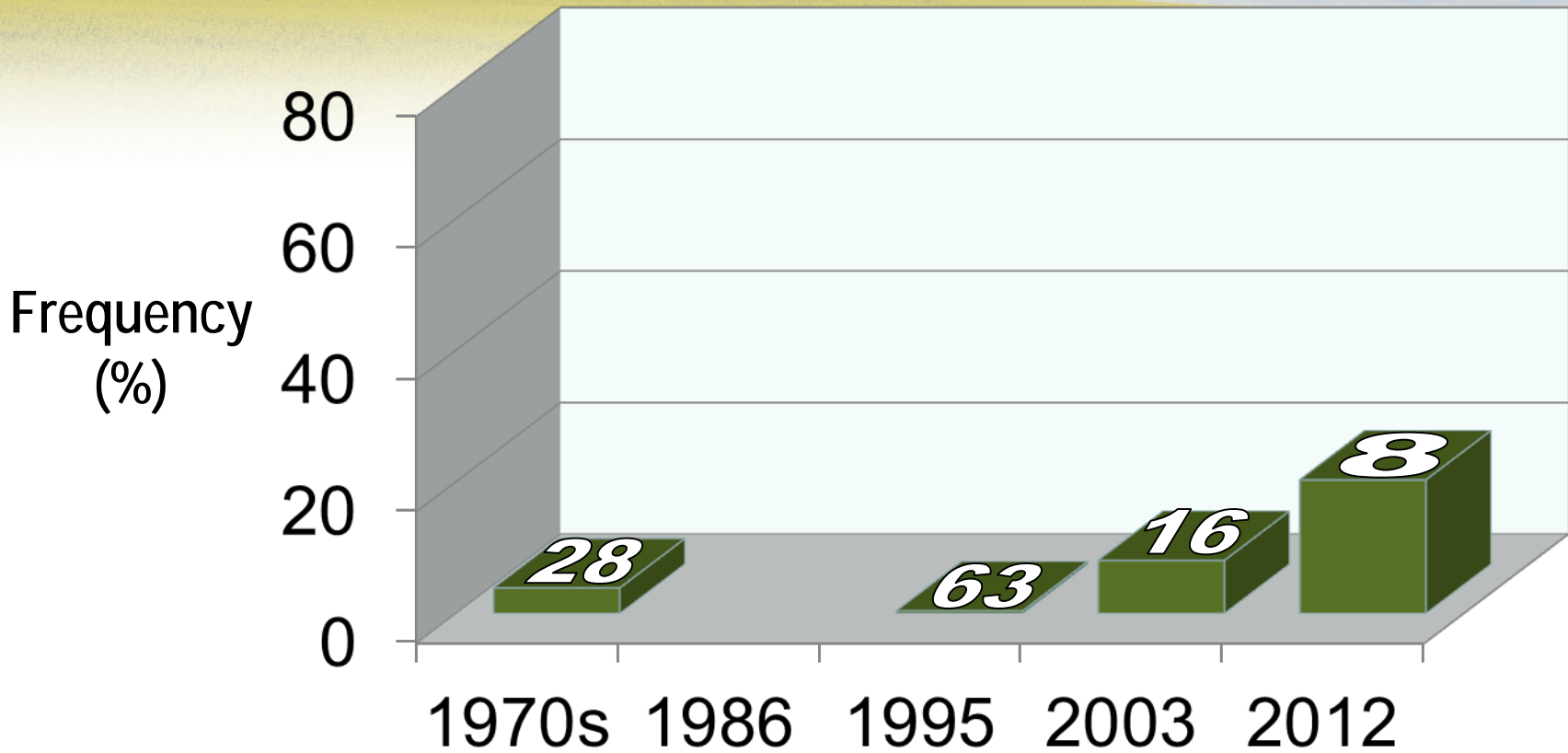
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#8 Barnyard Grass Species

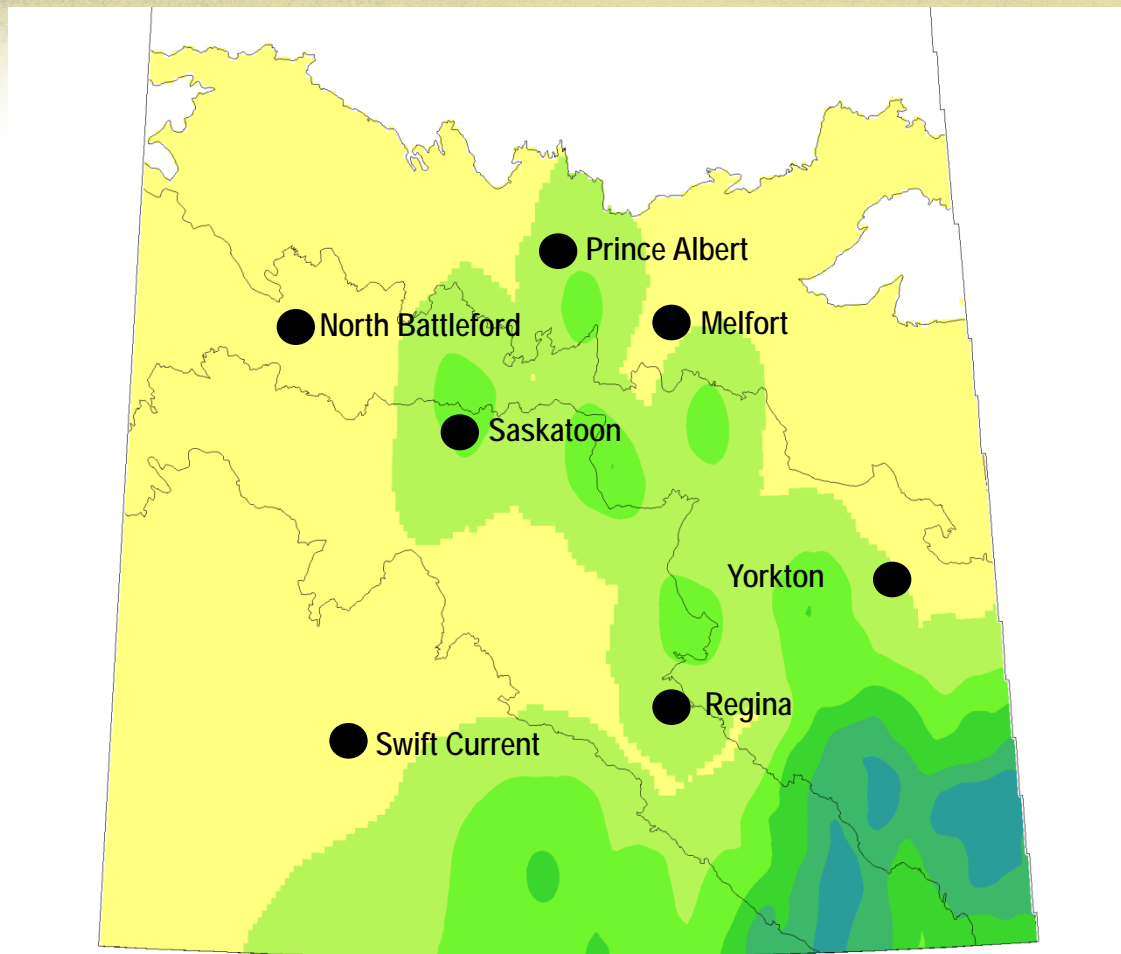


#8 Barnyard Grass Species



Rank based on:  Relative Abundance

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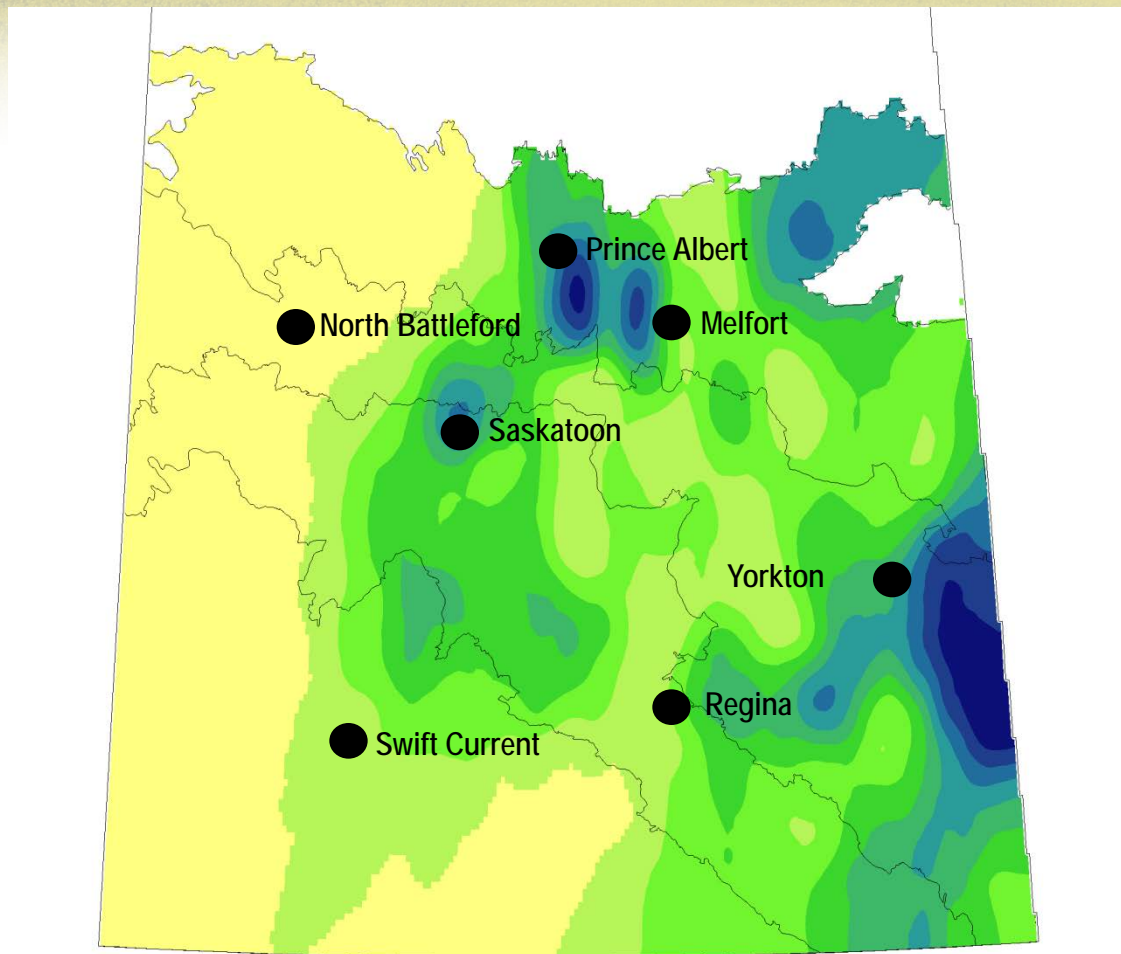


2003

Frequency











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#8 Barnyard Grass Species



2012

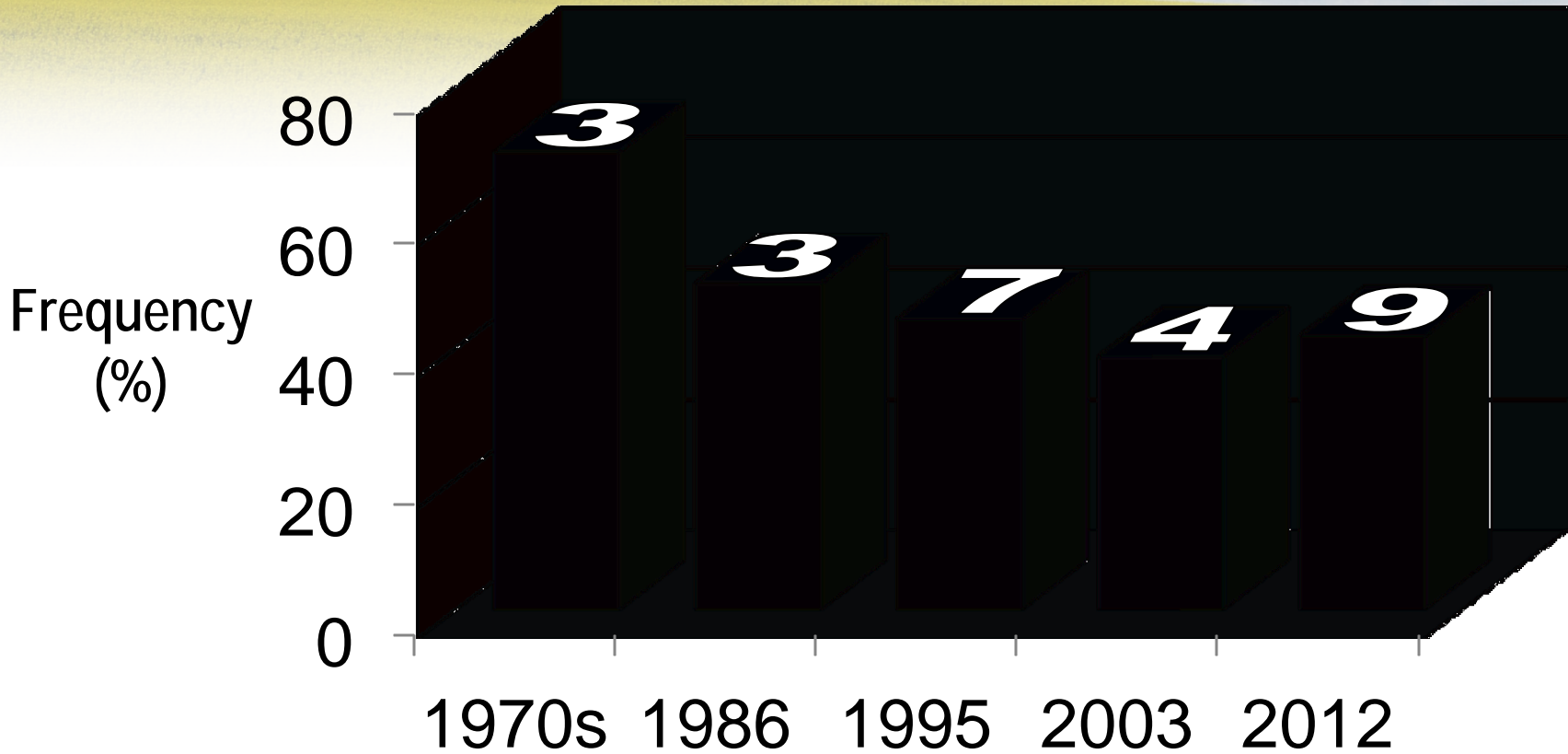
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#9 Lamb's-quarters

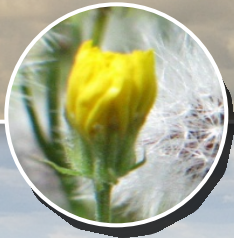


#9 Lamb's-quarters

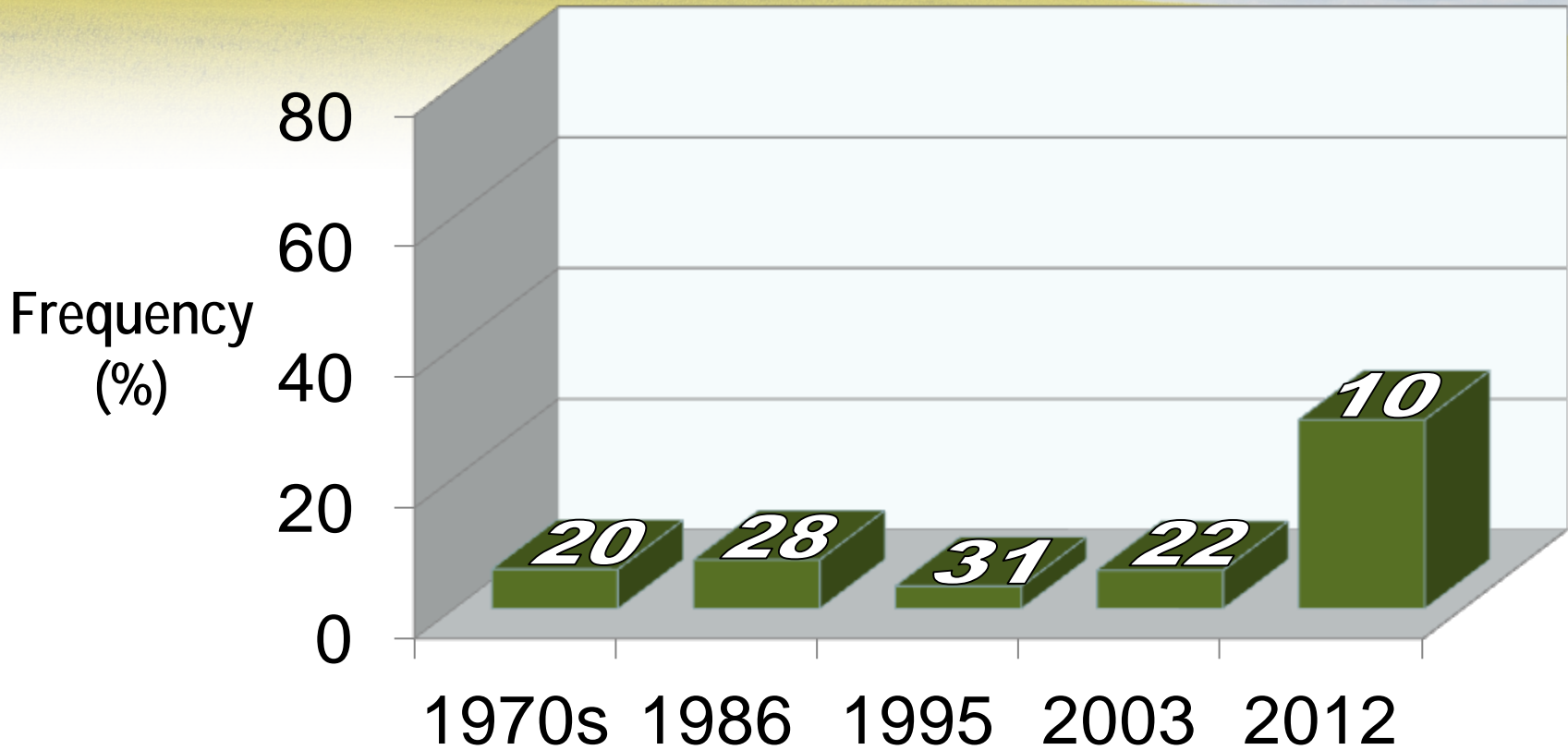
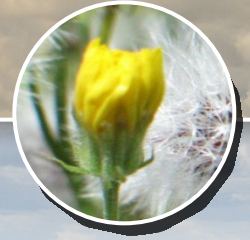


Rank based on:  Relative Abundance

#10 Narrow-leaved Hawk's-beard

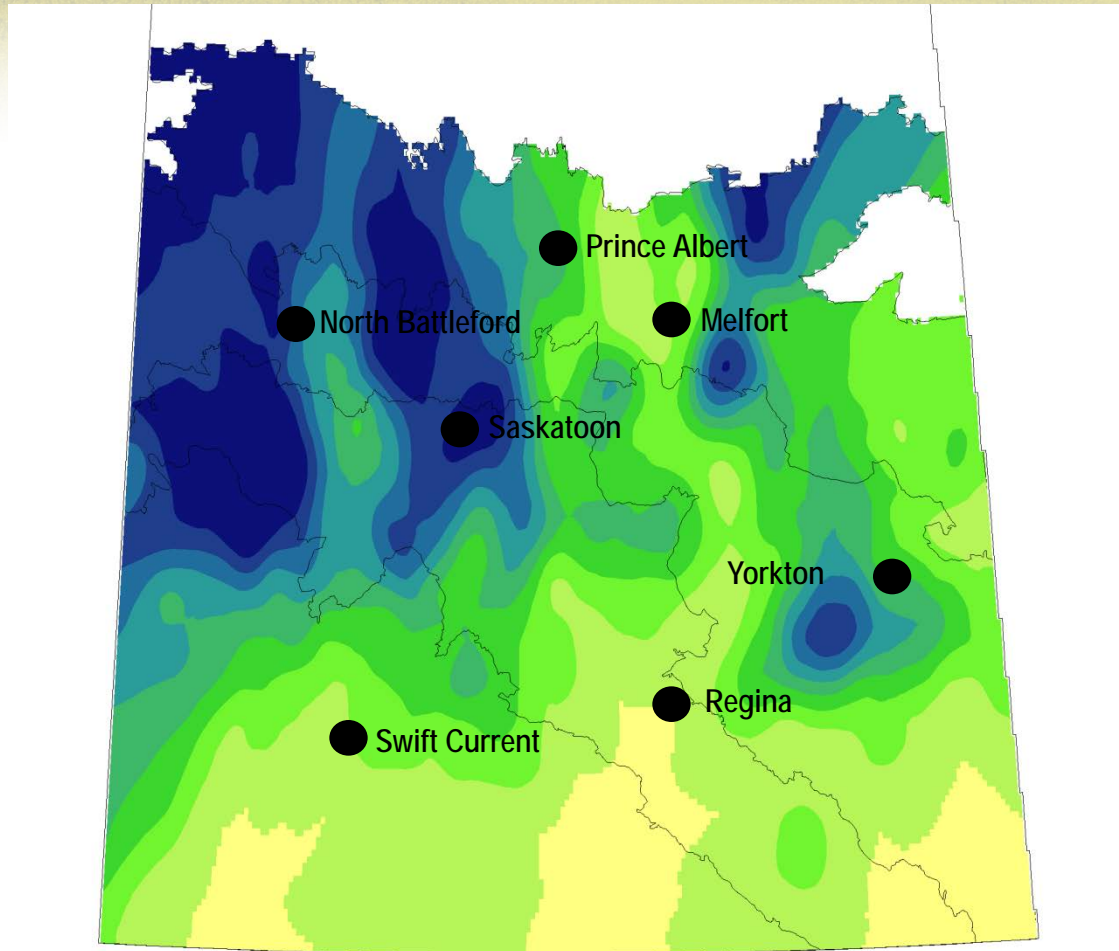
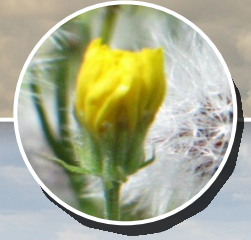


#10 Narrow-leaved Hawk's-beard













Rank based on:  Relative Abundance

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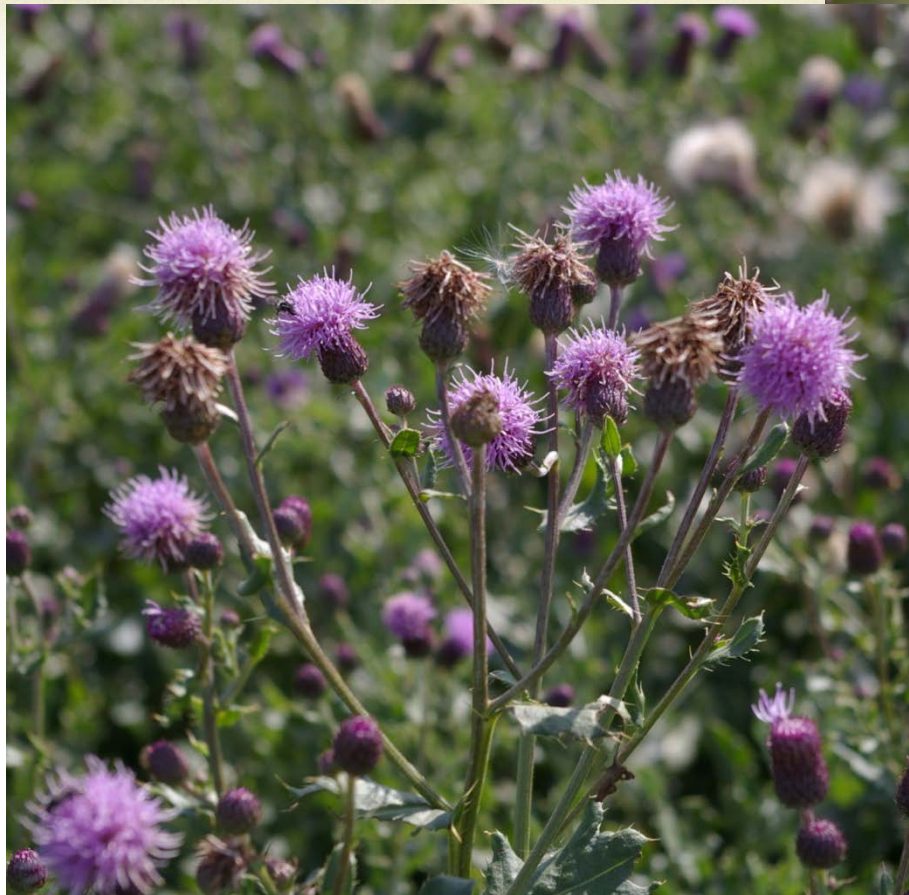


2012

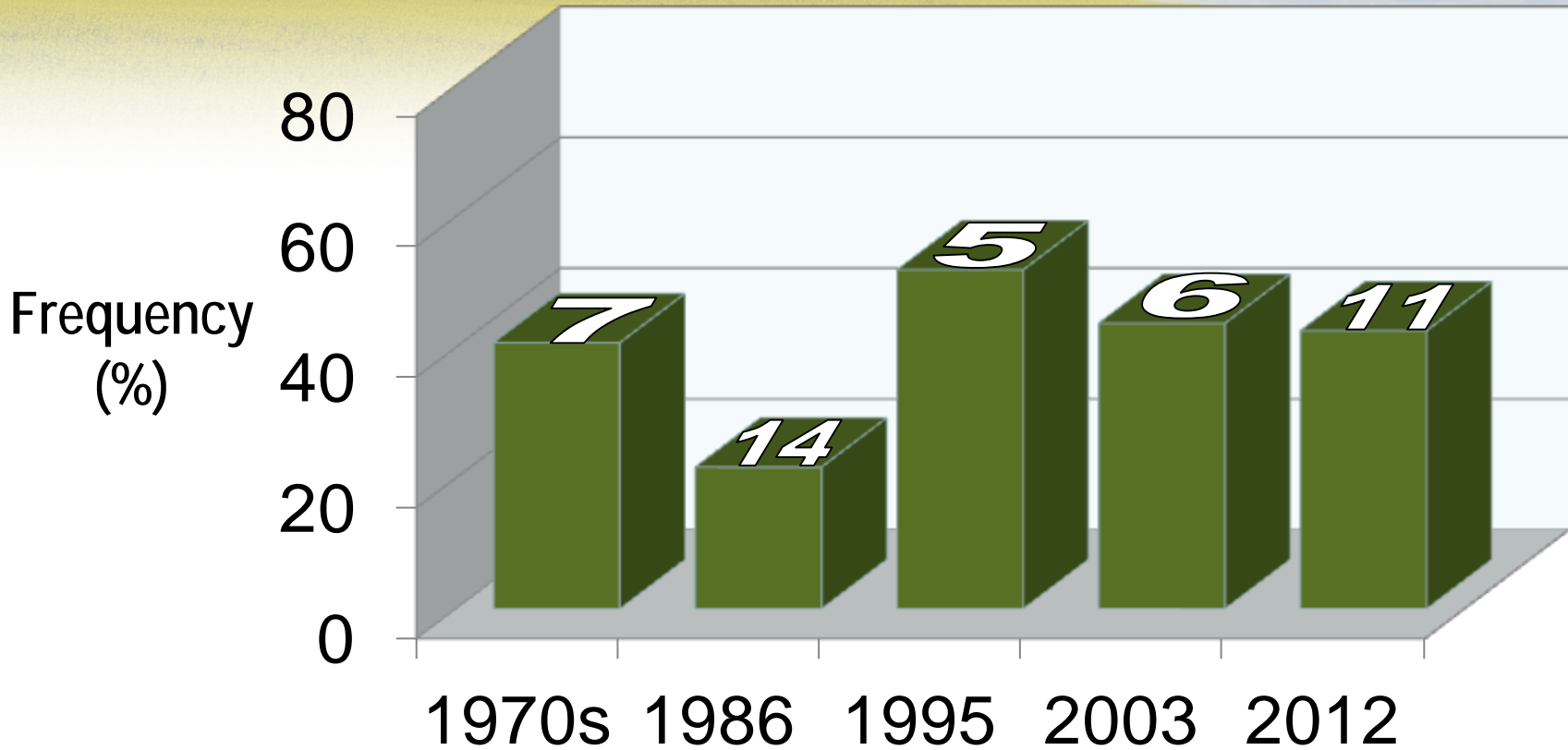
Frequency


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#11 Canada Thistle



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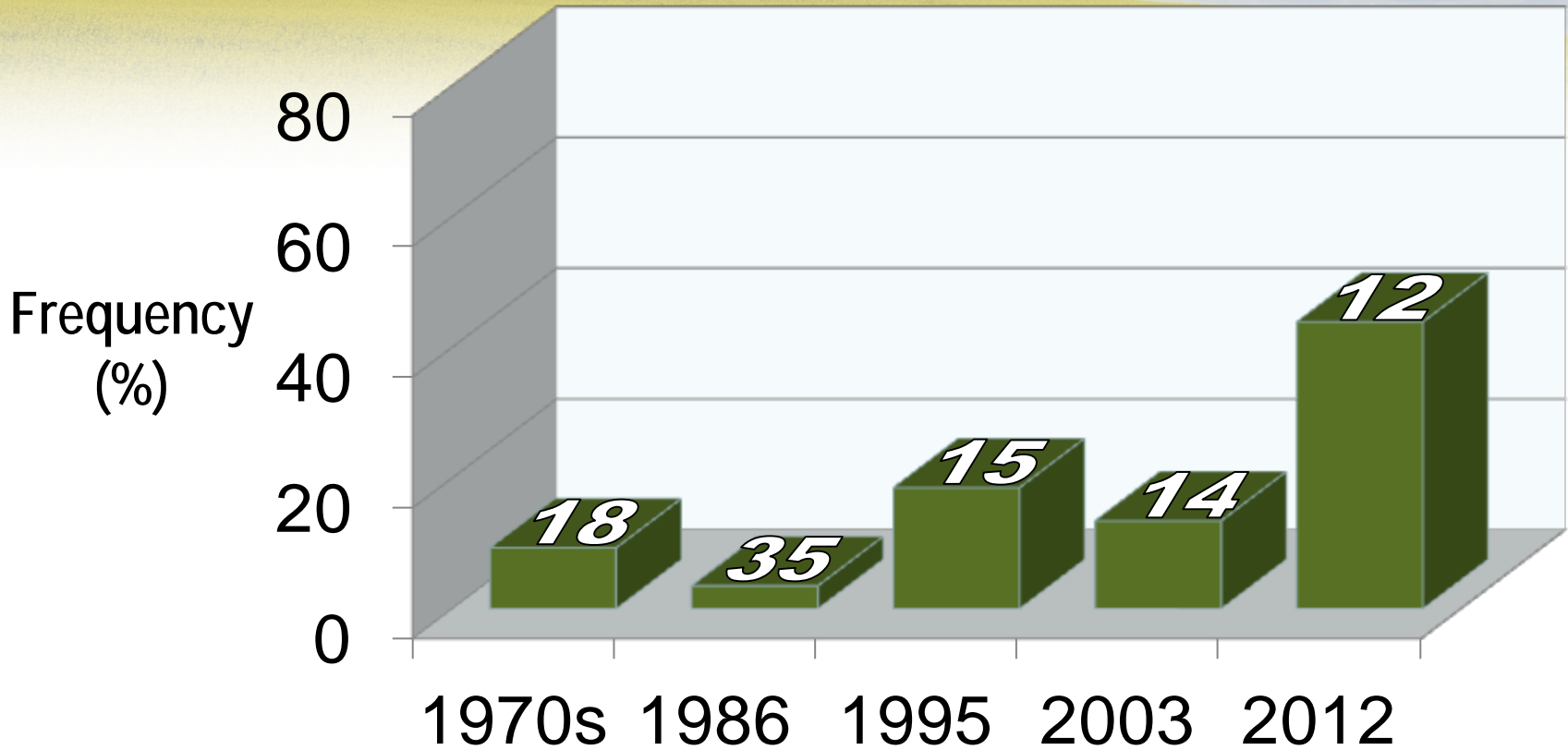


Rank based on:  Relative Abundance

#12 Dandelion



#12 Dandelion



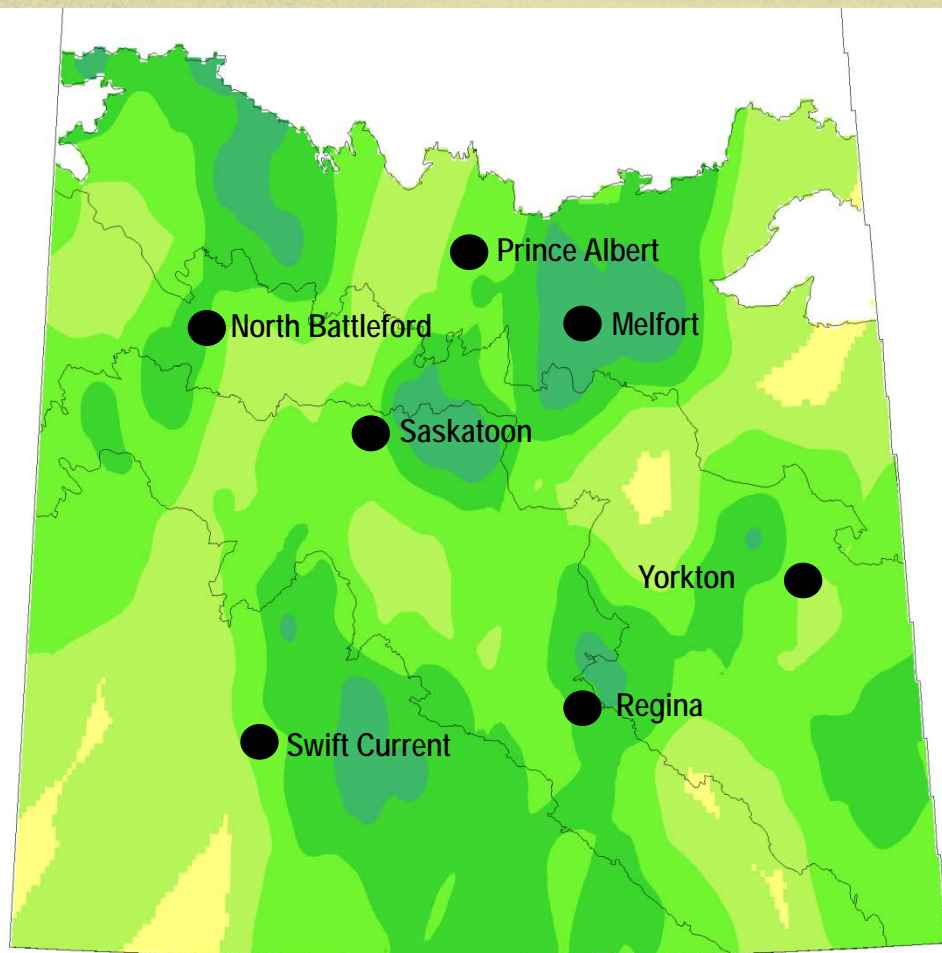
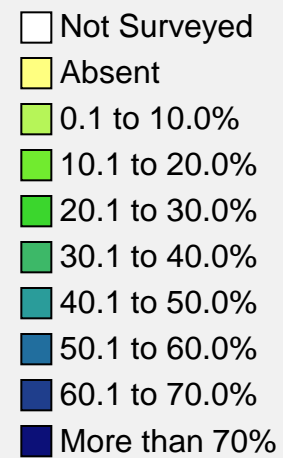
Rank based on:  Relative Abundance

#12 Dandelion

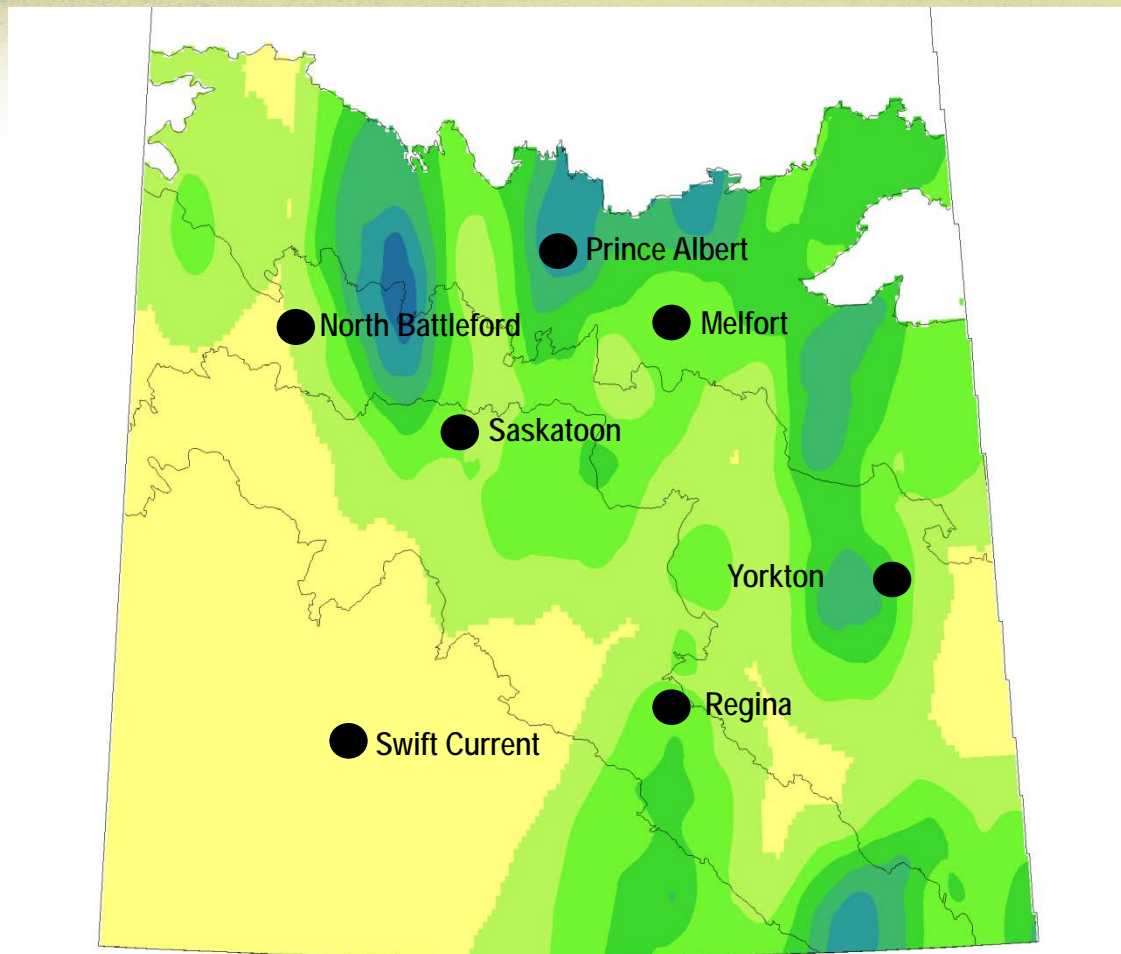


1995

Frequency













#12 Dandelion

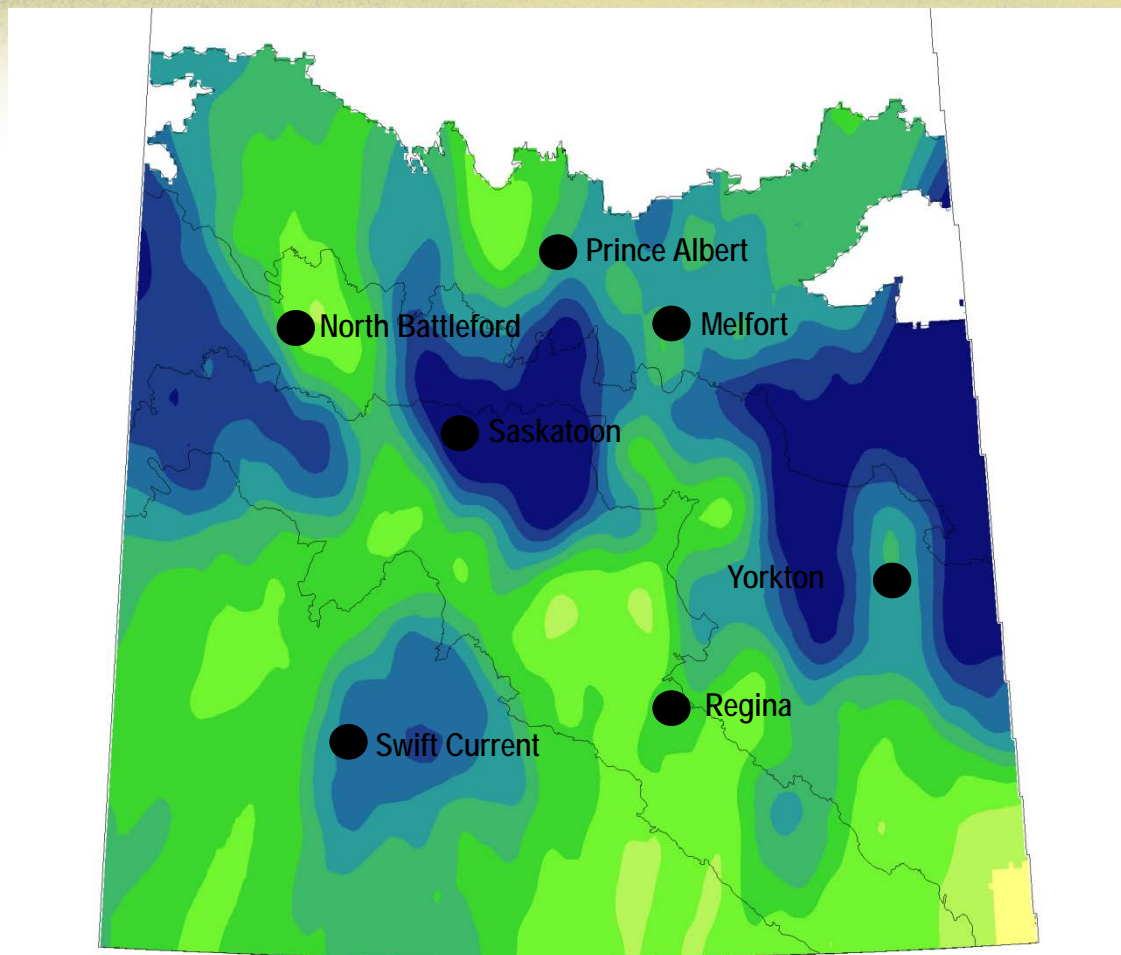


2003

Frequency











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#12 Dandelion



2012

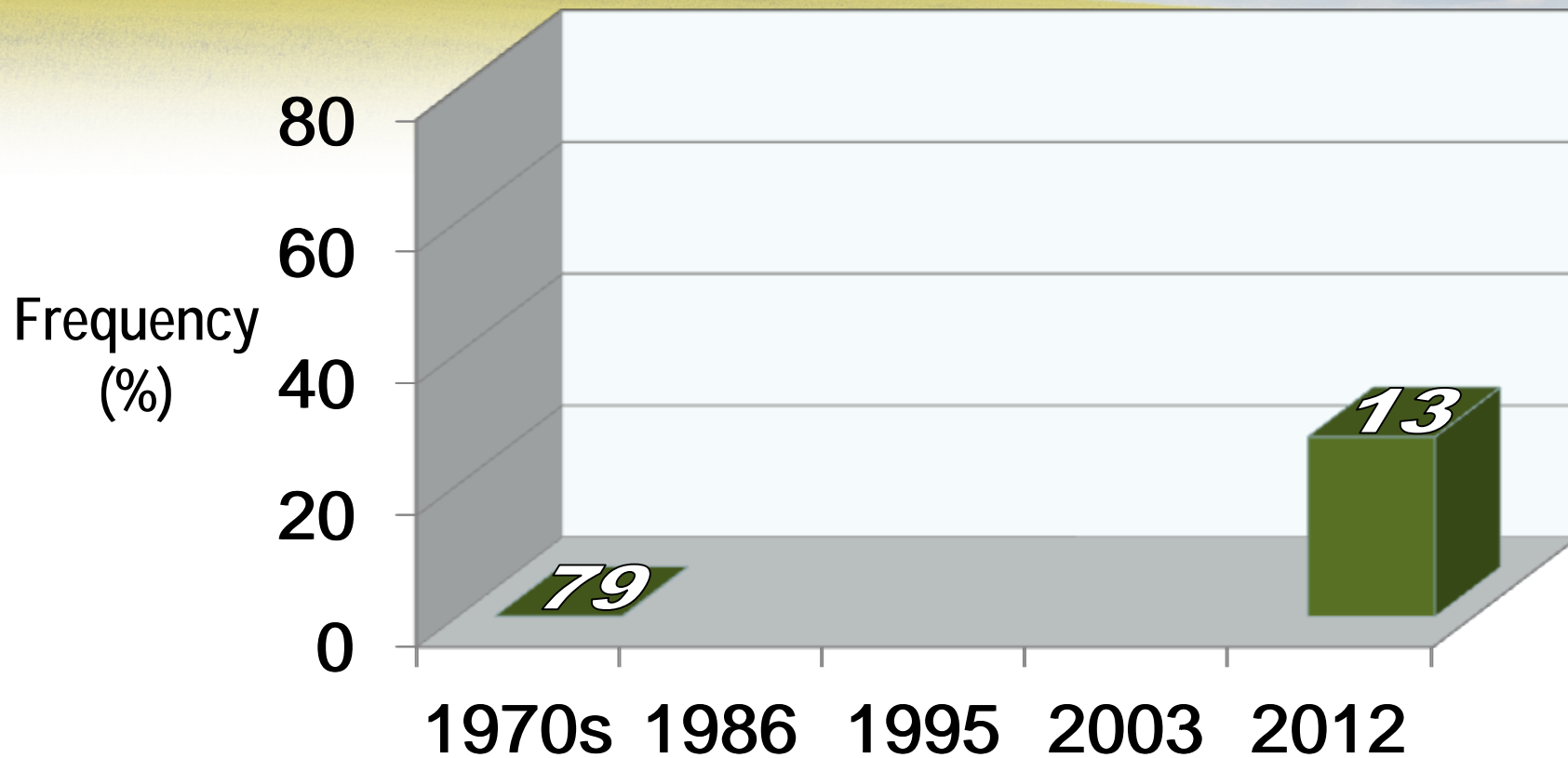
Frequency


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#13 Willowherb Species

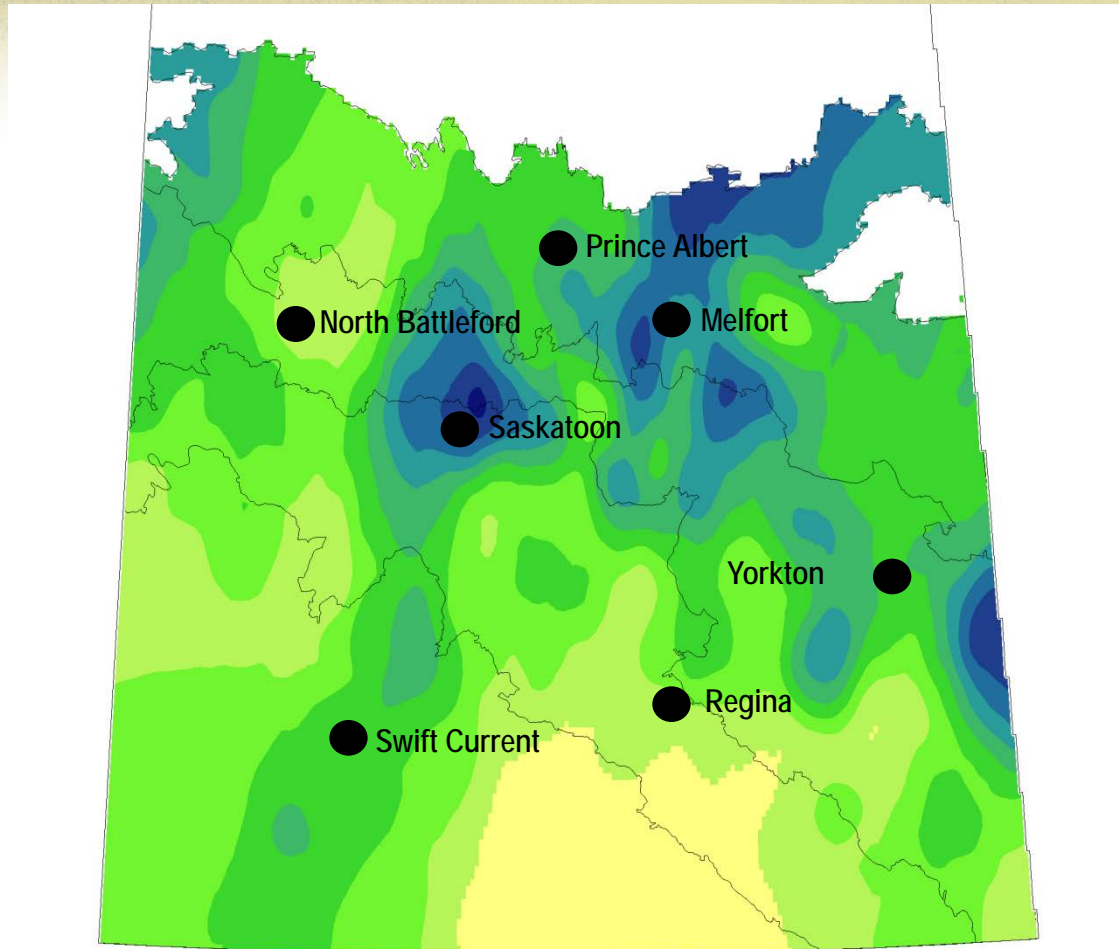


#13 Willowherb Species













Rank based on:  Relative Abundance

#13 Willowherb Species



2012

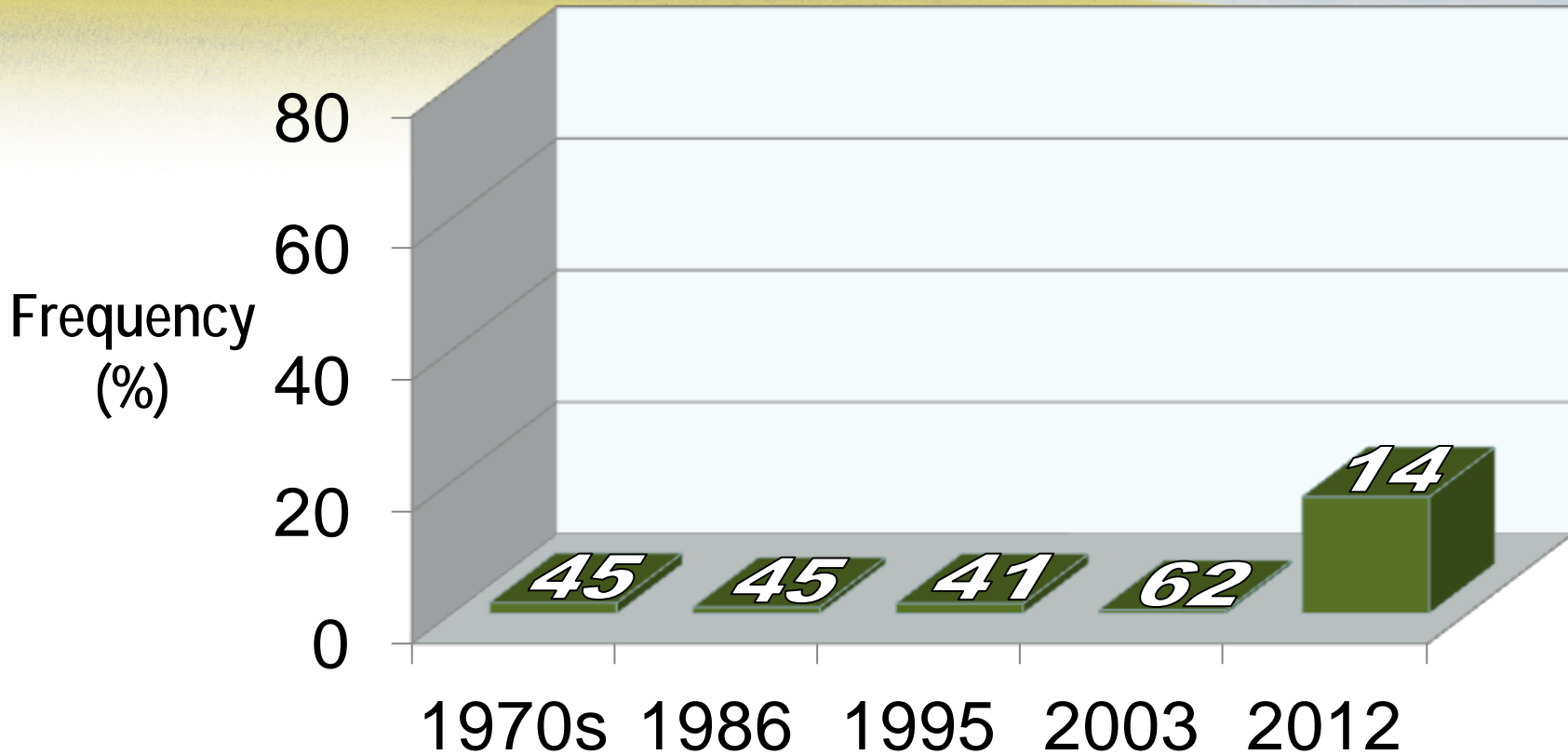
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#14 Broad-leaved Plantain

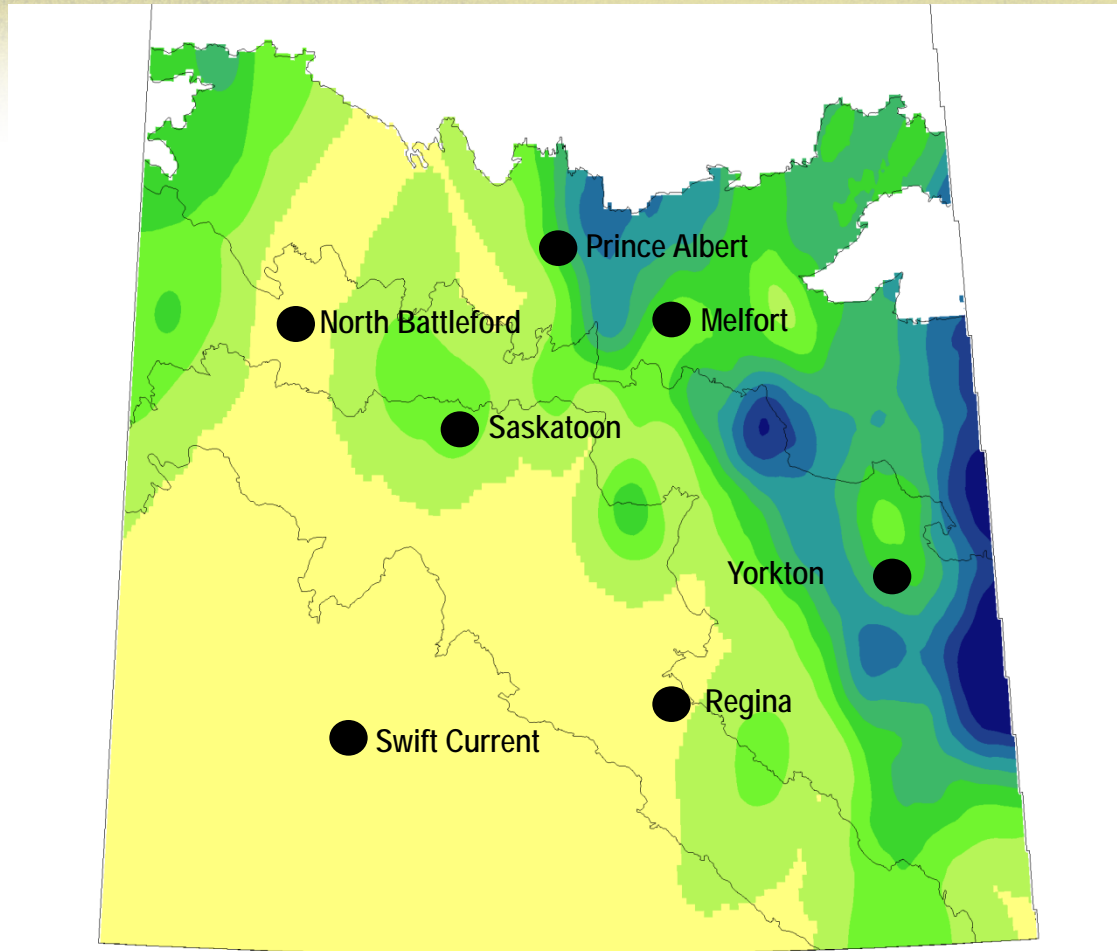


#14 Broad-leaved Plantain













Rank based on:  Relative Abundance

#14 Broad-leaved Plantain



2012

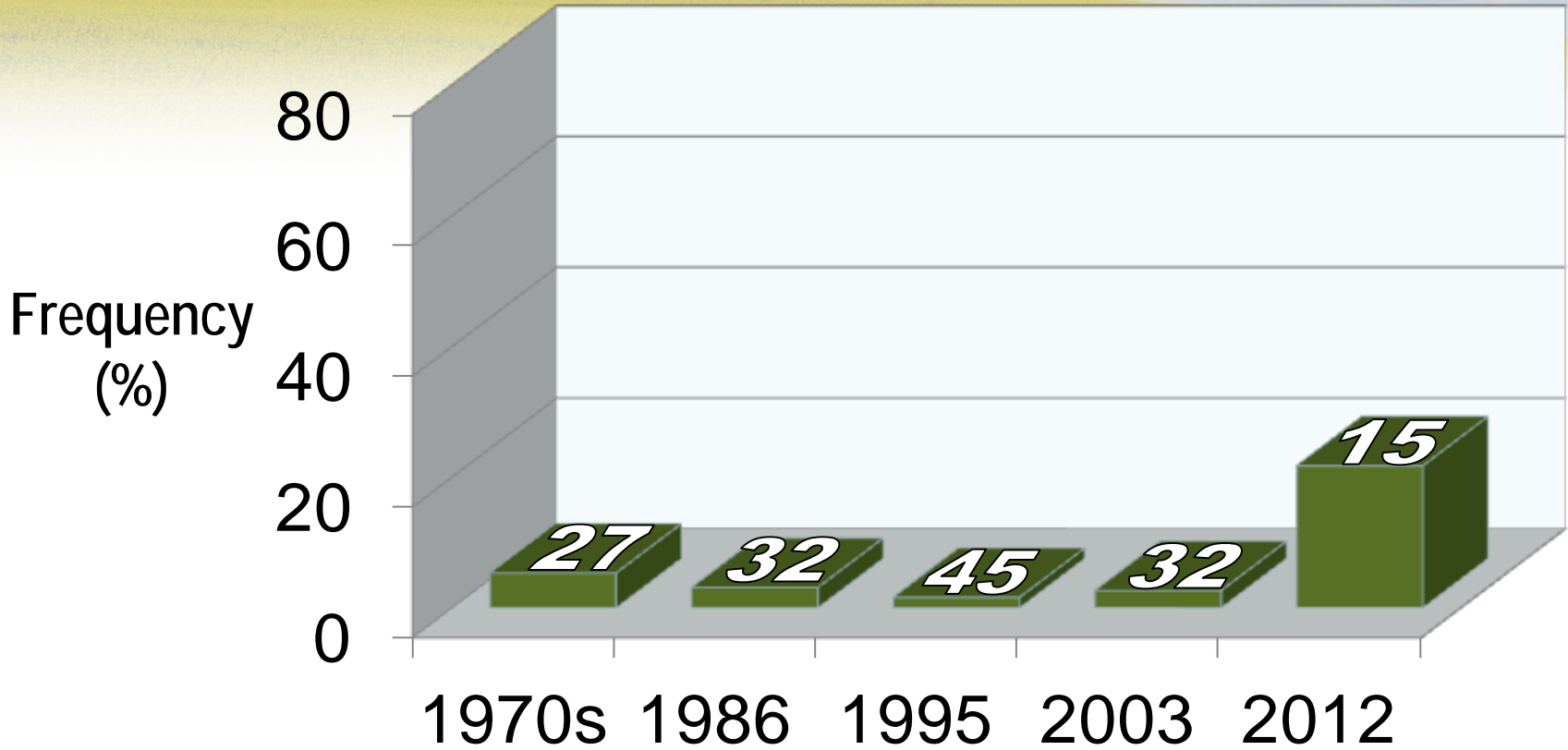
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#15 Biennial Wormwood

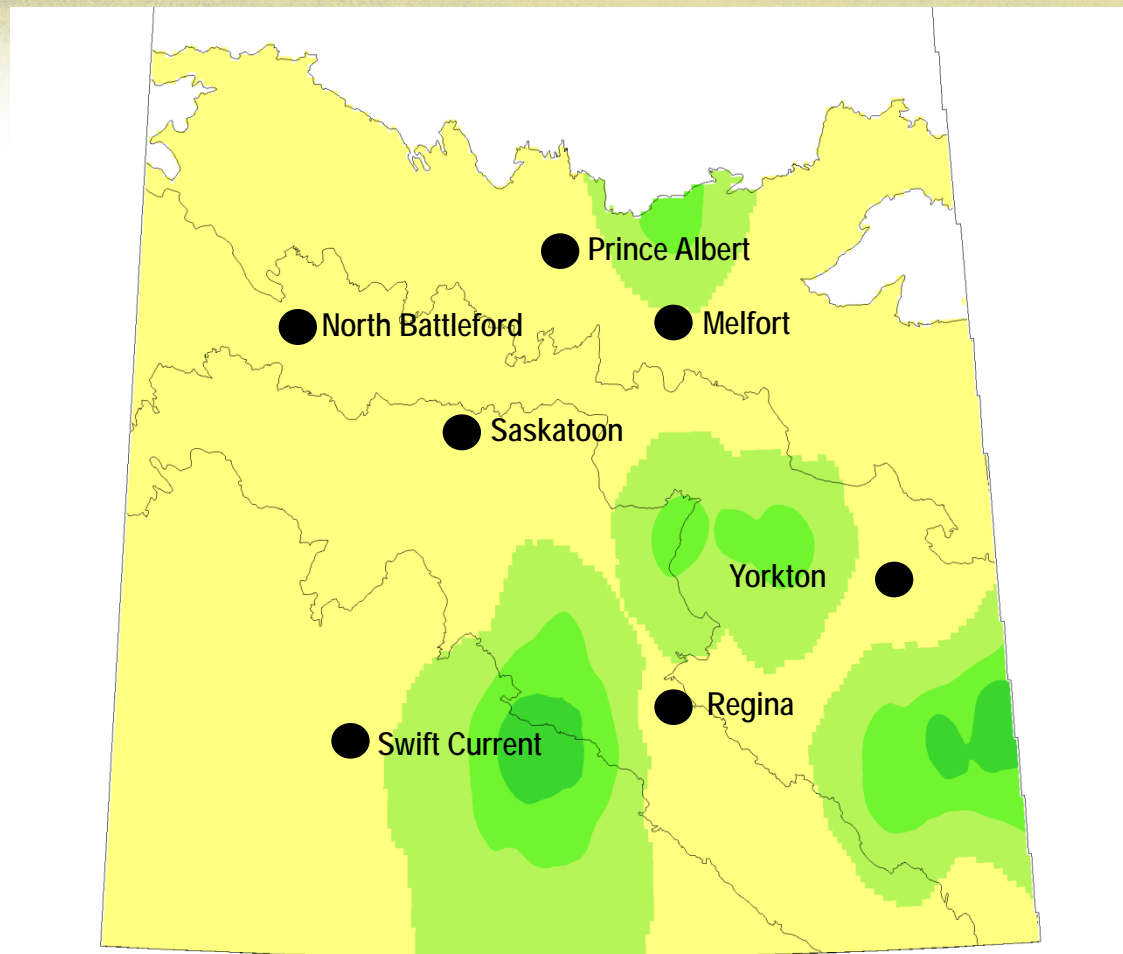


#15 Biennial Wormwood













Rank based on:  Relative Abundance

#15 Biennial Wormwood

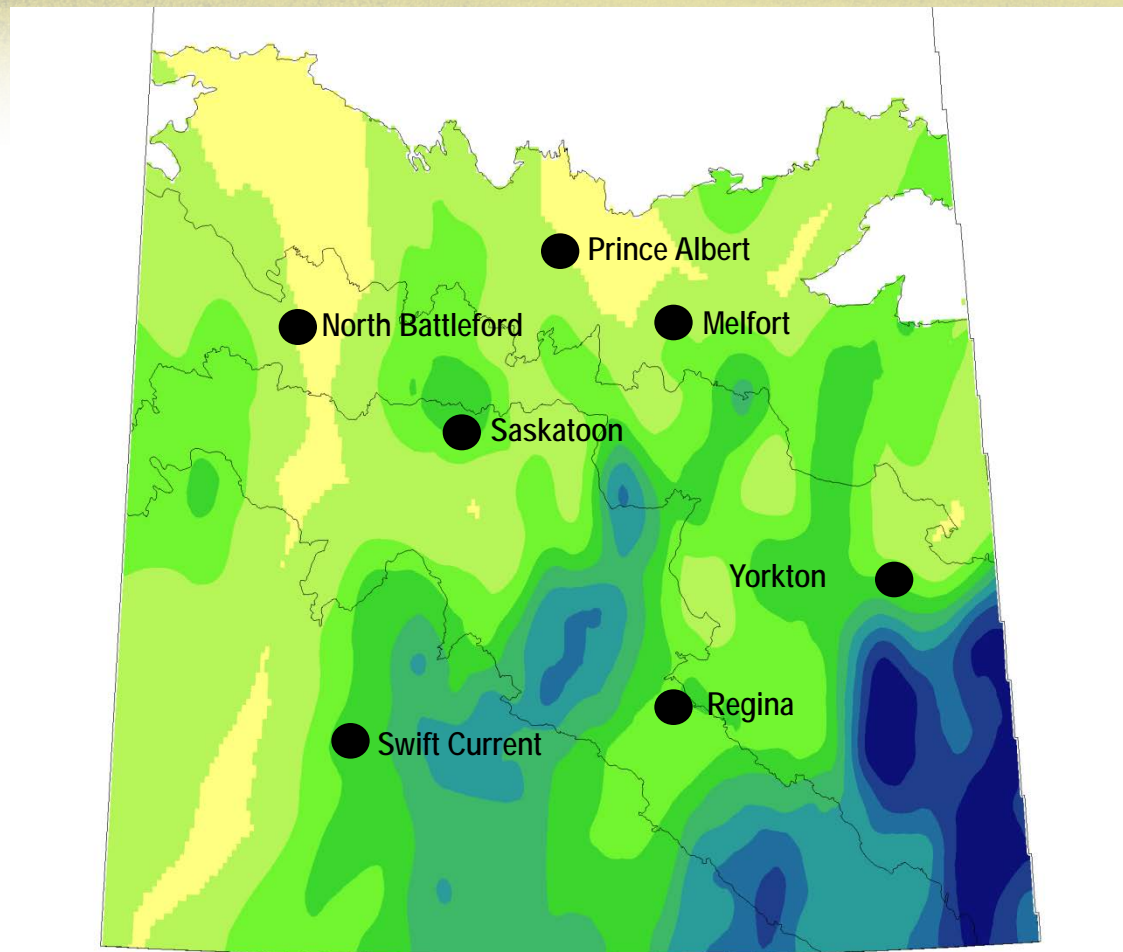


2003

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#15 Biennial Wormwood

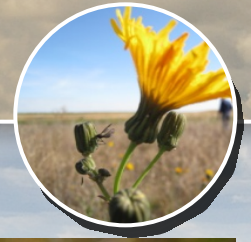


2012

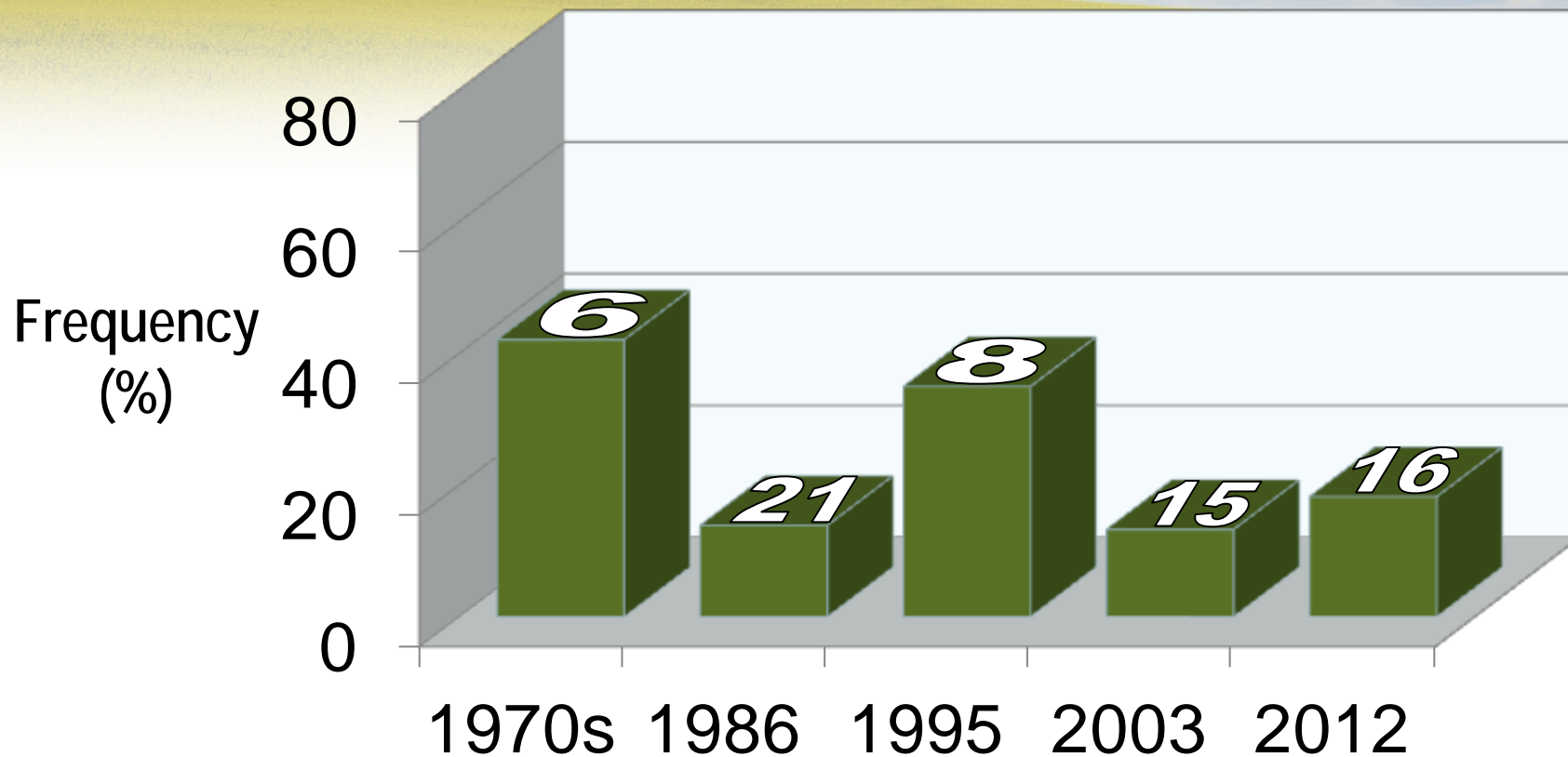
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#16 Perennial Sow-thistle



#16 Perennial Sow-thistle



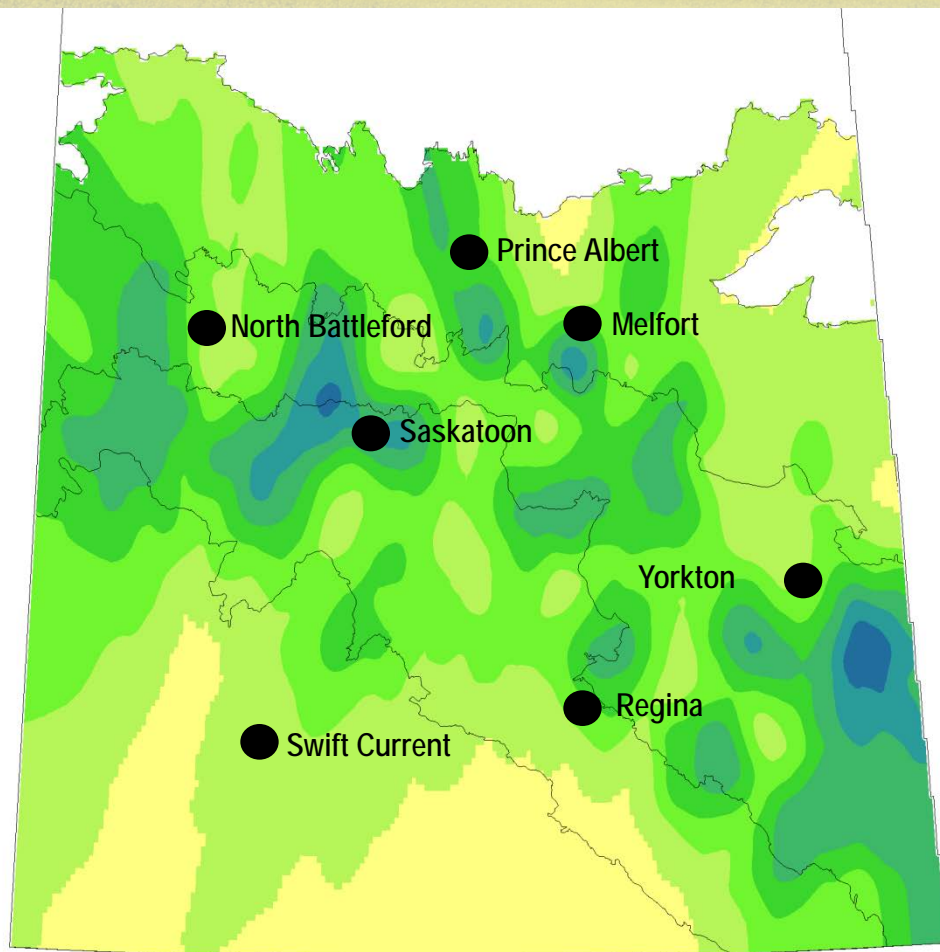
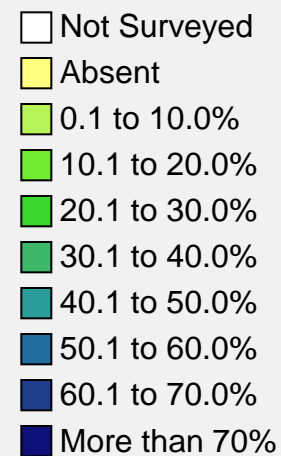
Rank based on:  Relative Abundance

#16 Perennial Sow-thistle

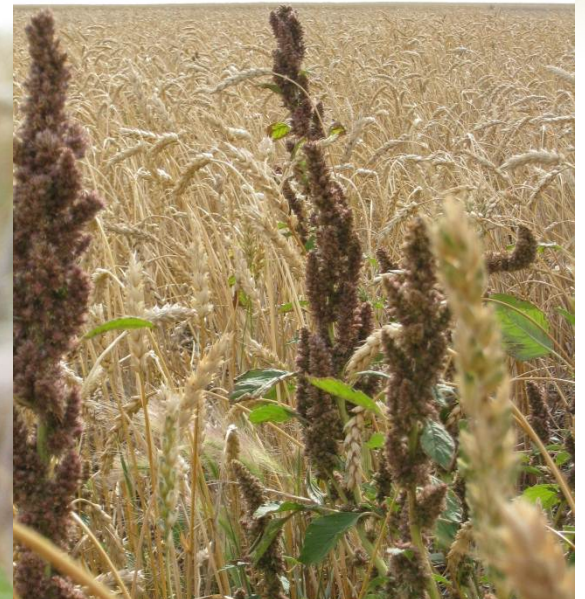


2012

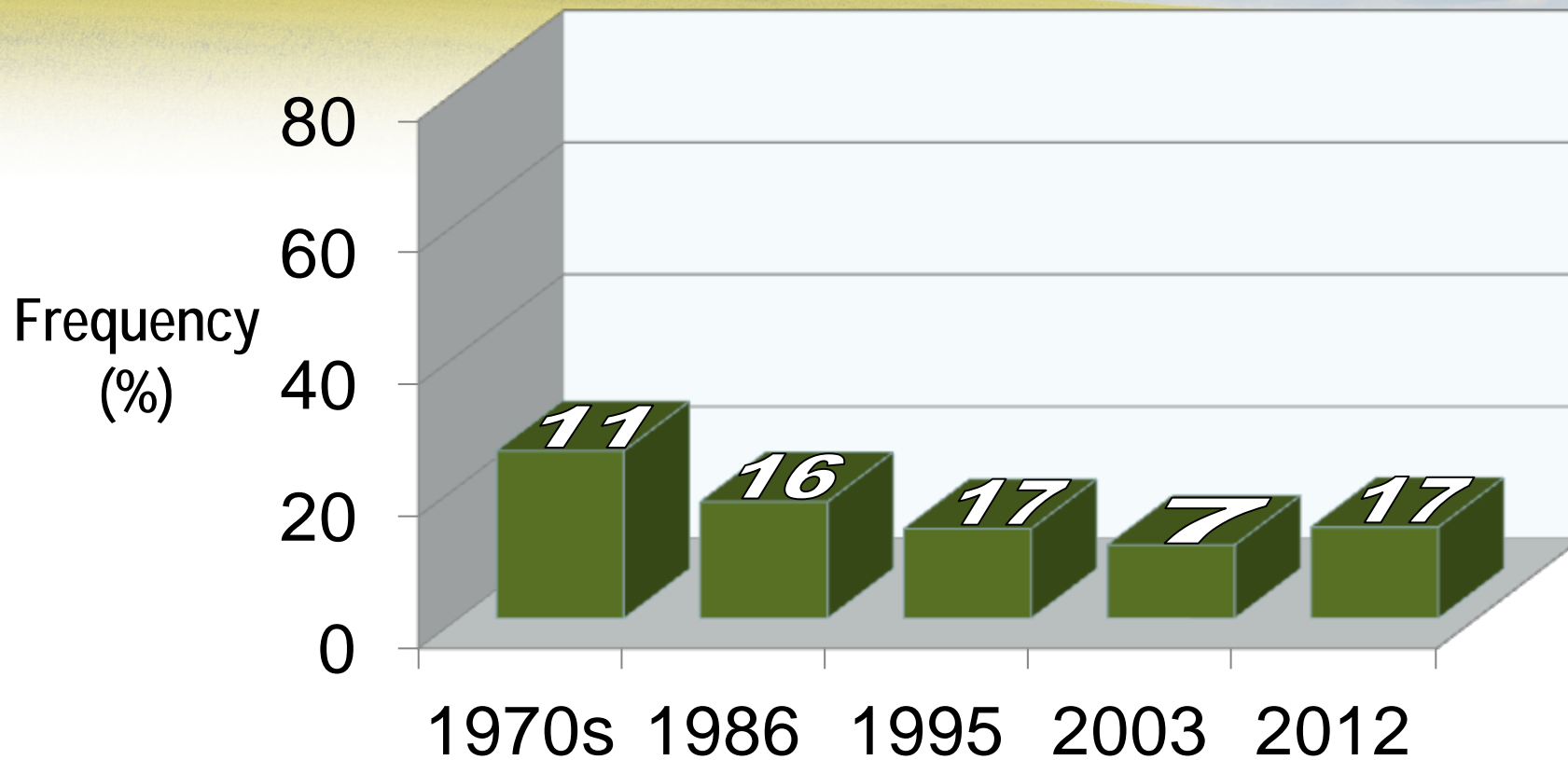
Frequency




#17 Redroot Pigweed



#17 Redroot Pigweed













Rank based on:  Relative Abundance

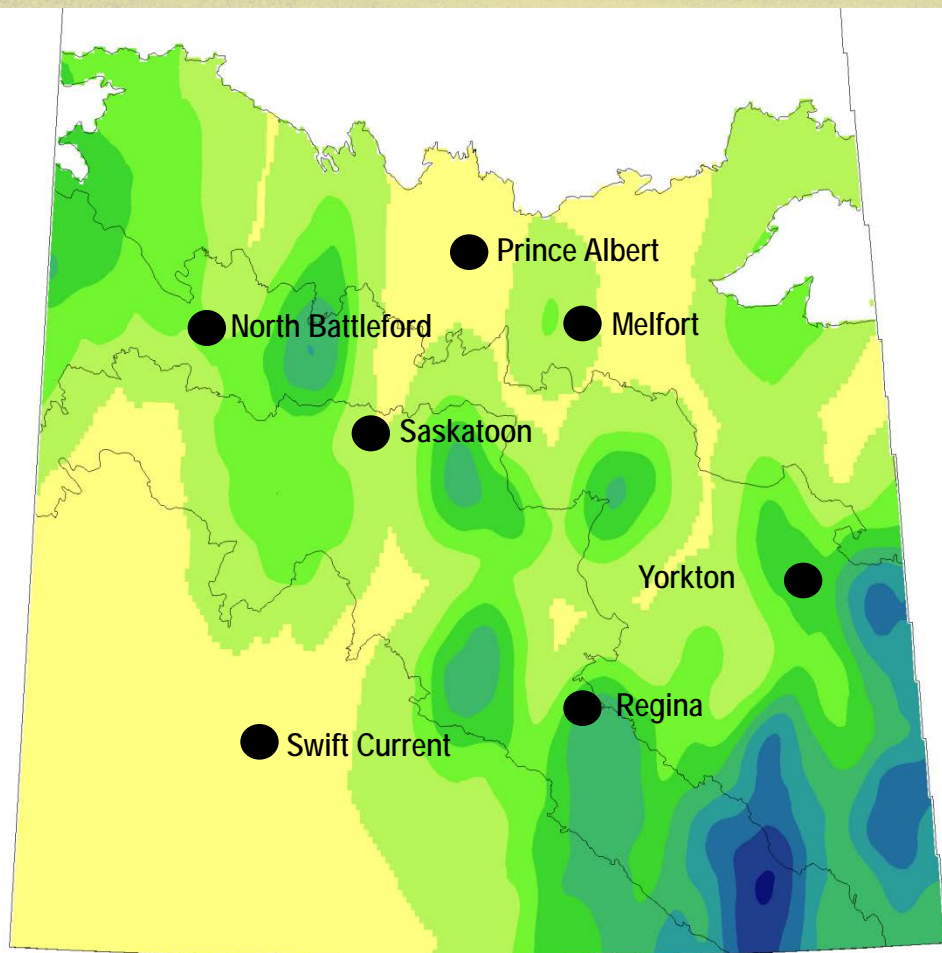
#17 Redroot Pigweed



2012

Frequency

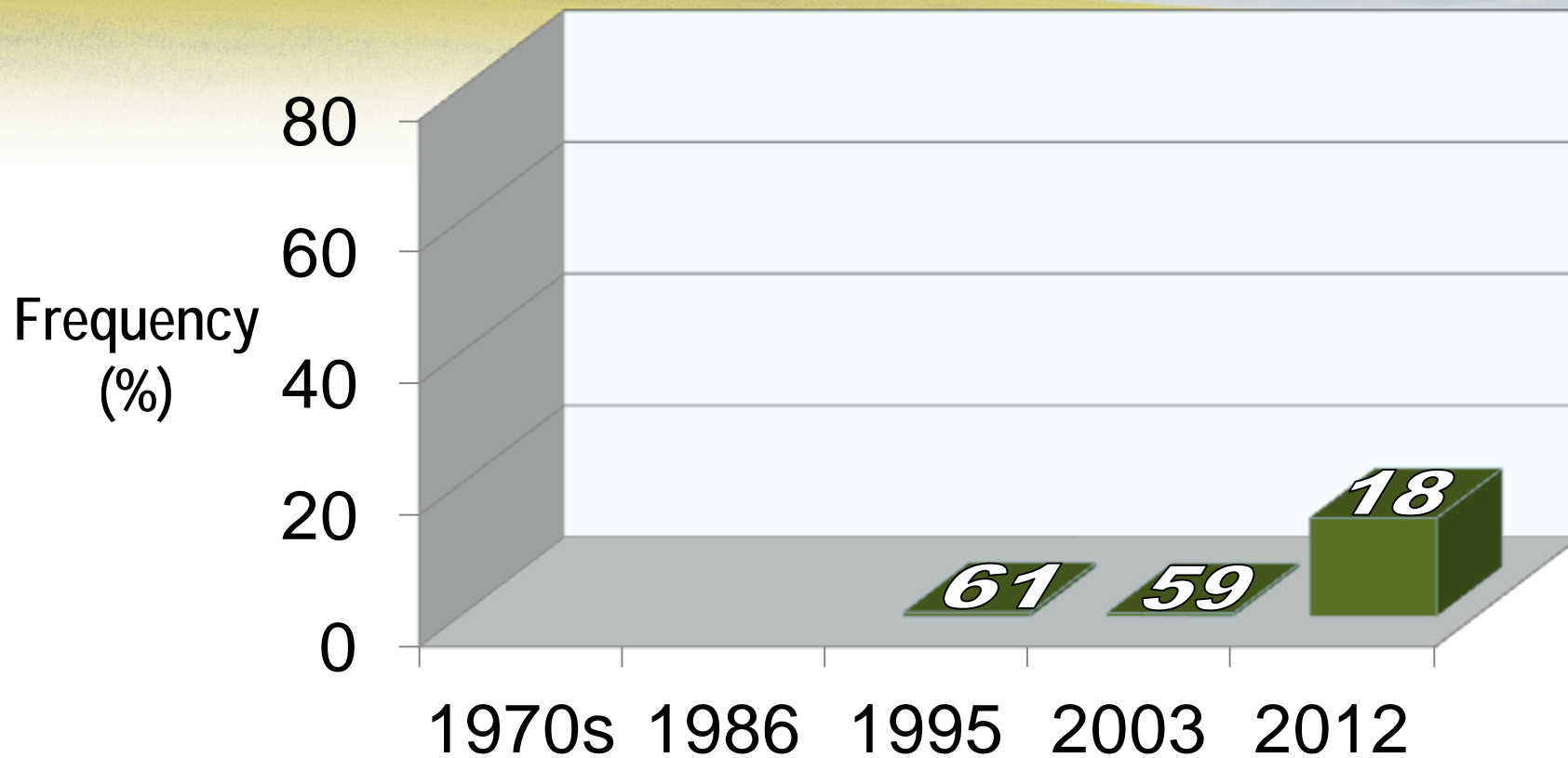
-  Not Surveyed
-  Absent
-  0.1 to 10.0%
-  10.1 to 20.0%
-  20.1 to 30.0%
-  30.1 to 40.0%
-  40.1 to 50.0%
-  50.1 to 60.0%
-  60.1 to 70.0%
-  More than 70%



#18 Foxtail Barley

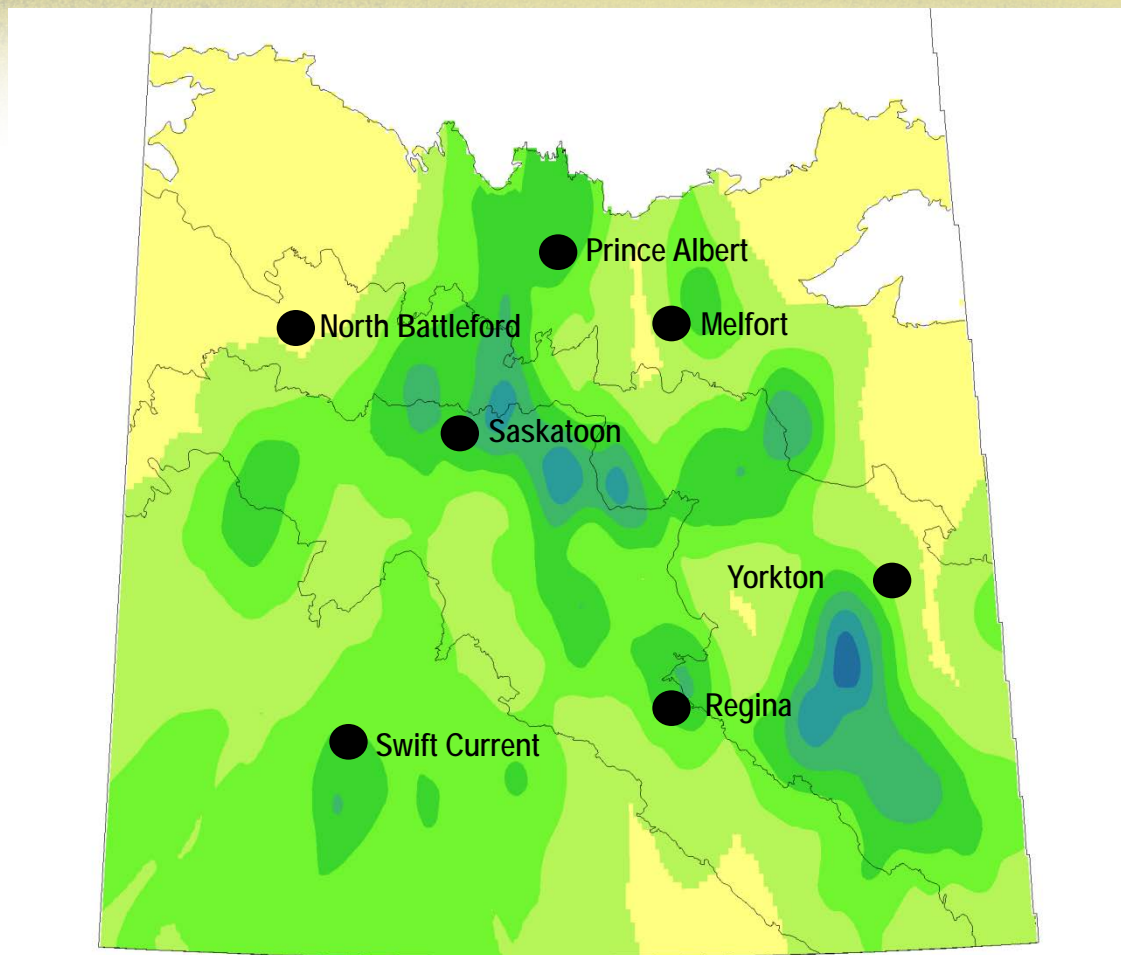


#18 Foxtail Barley













Rank based on:  Relative Abundance

#18 Foxtail Barley



2012

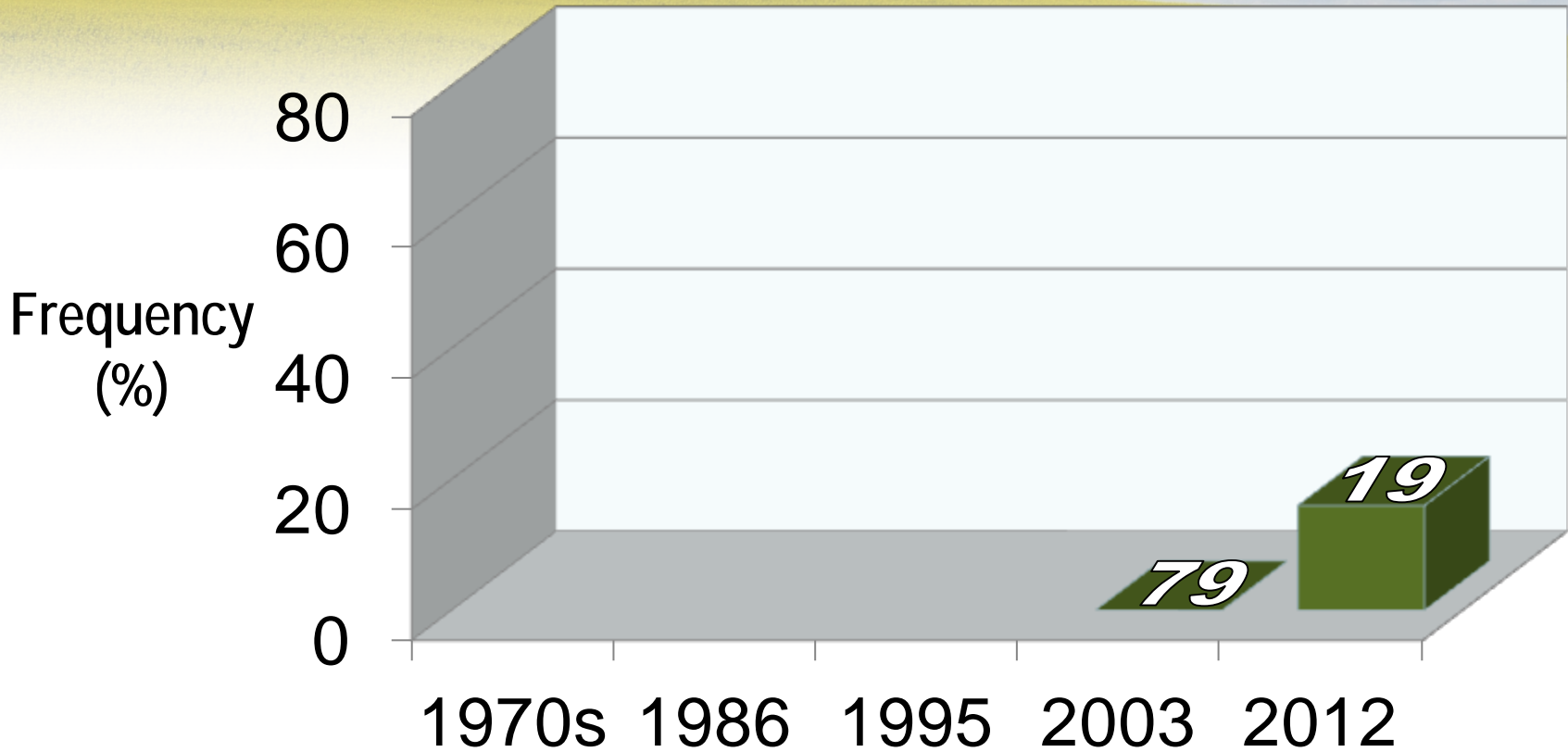
Frequency

-  Not Surveyed
-  Absent
-  0.1 to 10.0%
-  10.1 to 20.0%
-  20.1 to 30.0%
-  30.1 to 40.0%
-  40.1 to 50.0%
-  50.1 to 60.0%
-  60.1 to 70.0%
-  More than 70%

#19 Marsh Cudweed

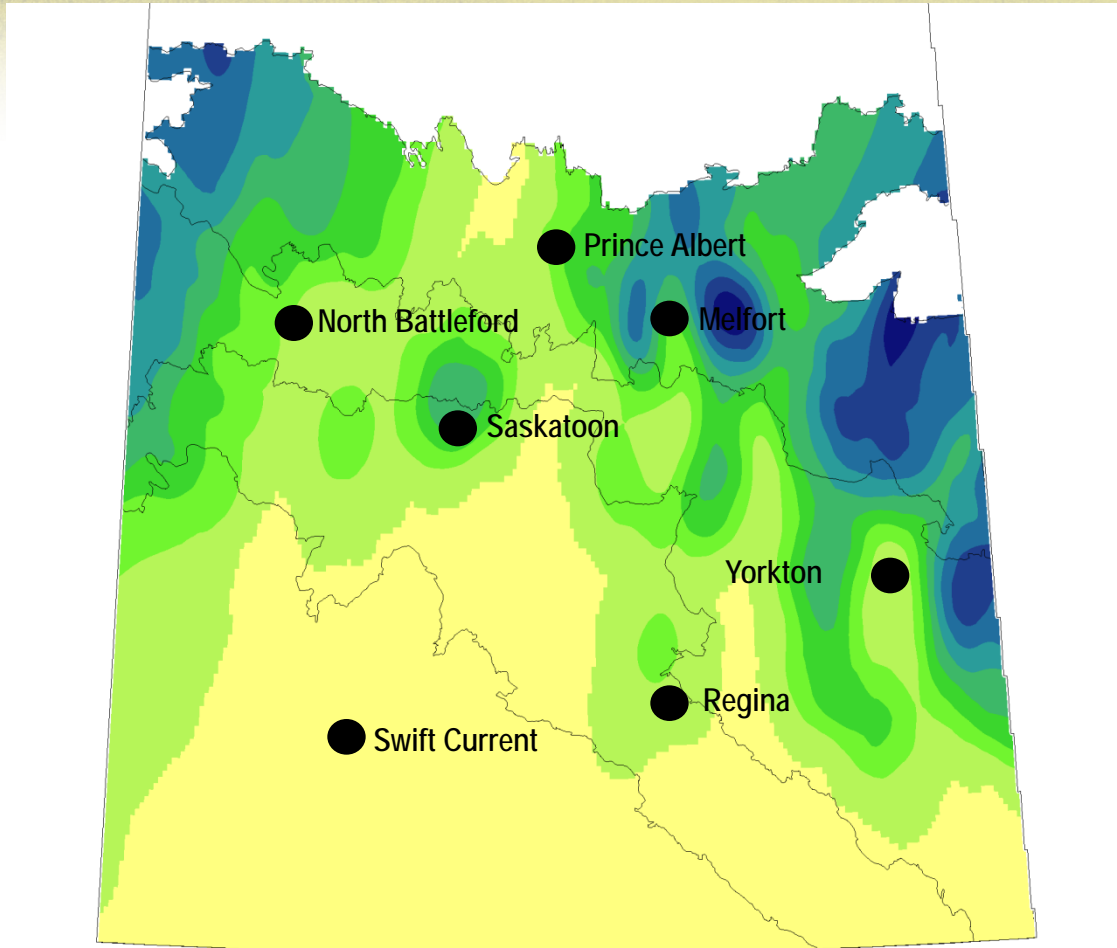


#19 Marsh Cudweed













Rank based on:  Relative Abundance

#19 Marsh Cudweed



2012

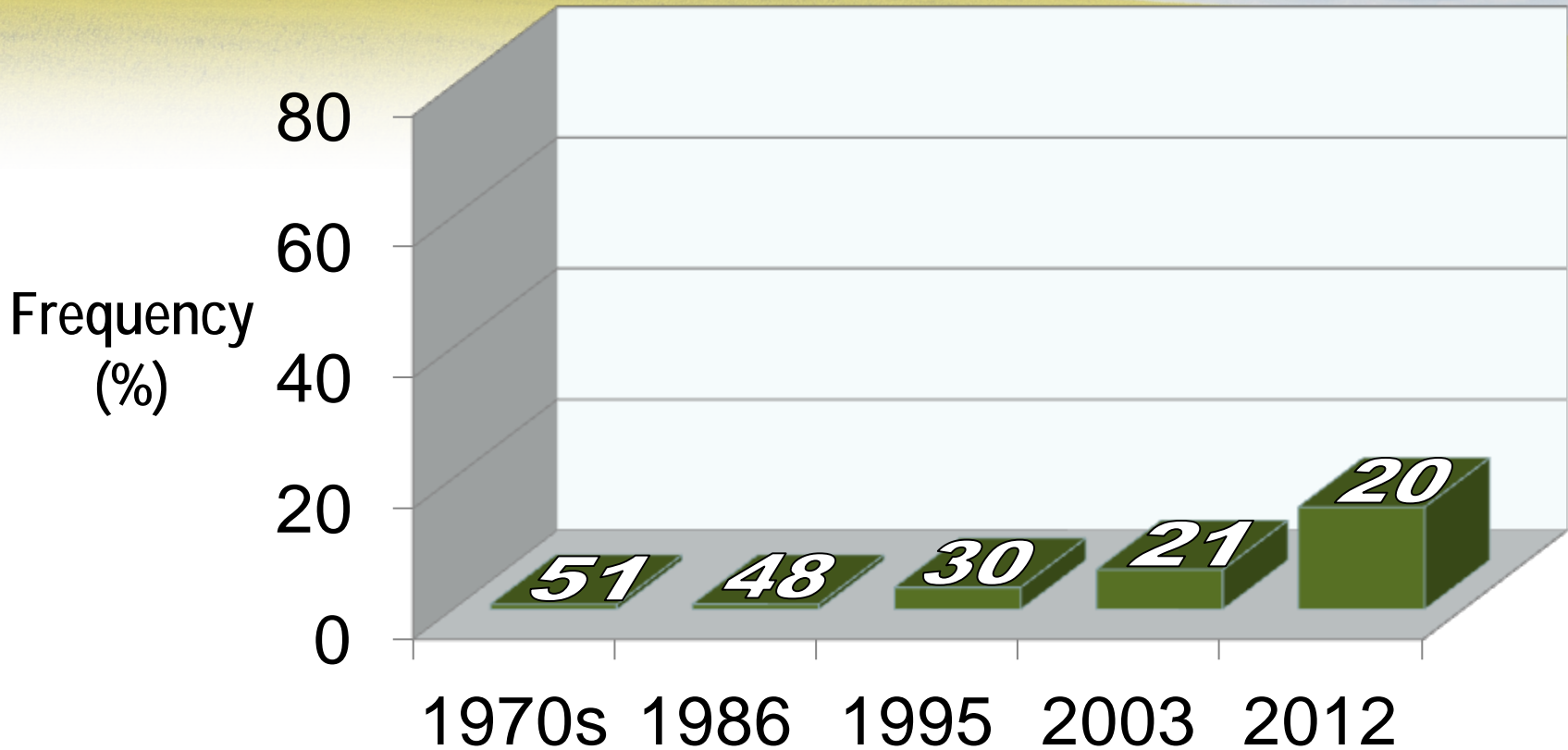
Frequency

-  Not Surveyed
-  Absent
-  0.1 to 10.0%
-  10.1 to 20.0%
-  20.1 to 30.0%
-  30.1 to 40.0%
-  40.1 to 50.0%
-  50.1 to 60.0%
-  60.1 to 70.0%
-  More than 70%

#20 Round-leaved Mallow



#20 Round-leaved Mallow













Rank based on:  Relative Abundance

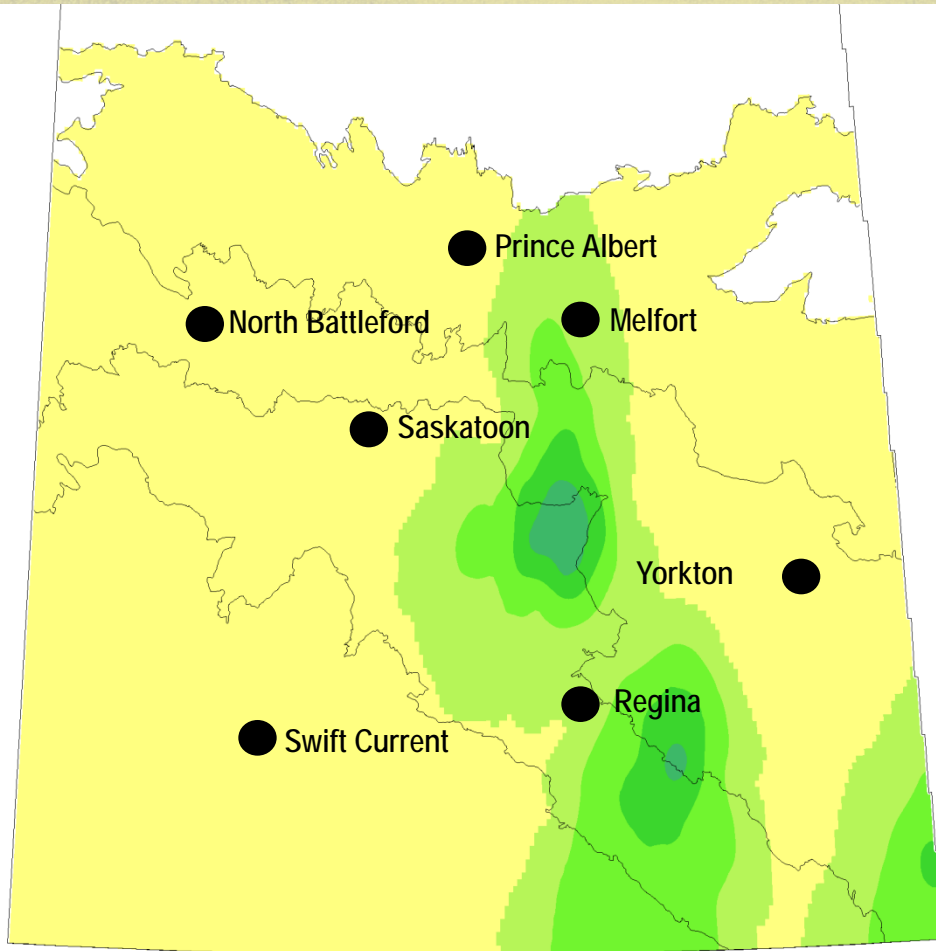
#20 Round-leaved Mallow



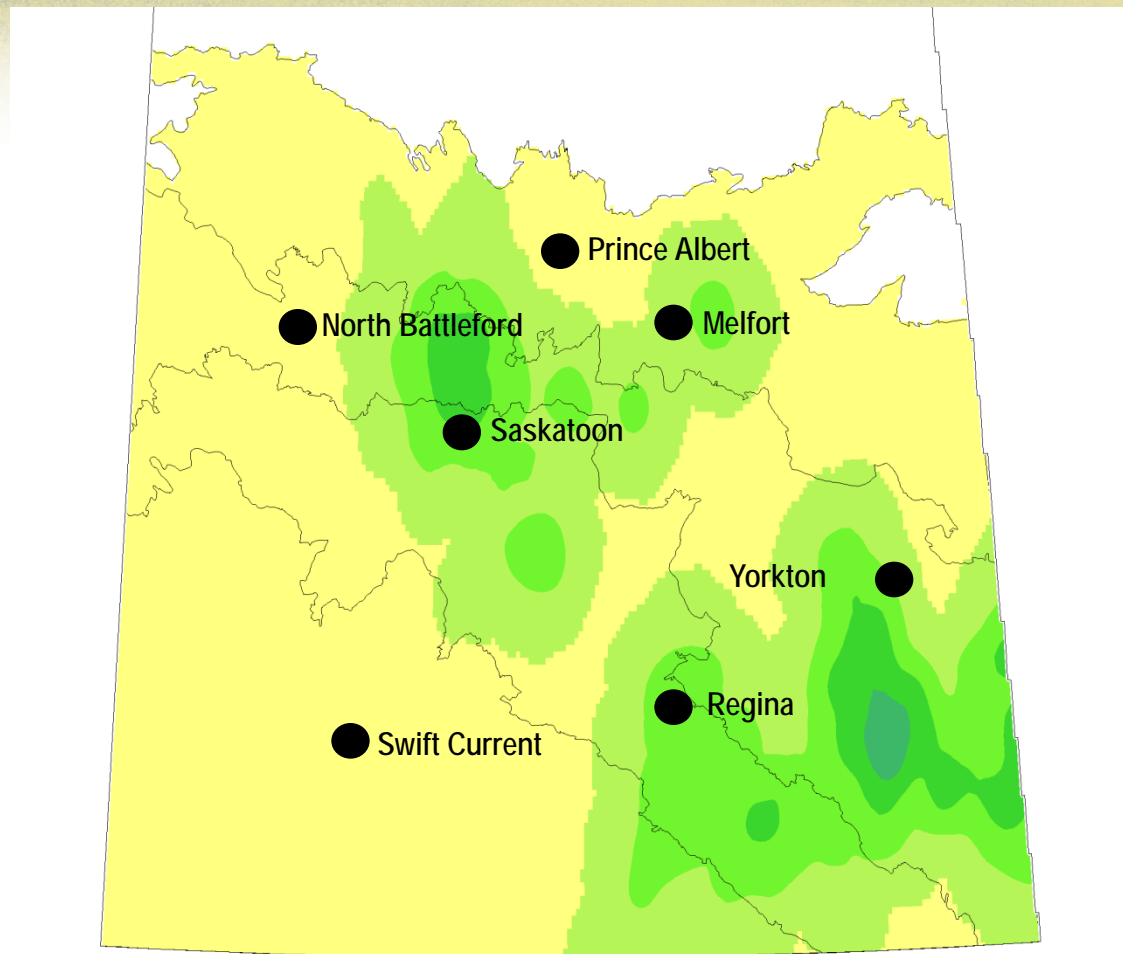
1995

Frequency

-  Not Surveyed
-  Absent
-  0.1 to 10.0%
-  10.1 to 20.0%
-  20.1 to 30.0%
-  30.1 to 40.0%
-  40.1 to 50.0%
-  50.1 to 60.0%
-  60.1 to 70.0%
-  More than 70%



#20 Round-leaved Mallow

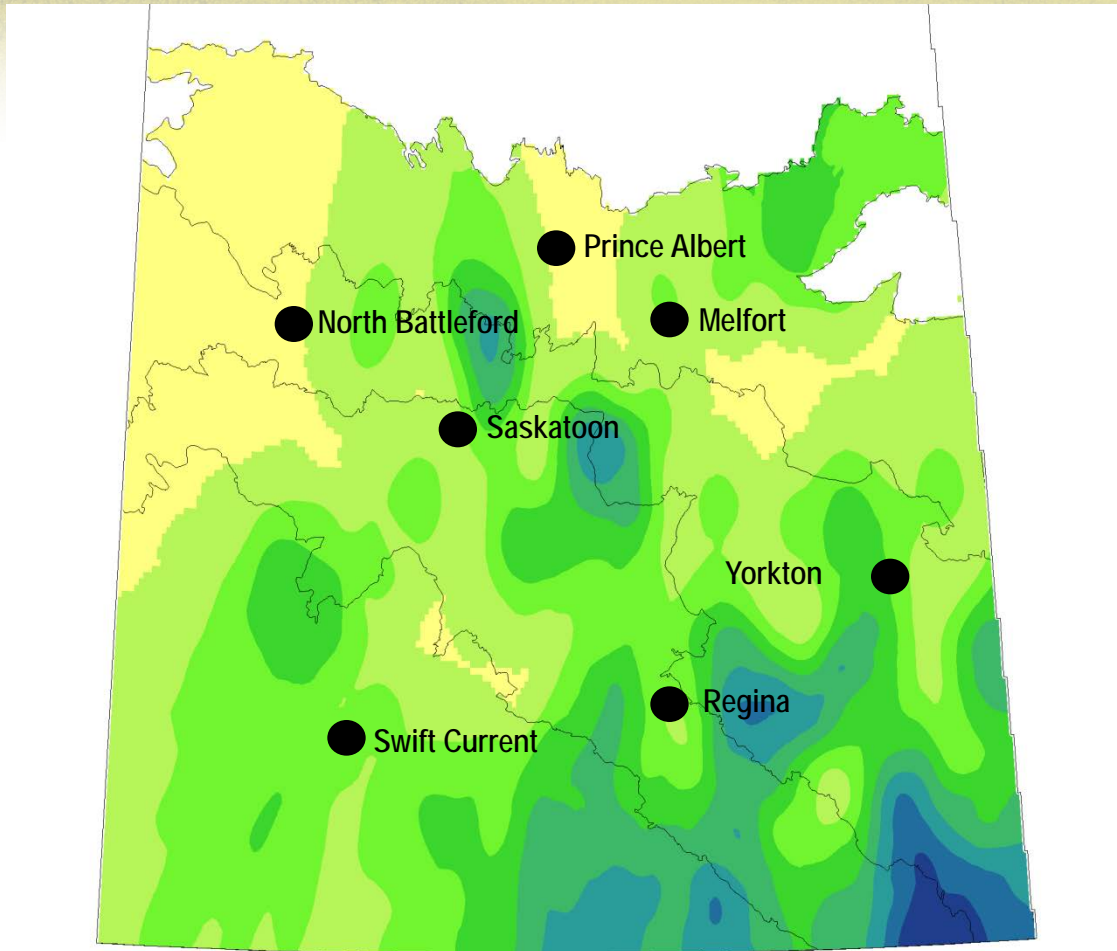


2003

Frequency











- Not Surveyed
- Absent
- 0.1 to 10.0%
- 10.1 to 20.0%
- 20.1 to 30.0%
- 30.1 to 40.0%
- 40.1 to 50.0%
- 50.1 to 60.0%
- 60.1 to 70.0%
- More than 70%

#20 Round-leaved Mallow



2012

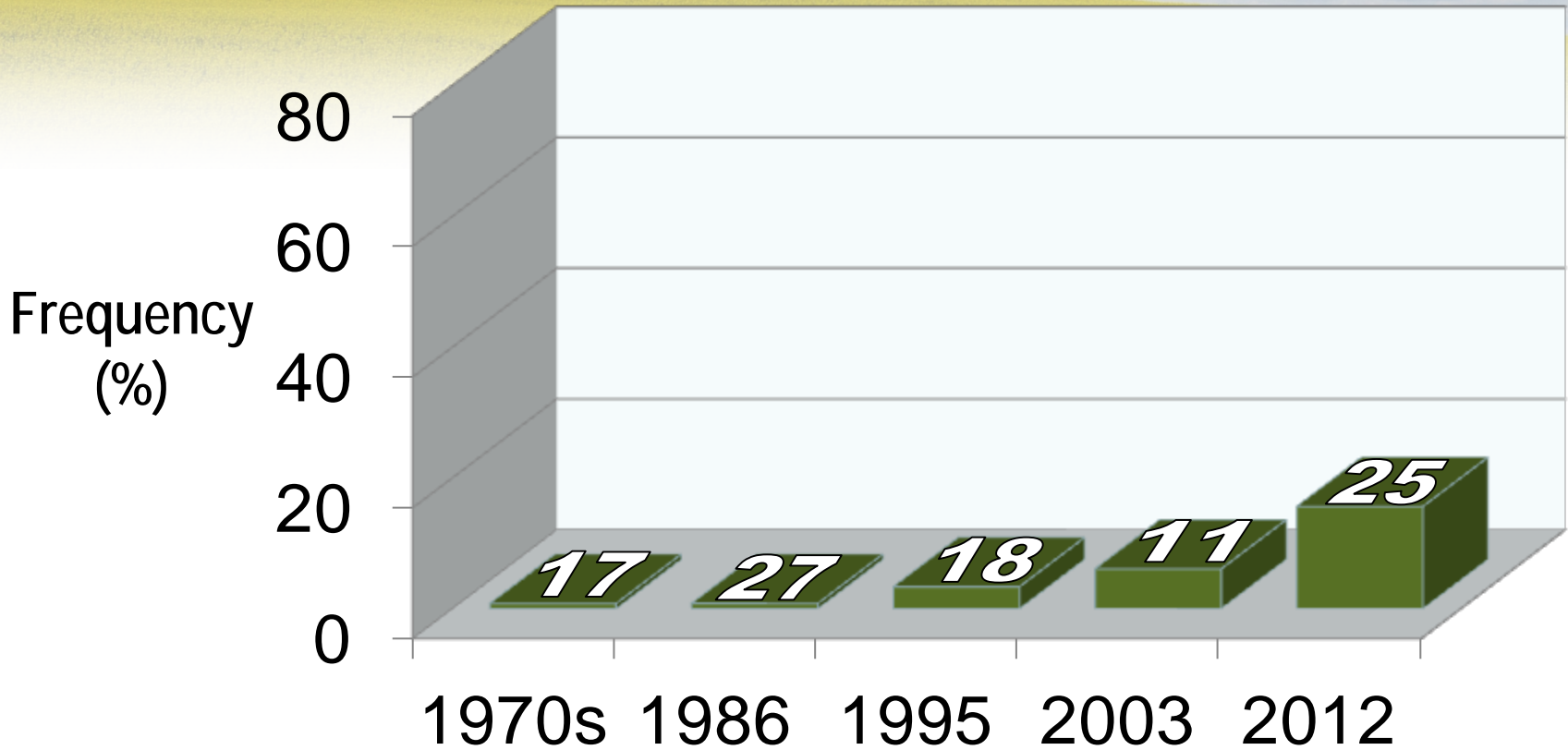
Frequency


-  Not Surveyed
-  Absent
-  0.1 to 10.0%
-  10.1 to 20.0%
-  20.1 to 30.0%
-  30.1 to 40.0%
-  40.1 to 50.0%
-  50.1 to 60.0%
-  60.1 to 70.0%
-  More than 70%

#25 Kochia

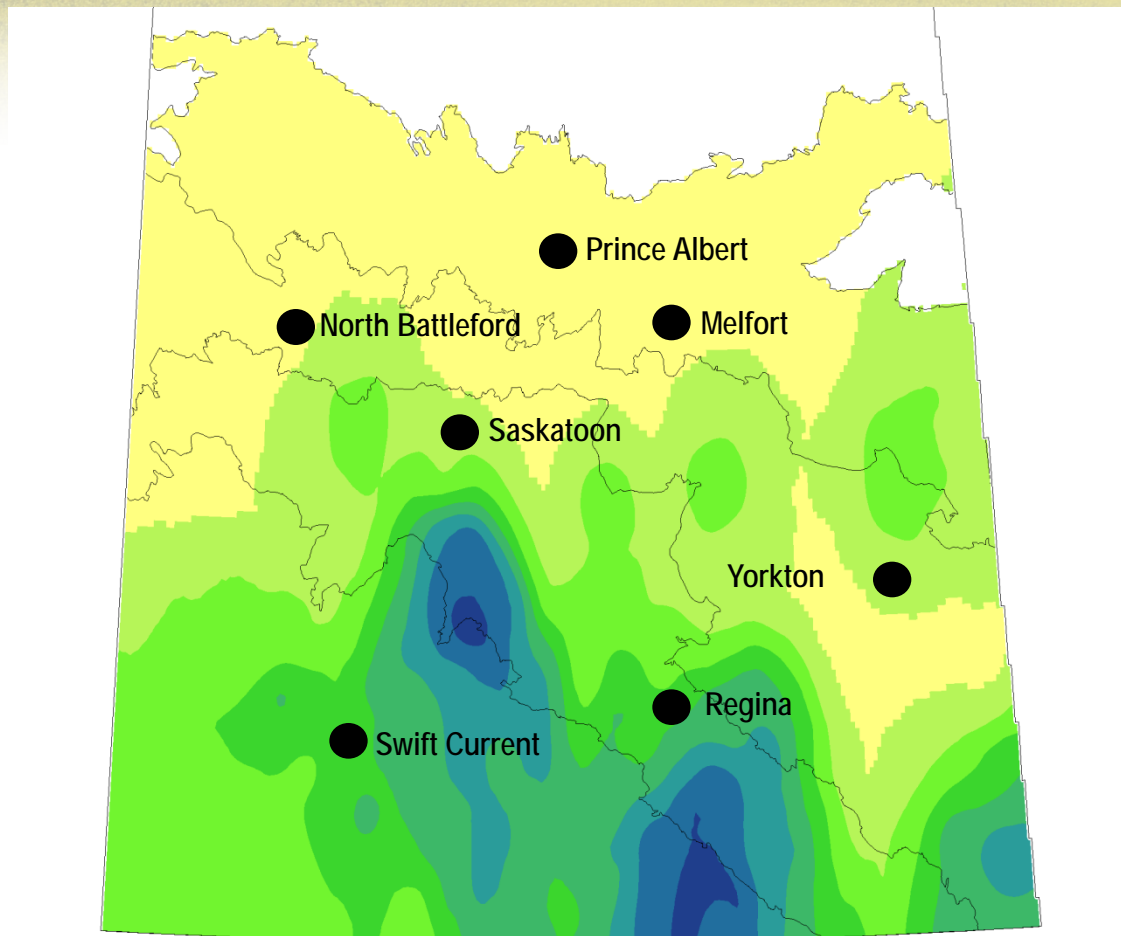


#25 Kochia













Rank based on:  Relative Abundance

#25 Kochia

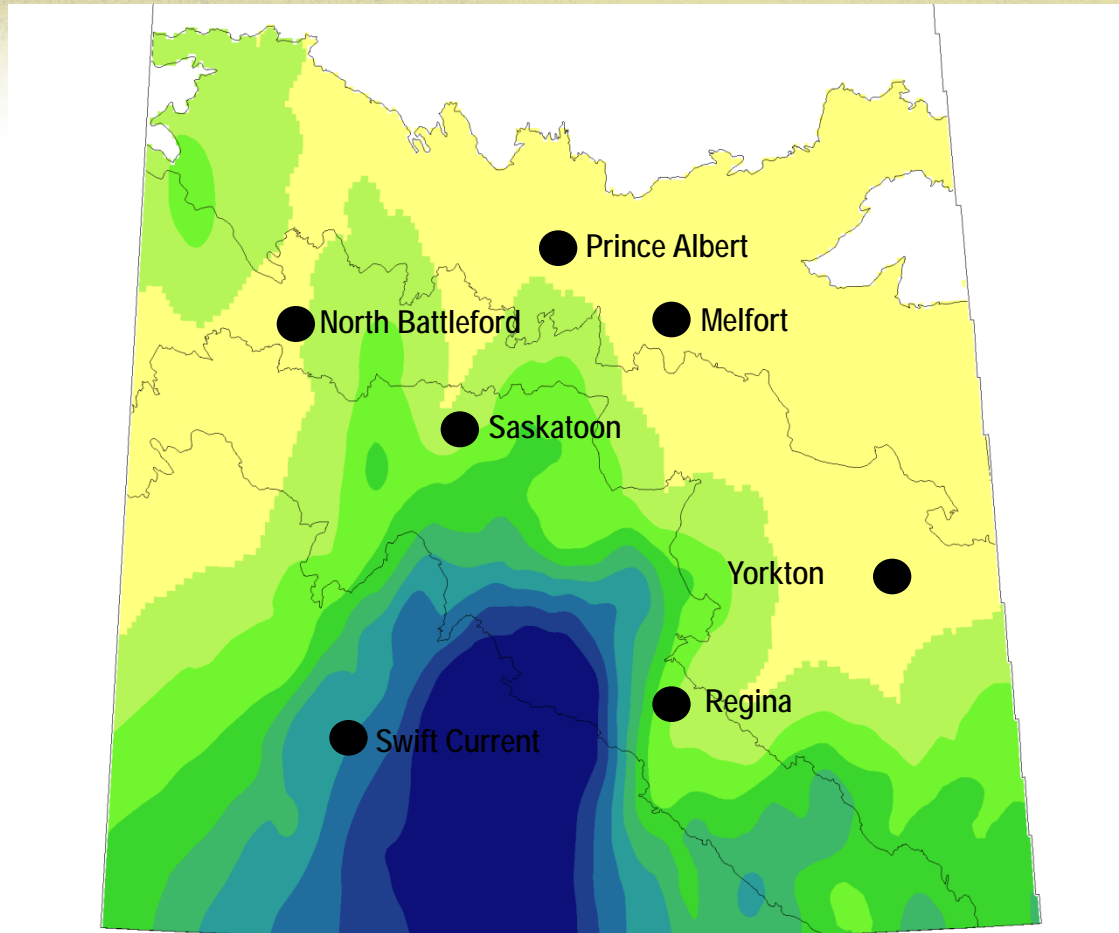


1995

Frequency











-  Not Surveyed
-  Absent
-  0.1 to 10.0%
-  10.1 to 20.0%
-  20.1 to 30.0%
-  30.1 to 40.0%
-  40.1 to 50.0%
-  50.1 to 60.0%
-  60.1 to 70.0%
-  More than 70%

#25 Kochia

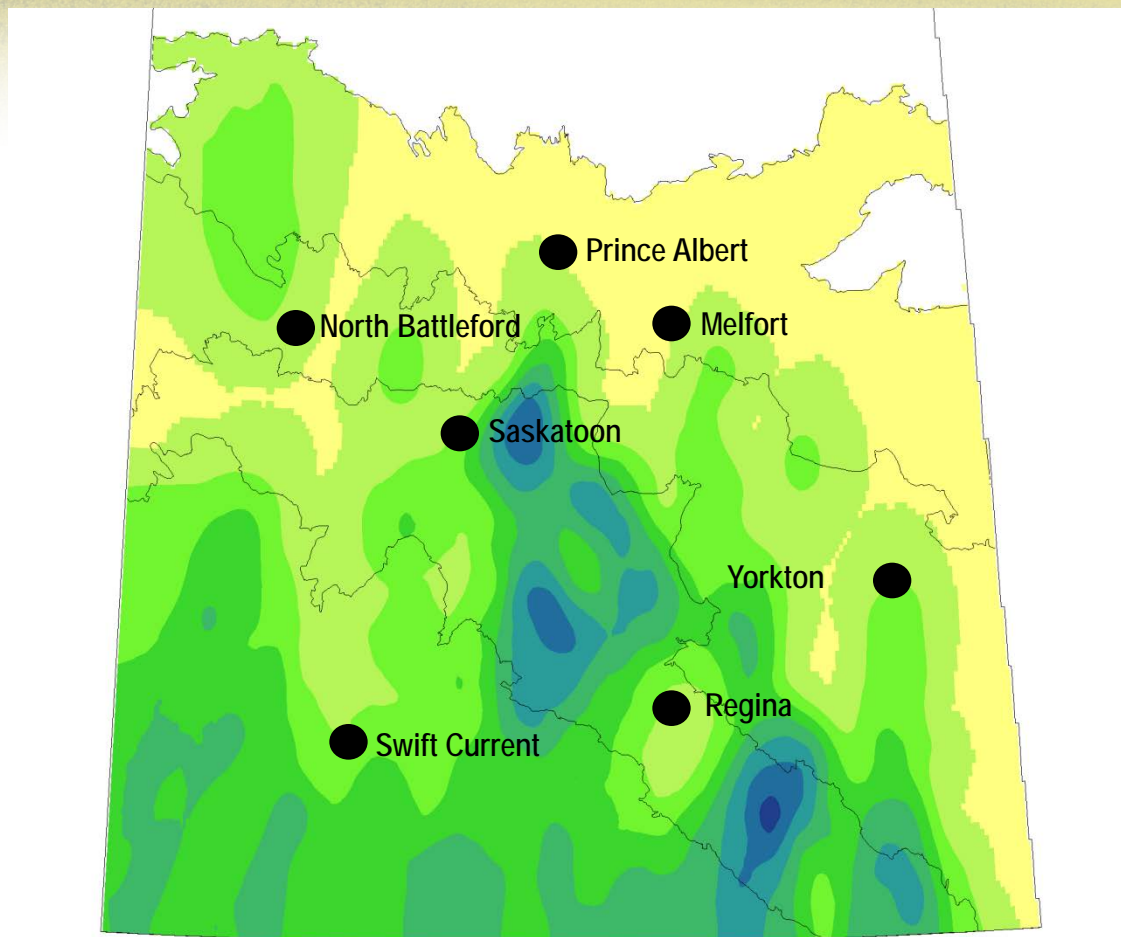


2003

Frequency











-  Not Surveyed
-  Absent
-  0.1 to 10.0%
-  10.1 to 20.0%
-  20.1 to 30.0%
-  30.1 to 40.0%
-  40.1 to 50.0%
-  50.1 to 60.0%
-  60.1 to 70.0%
-  More than 70%

#25 Kochia



2012

Frequency

-  Not Surveyed
-  Absent
-  0.1 to 10.0%
-  10.1 to 20.0%
-  20.1 to 30.0%
-  30.1 to 40.0%
-  40.1 to 50.0%
-  50.1 to 60.0%
-  60.1 to 70.0%
-  More than 70%

Summary

- Wet conditions in 2012 led to weedier fields due to difficulties with timing of in-crop herbicide applications
- Allows a good representation of geographic distribution of weed species
- Several species increasing since 1970s including: wild buckwheat, spiny annual sow-thistle, cleavers, barnyard grass, biennial wormwood, foxtail barley and round-leaved mallow
- Species that are decreasing include lamb's-quarters, stinkweed, annual smartweed, field horsetail, wild mustard, Russian thistle, flixweed, bluebur, cow cockle
- Will be collecting management data to relate to weed data

Thank you to all the producers who agreed to let us survey your fields!





Canada