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Wetlands, Streams and Weeds Oh My!?

*Invasive Plant Species Trends from 21 Years
of Riparian Health Work*

Alberta Invasive Species Council Conference

March 8, 2023

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Cows and Fish



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RMA
RURAL MUNICIPALITIES
OF ALBERTA

Alberta Riparian Habitat Management Society

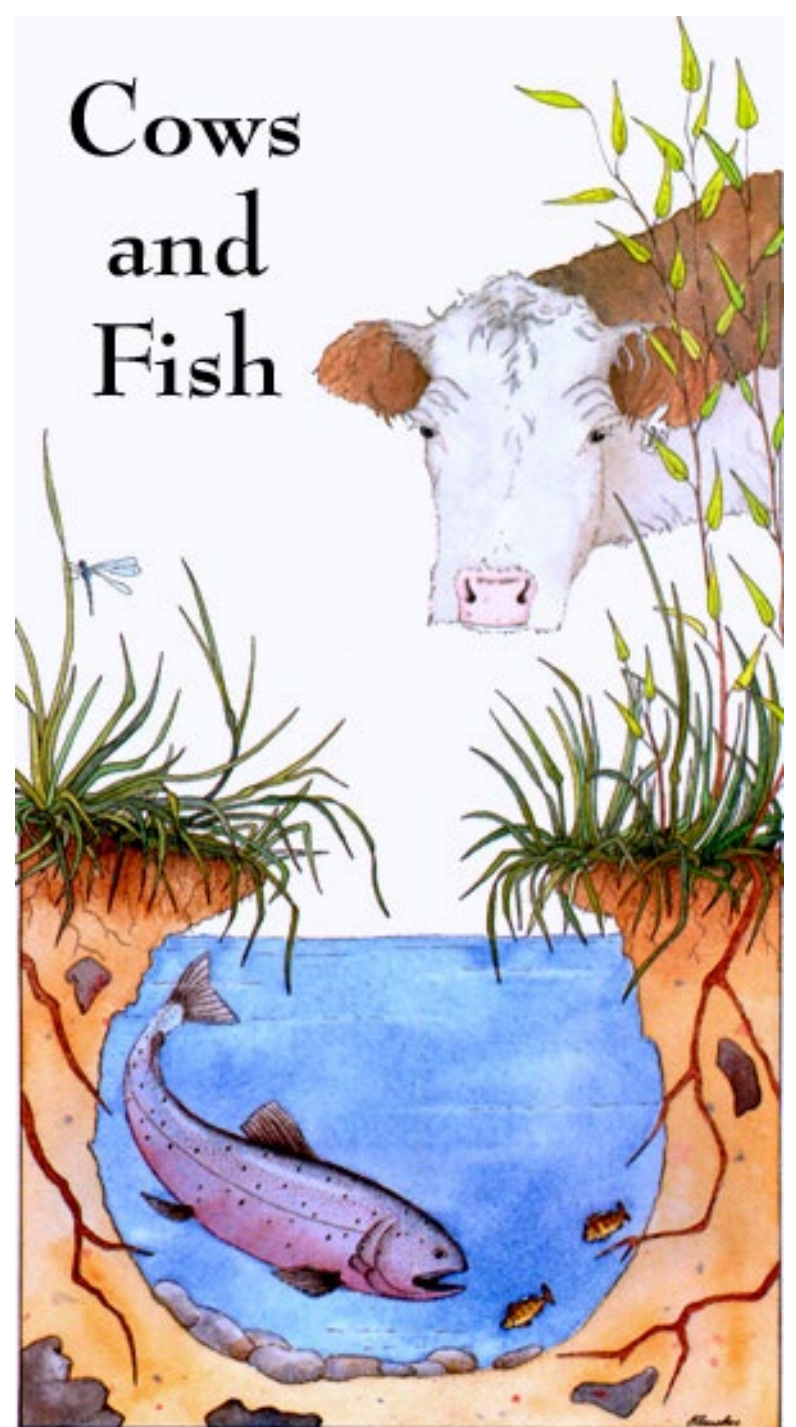
Our Vision

Healthy, functioning riparian areas
for the benefit of all

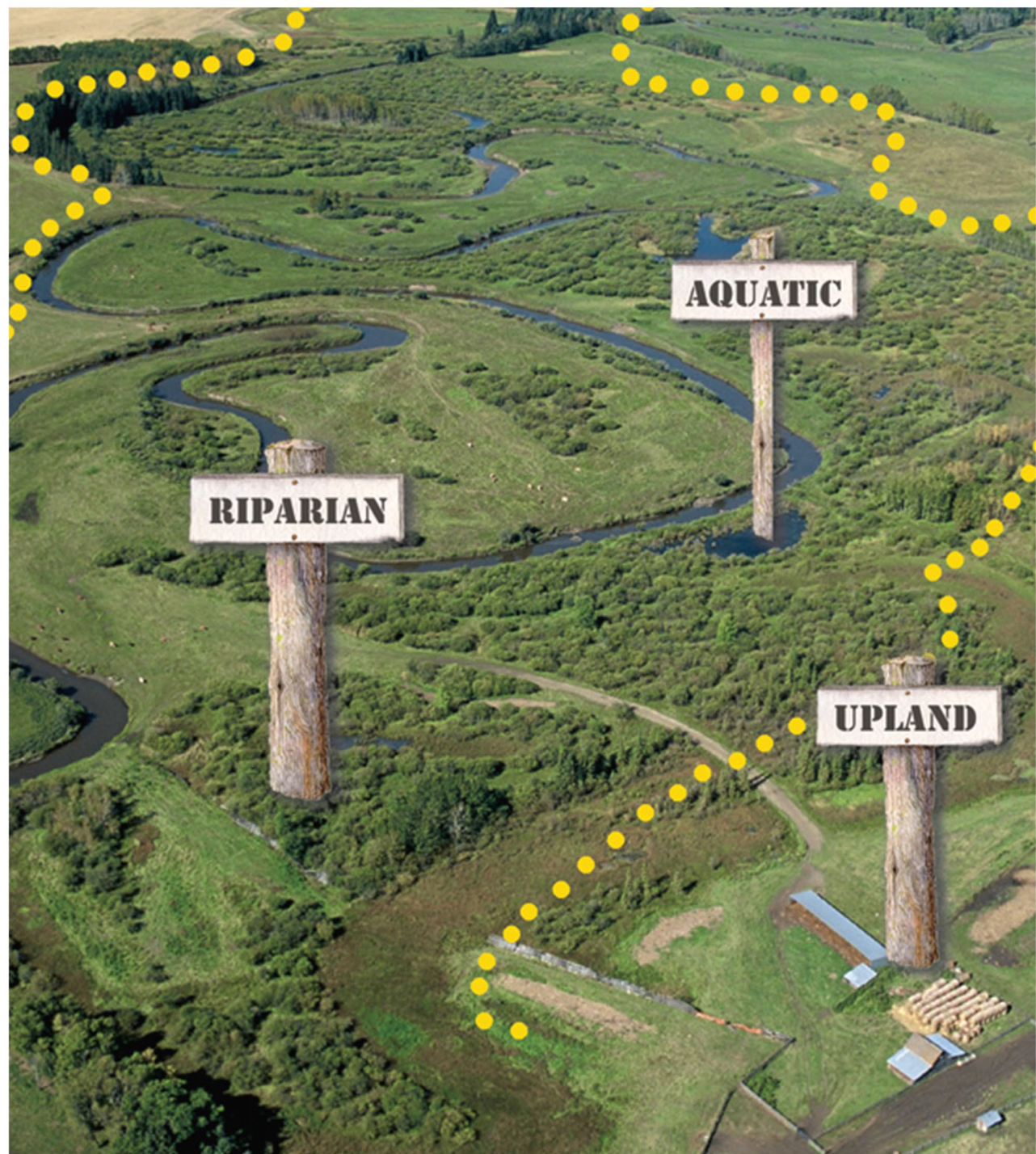
Our Mission

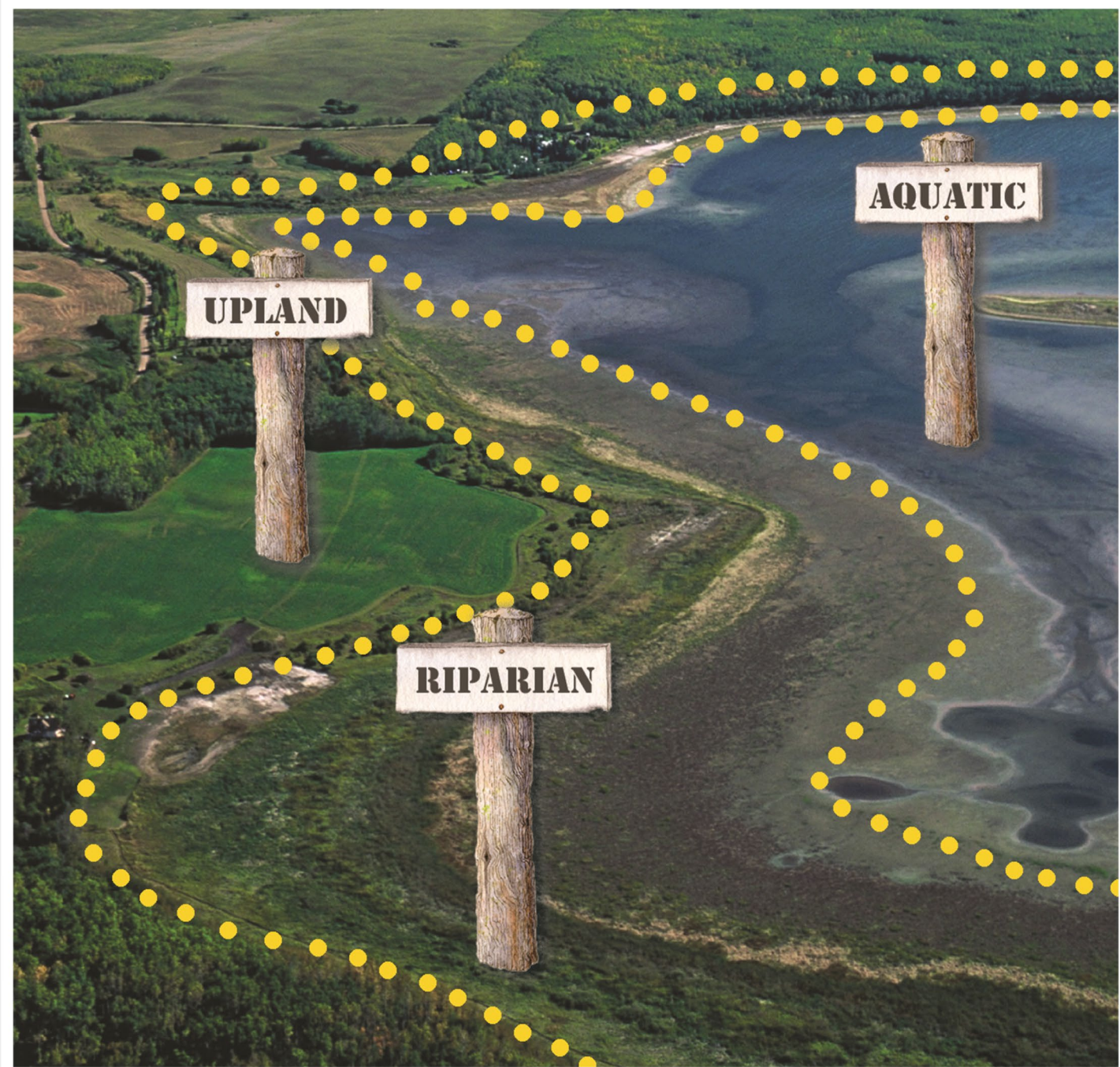
To promote healthy landscapes by
fostering riparian stewardship

*Empowering people who live, work,
and play in Alberta's riparian areas to
take action to care for riparian areas*



Lotic
**Streams/
Rivers**
Flowing



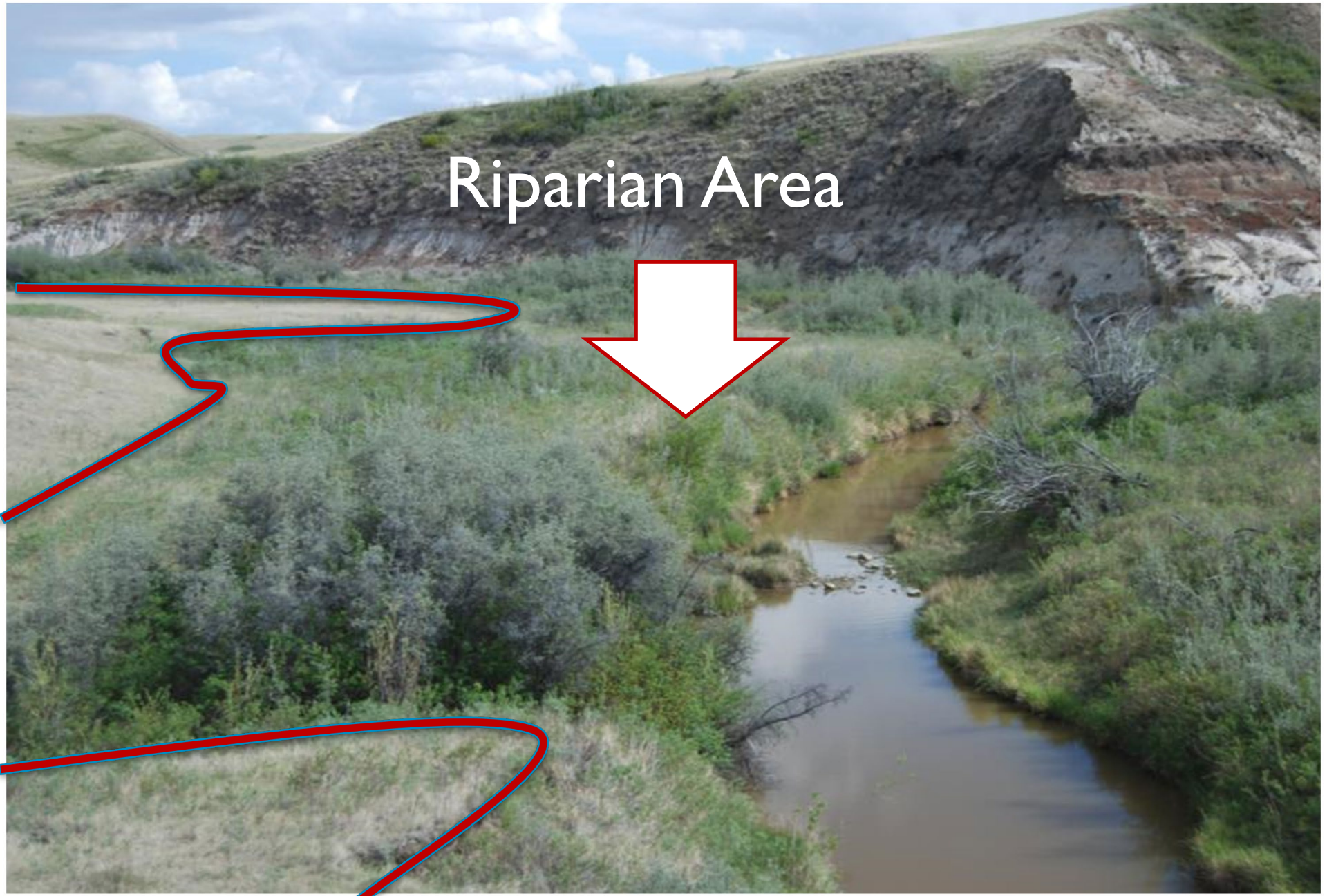


Lentic

**Lakes/
Wetlands**

**Non-
Flowing**

Riparian Area





The Story of Riparian Health

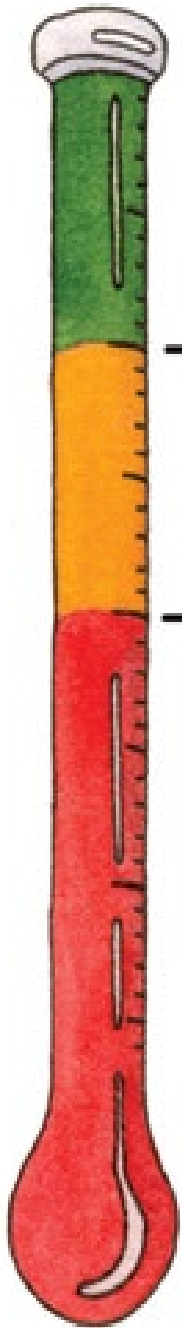




Alberta **Lentic** or **Lotic** Wetland Inventory / Riparian Health Inventory (RHI)

Includes Indicators of:

- ✓ Vegetation
- ✓ Soil/Hydrology



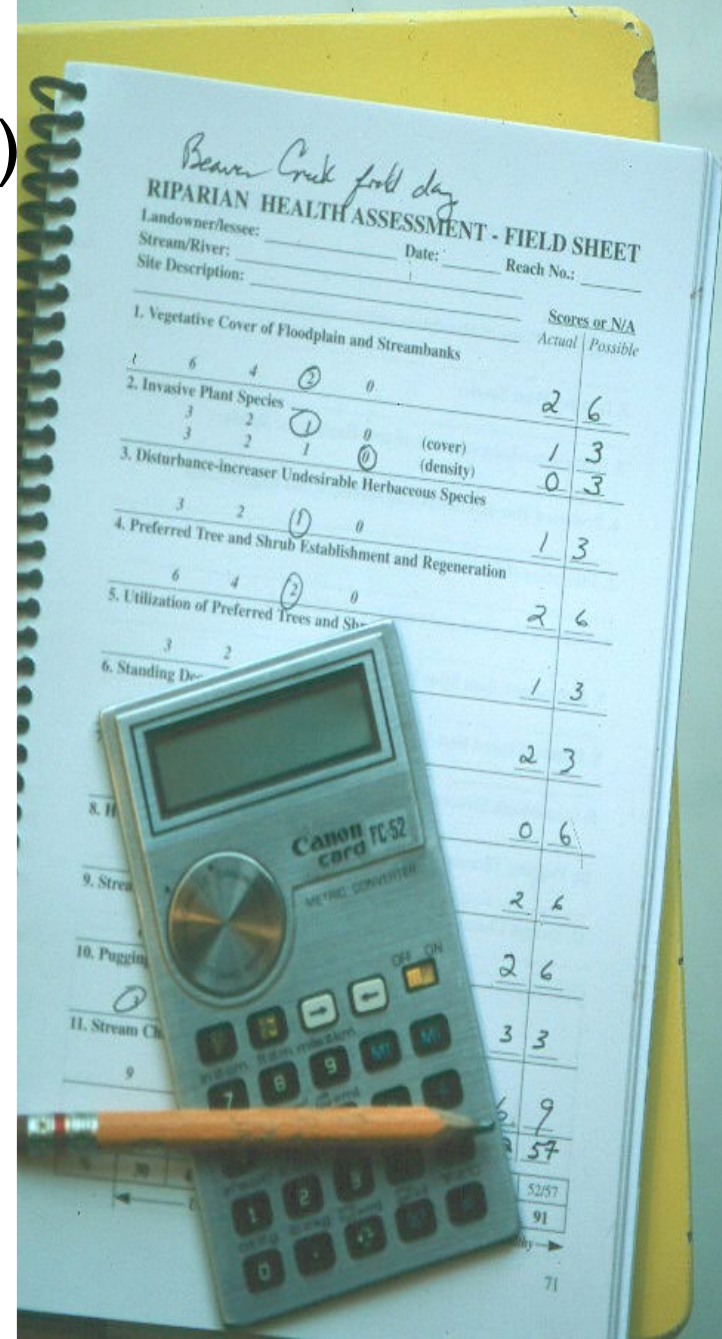
Healthy
(Proper Functioning Condition)

—80%

Healthy but with Problems
(Functional at Risk)

—60%

Unhealthy
(Non Functional)



Beaver Creek fold day
RIPARIAN HEALTH ASSESSMENT - FIELD SHEET
Landowner/lessee: _____ Date: _____ Reach No.: _____
Stream/River: _____
Site Description: _____

				Scores or N/A	
				Actual	Possible
1. Vegetative Cover of Floodplain and Streambanks					
1	6	4	②	0	2 6
2. Invasive Plant Species					
3	3	2	①	0	1 3
3	3	2	1	①	0 3
3. Disturbance-increaser Undesirable Herbaceous Species					
3	3	2	①	0	1 3
4. Preferred Tree and Shrub Establishment and Regeneration					
6	6	4	②	0	2 6
5. Utilization of Preferred Trees and Shrubs					
3	3	2			1 3
6. Standing Deadwood					
					2 3
8. Bank Erosion					0 6
9. Stream Channel					2 4
10. Pugging					2 6
11. Stream Channel					3 3
9					6 9
					57
					52/57
					91
					71

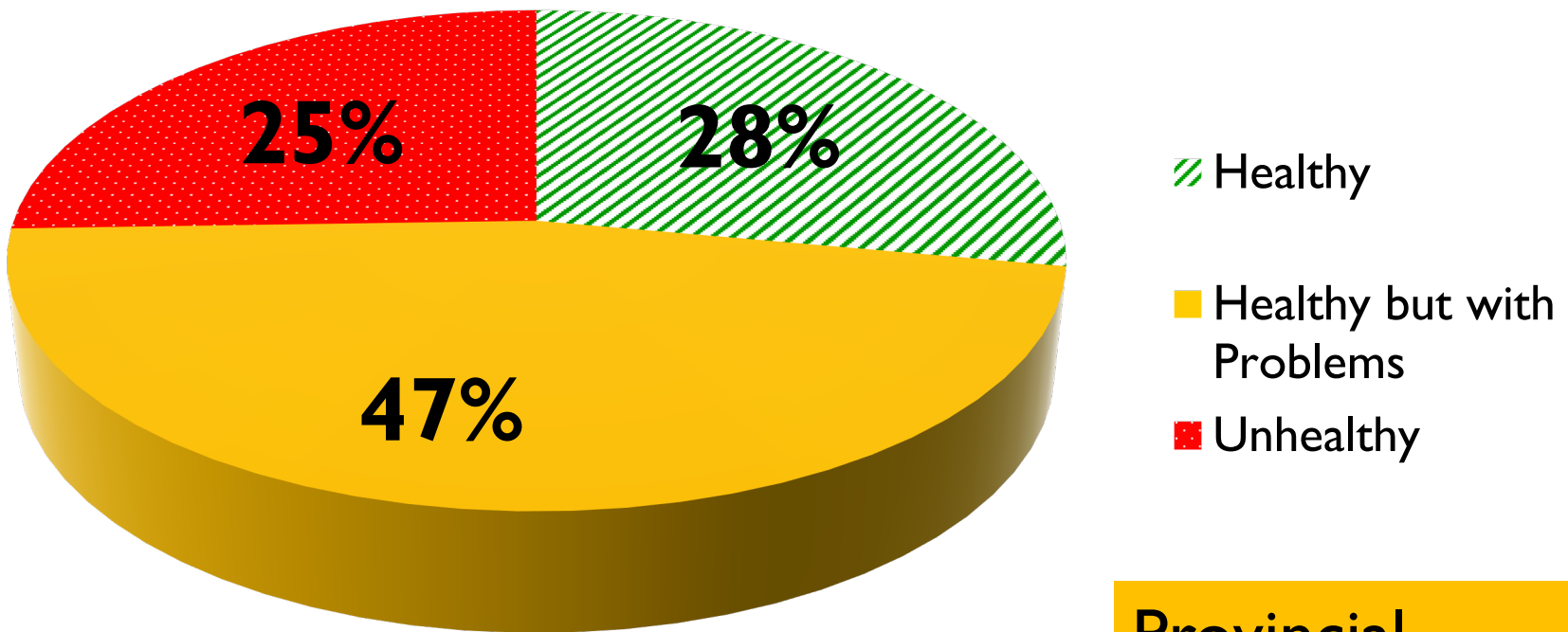
1996 to 2021 Alberta Riparian Health

3,168 sites

918 waterbodies

2,386 km of stream/shore

~13,000 ha riparian area



Provincial
Average = 69%



Riparian Sites in Alberta by Major Watershed from 1996-2021 (n=3130)



Subset of Data presented today:

- 2001-2022 (21 year time period)
- 2739 Riparian Health Inventory Sites
- Streams and Small Rivers
- Large Rivers
- Springs
- Lakes and Wetlands
- Seeps
- Public and Private Land
- Urban, Rural, Lakefront, Parks/Protected Areas
- Focus on invasive plant species

Lotic (81%)

Lentic (19%)

Legend

Riparian Assessment Site Health Category:

- Healthy
- Healthy, but with Problems
- Unhealthy

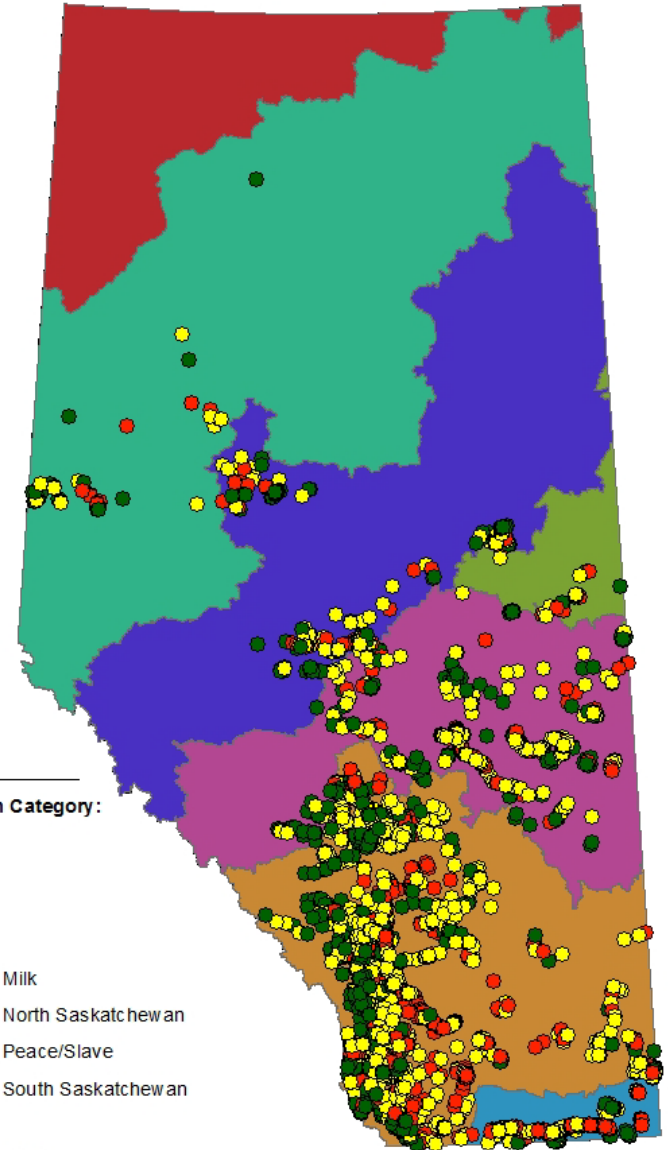
Major Basins:

- | | |
|----------------------|----------------------|
| ● Athabasca | ● Milk |
| ● Beaver | ● North Saskatchewan |
| ● Hay/Great Slave | ● Peace/Slave |
| ● South Saskatchewan | |

Scale: 1:5,500,000

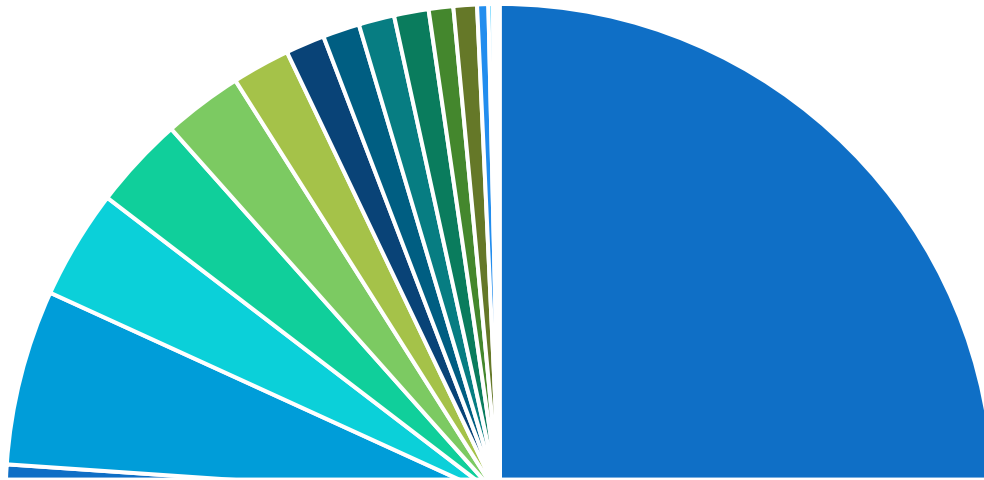
0 45 90 180 270 360 Kilometers

Note: Provincial Health (n=3168) & Provincial Health mapped (n=3130) due to insufficient waypoint data
Base mapping data provided by AltaLis & Agriculture and Agri-Food Canada



Total Sites by:

Land Use Sector



76% Agriculture

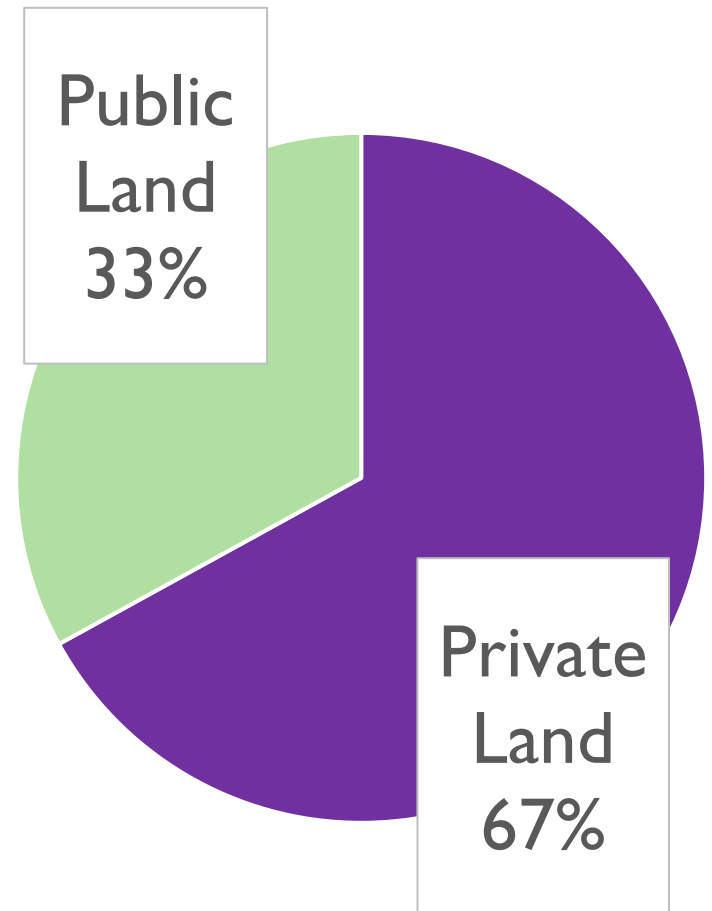
6% Parks and Protected Areas

Recreation (excl. other types
4% listed)

Lakefront/Waterfront (excl.
3% other types listed)

12% Other

Public and Private Land



Public
Land
33%

Private
Land
67%



Riparian Plants – What's Out There

- 1156 unique plant species identified
- 911 (79%) native plant species
- 245 (21%) introduced plant species (including invasive plants (weeds))
- 44 (4%) invasive plant species (weeds)

(Cows and Fish Alberta RHI sites 2001 to 2022)

Riparian Plants Overview Top Ten

SPECIES	Species Status	Presence	Cover
1. Canada thistle	invasive, introduced	91%	2%
2. Kentucky bluegrass	disturbance, introduced	90%	13%
3. common dandelion	disturbance, introduced	85%	2%
4. common yarrow	native	81%	0.4%
5. smooth brome	disturbance, introduced	79%	18%
6. buckbrush/snowberry	native	74%	8%
7. beaked willow	native	72%	4%
8. common horsetail	native, poisonous	71%	1%
9. balsam poplar	native	66%	13%
10. wild vetch	native	65%	0.4%

(Cows and Fish Alberta RHI sites 2001 to 2022, n=2739)



Flora practical jokes

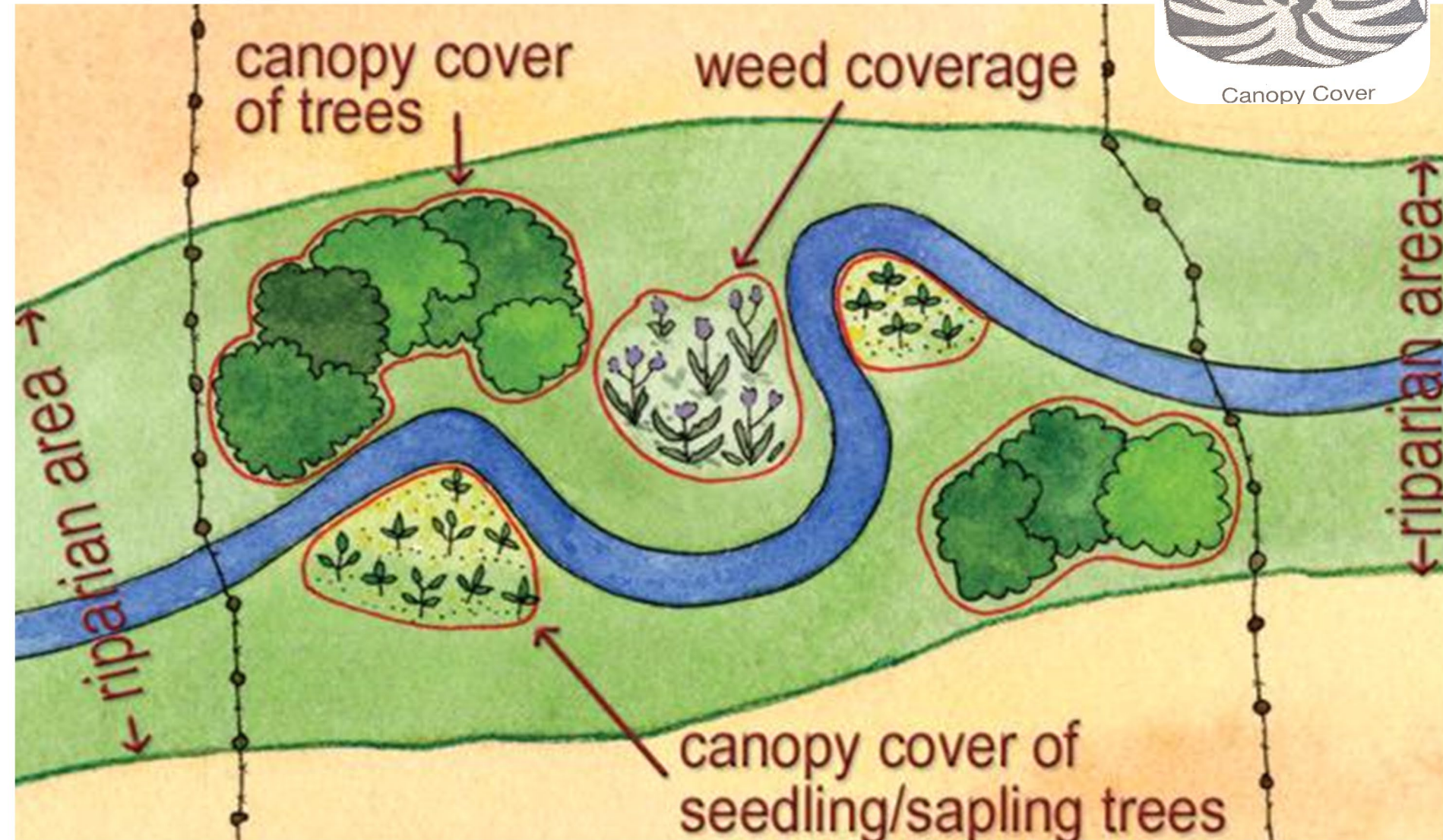


Invasive Plant Species Defined for Riparian Health Evaluation

- “alien species whose introduction does or is likely to cause economic or environmental harm”
- Regulated as **prohibited noxious** or **noxious** weeds in *Alberta Weed Act (2021)*
- Other unregulated species identified as problematic in riparian areas (e.g. common caragana, *Caragana arborescens*)

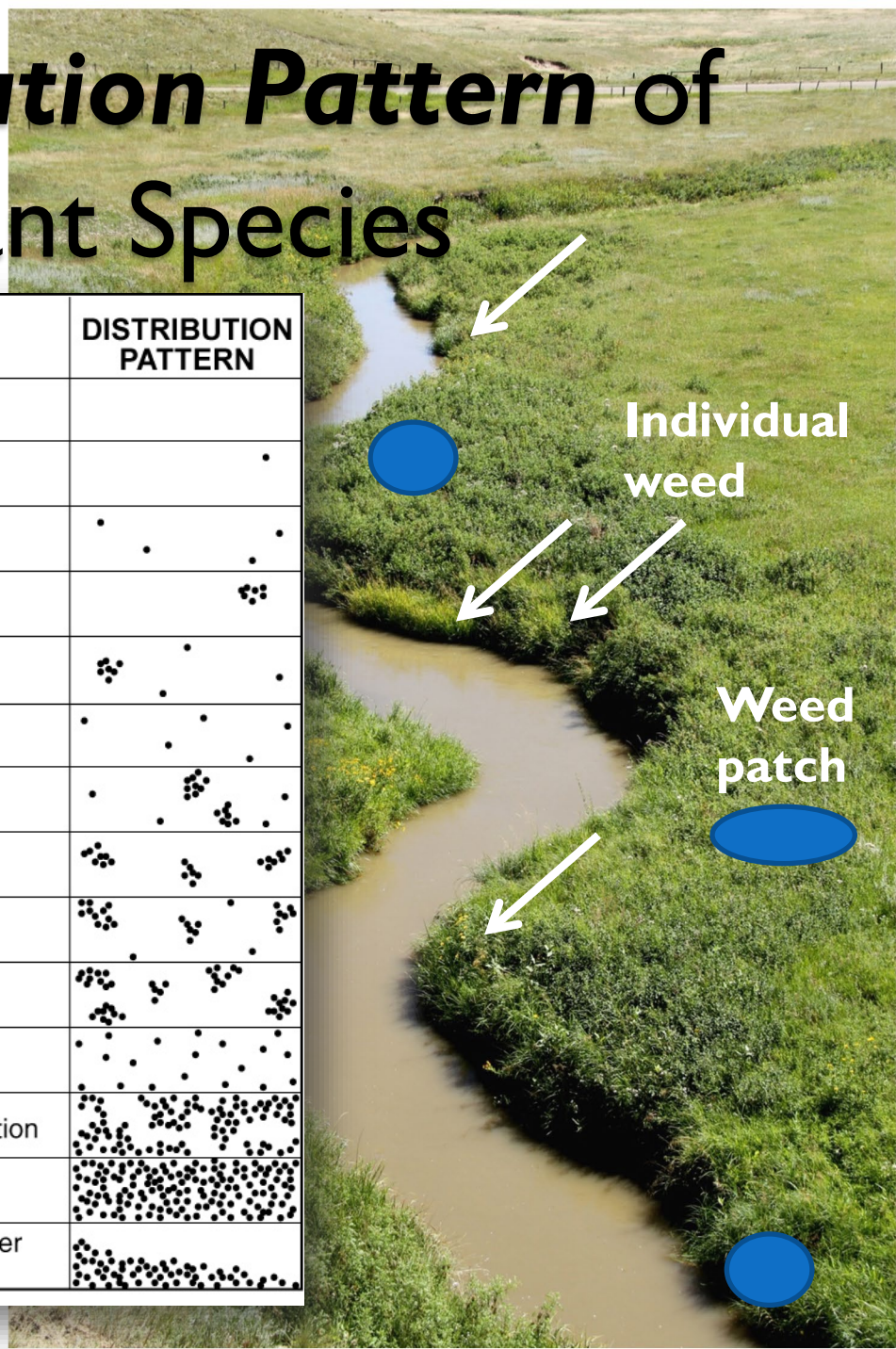


Total *Canopy Cover* of Invasive Plant Species



Density Distribution Pattern of Invasive Plant Species

CLASS	DESCRIPTION OF ABUNDANCE	DISTRIBUTION PATTERN
0	No invasive plants on the polygon	
1	Rare occurrence	.
2	A few sporadically occurring individual plants	. . .
3	A single patch	•••••
4	A single patch plus a few sporadically occurring plants	••••• . . .
5	Several sporadically occurring plants
6	A single patch plus several sporadically occurring plants	. . . ••••• . . .
7	A few patches	••••• . . . •••••
8	A few patches plus several sporadically occurring plants	••••• . . . ••••• . . .
9	Several well spaced patches	••••• . . . ••••• . . .
10	Continuous uniform occurrence of well spaced plants
11	Continuous occurrence of plants with a few gaps in the distribution	••••• . . . •••••
12	Continuous dense occurrence of plants	•••••
13	Continuous occurrence of plants associated with a wetter or drier zone within the polygon.	•••••



Riparian Health Parameter: Invasive Plants

Canopy Cover Scoring

3 = No invasive species on the site

2 = Invasive plants present with total canopy cover less than 1% of site

1 = Invasive plants present with total canopy cover 1-15% of site

0 = Invasive plants present with total canopy cover more than 15% of site

Density/Distribution Scoring

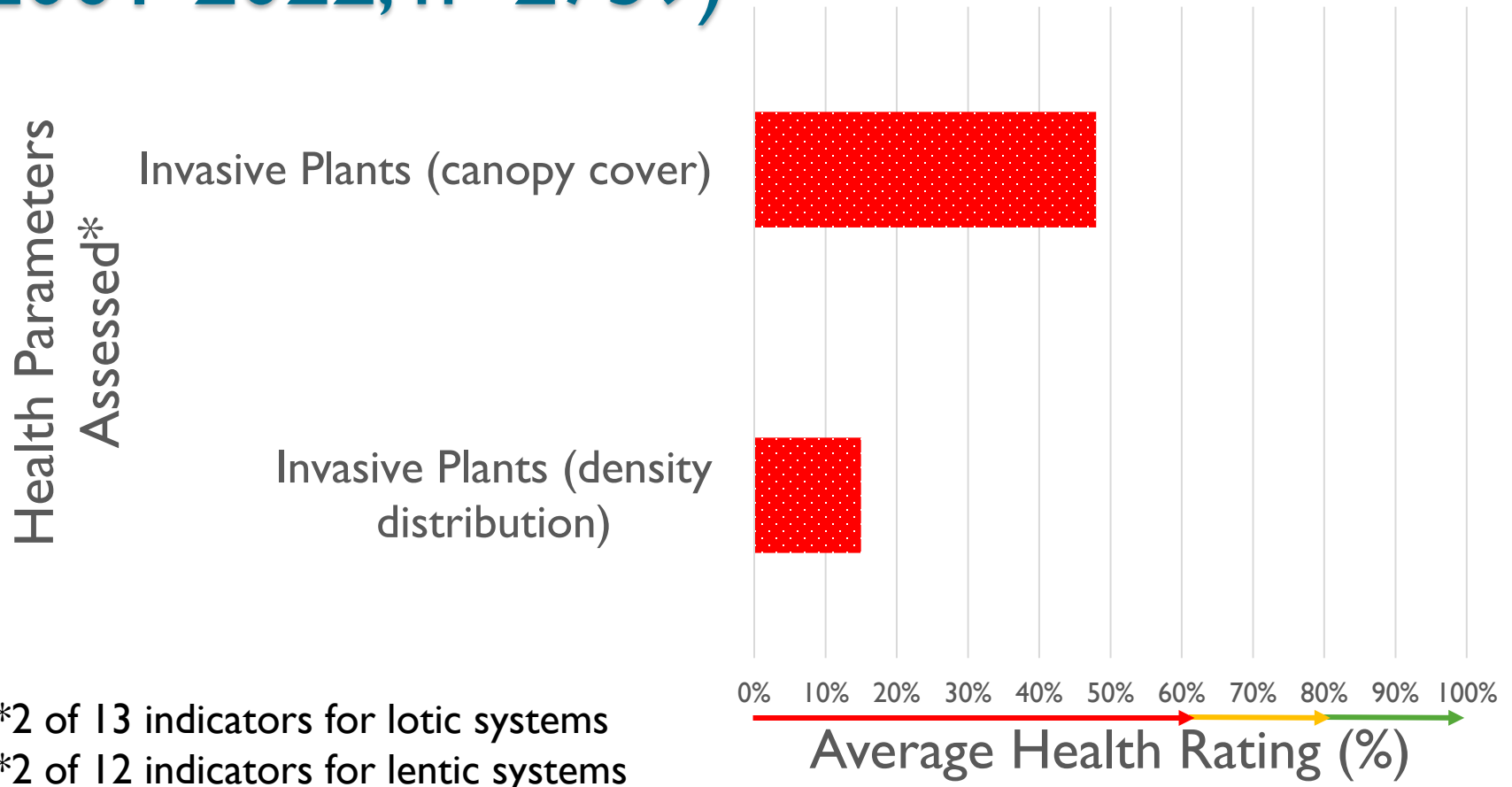
3 = No invasive species on the site



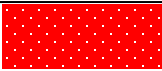
2 = Invasive plants present with density/distribution class in class 1, 2, or 3

1 = Invasive plants present with density/distribution class in class 4, 5, 6 or 7

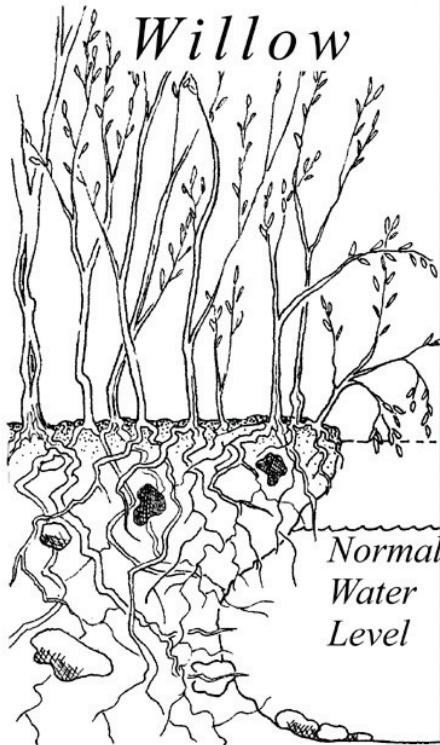
0 = Invasive plants present with density/distribution class in class 8 or higher

Riparian Health Parameter: Invasive Plants (2001-2022, n=2739)



Healthy  Healthy but with Problems  Unhealthy 

Invasive Plants Impact Riparian Form & Function



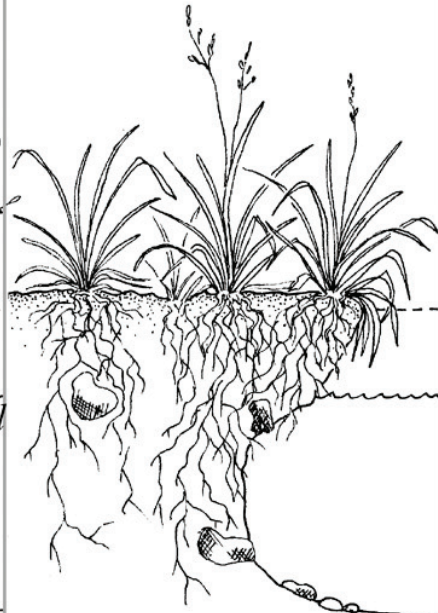
Willow

Normal
Water
Level

Similar Species:

- Silverberry
- Chokecherry
- Balsam Poplar
- Plains Cottonwood

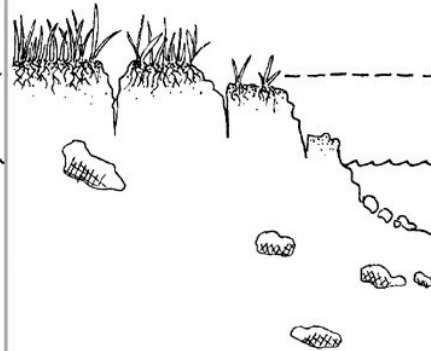
Bunch Grass



Similar Species:

- Sedges
- Cattails
- Rushes
- Tufted Hairgrass

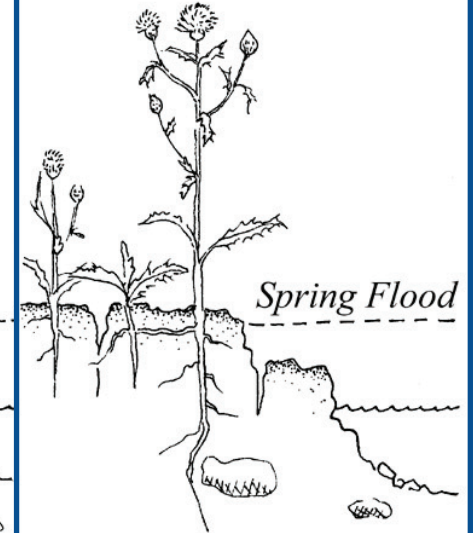
*Kentucky
Bluegrass*



Similar Species:

- Plantain
- Dandelion
- Timothy
- Smooth Brome

*Canada
Thistle*



Similar Species:

- Knapweeds
- Leafy Spurge
- Houndstongue
- Dalmation Toadflax

- Reduced species diversity (flora, fauna) but can add pollinator habitat at times
- Reduced bank holding and building capacity but can be better than bare ground



Wetlands, Streams & Weeds – Wonder What's Out There?

- 2613 of 2739 riparian sites (lentic & lotic combined) (95%) with weeds present covering 4.9% of area & 44 species
- 486 of 507 lentic sites (96%) with weeds present covering 5.3% of area & 25 species
- 2127 of 2232 lotic sites (95%) with weeds present covering 4.8% of area & 41 species

(Cows and Fish Alberta RHI sites 2001 to 2022)



Riparian Weeds: **Top Ten** **List** (*Presence* lentic & lotic, 2613 sites)

1. Canada thistle (95% of sites)
2. perennial sow-thistle (71%)
3. tall buttercup (21%)
4. common hound's-tongue (12%)
5. yellow toadflax (10%)
6. ox-eye daisy (10%)
7. common burdock (9%)
8. common tansy (9%)
9. scentless chamomile (9%)
10. white cockle (7%)

(Cows and Fish Alberta RHI sites 2001 to 2022, n=2613)



Riparian Weeds: **Top Ten List** (% Cover lentic & lotic, 2613 sites)

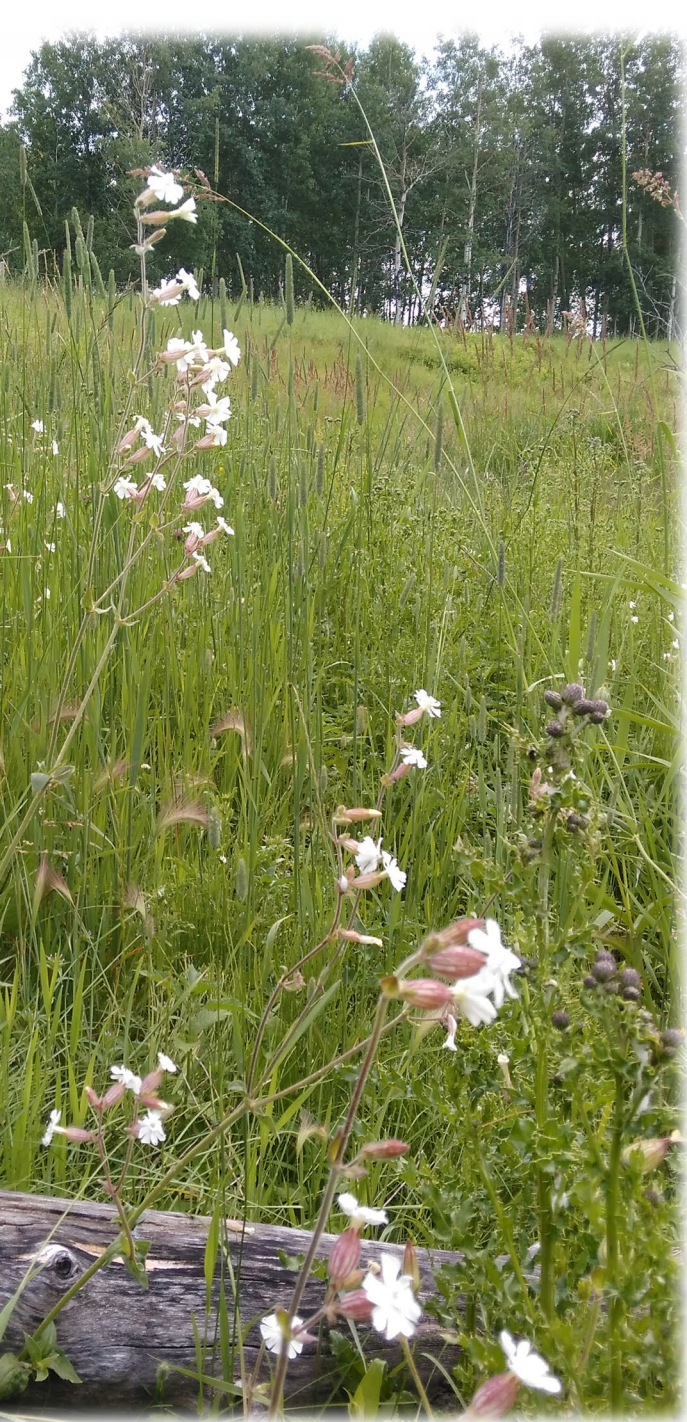
1. Canada thistle (2.4% total cover)
2. leafy spurge (1.2%)
3. perennial sow thistle (1.0%)
4. common tansy (0.3%)
5. tall buttercup (0.3%)
6. tufted vetch (0.2%)
7. ox-eye daisy (0.1%)
8. downy brome (0.1%)
9. common hound's-tongue (0.1%)
10. yellow toadflax (0.1%)

(Cows and Fish Alberta RHI sites 2001 to 2022, n=2613)

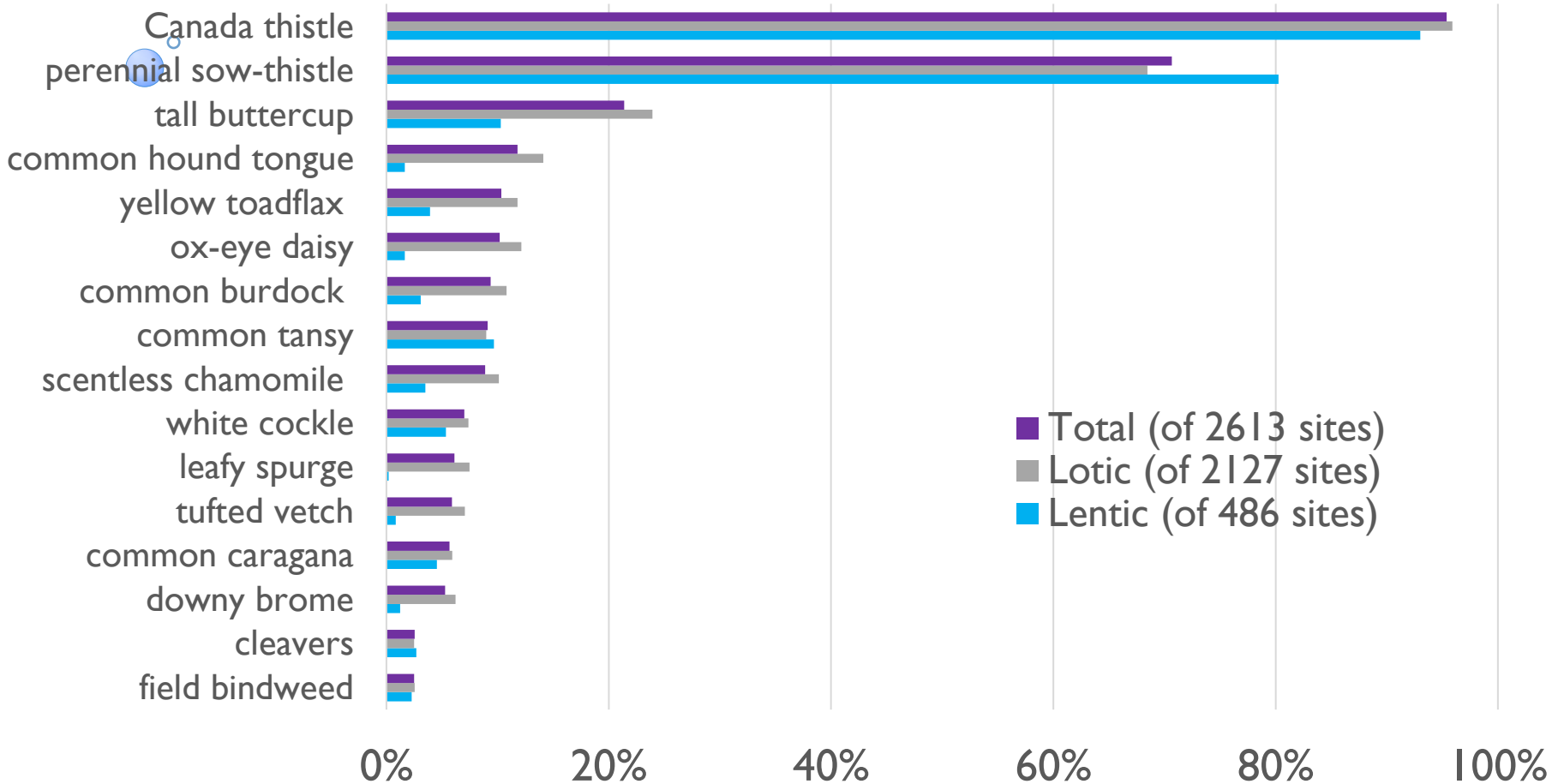
Top 10 Riparian Weeds Ranking Highest to Lowest (Lotic & Lentic, 2613 Sites)

Species	Presence	Cover
Canada thistle	1	1
perennial sow thistle	2	3
tall buttercup	3	5
common hound tongue	4	9
yellow toadflax	5	10
ox-eye daisy	6	7
common burdock	7	9
common tansy	8	4
scentless chamomile	9	...
white cockle	10	...
leafy spurge	...	2
tufted vetch	...	6
downy brome	...	8

(Cows and Fish Alberta RHI sites 2001 to 2022)



Top Riparian Weeds (Presence)



Presence by Proportion of Sites with Weeds in each Category

Top 10 Riparian Weeds Ranking Highest to Lowest (*Presence*)



Lotic & Lentic Sites

1. Canada thistle (95%)
2. perennial sow-thistle (71%)
3. tall buttercup (21%)
4. common hound's-tongue (12%)
5. yellow toadflax (10%)
6. ox-eye daisy (10%)
7. common burdock (9%)
8. common tansy (9%)
9. scentless chamomile (7%)
10. white cockle (7%)

Lotic Sites

1. Canada thistle (96%)
2. perennial sow-thistle (68%)
3. tall buttercup (24%)
4. common hound's-tongue (14%)
5. ox-eye daisy (12%)
6. yellow toadflax (11%)
7. common burdock (11%)
8. scentless chamomile (10%)
9. common tansy (9%)
10. leafy spurge (7%)

Lentic Sites

1. Canada thistle (93%)
2. perennial sow-thistle (80%)
3. tall buttercup (10%)
4. common tansy (10%)
5. white cockle (5%)
6. common caragana (5%)
7. yellow toadflax (4%)
8. scentless chamomile (4%)
9. common burdock (3%)
10. cleavers (3%)

Top 10 Riparian Weeds Ranking Highest to Lowest (Cover)



Lotic & Lentic Sites

1. Canada thistle (2.4%)
2. leafy spurge (1.2%)
3. perennial sow-thistle (1%)
4. common tansy (0.3%)
5. tall buttercup (0.3%)
6. tufted vetch (0.2%)
7. ox-eye daisy (0.1%)
8. downy brome (0.1%)
9. common hound's-tongue (0.1%)
10. yellow toadflax (0.1%)

Lotic Sites

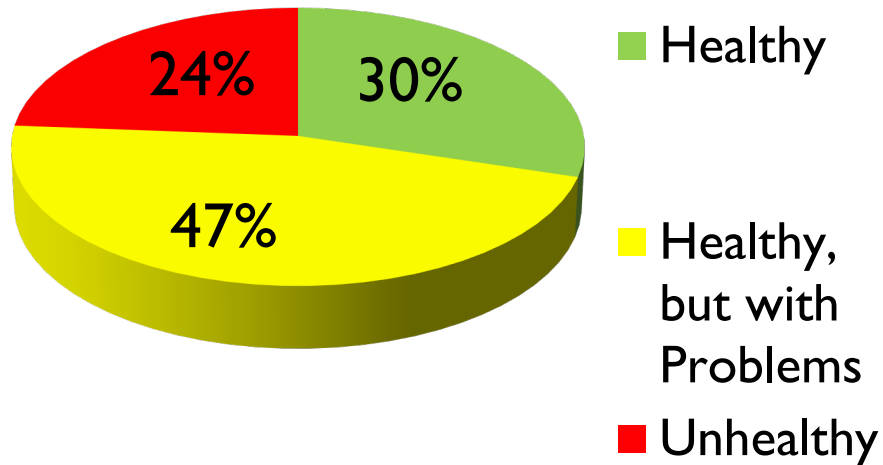
1. Canada thistle (2.3%)
2. leafy spurge (1.3%)
3. perennial sow-thistle (0.8%)
4. common tansy (0.4%)
5. tall buttercup (0.3%)
6. tufted vetch (0.3%)
7. ox-eye daisy (0.2%)
8. downy brome (0.1%)
9. common hound's-tongue (0.1%)
10. yellow toadflax (0.1%)

Lentic Sites

1. Canada thistle (3.3%)
2. perennial sow-thistle (2.6%)
3. common tansy (0.2%)
4. tall buttercup (0.1%)
5. common caragana (0.05%)
6. white cockle (0.05%)
7. scentless chamomile (0.03%)
8. cleavers (0.02%)
9. yellow toadflax (0.01%)
10. common hound's-tongue (0.01%)

Weeds & Riparian Health

Overall Riparian Health for 2739 Riparian Sites in Alberta 2001 - 2022



Health Category

% of Sites Without Weeds Present (n=2739)

Healthy	9.5%
Healthy, but with Problems	2.6%
Unhealthy	2.5%

Weeds & Riparian Health

**Riparian
Health
Category**

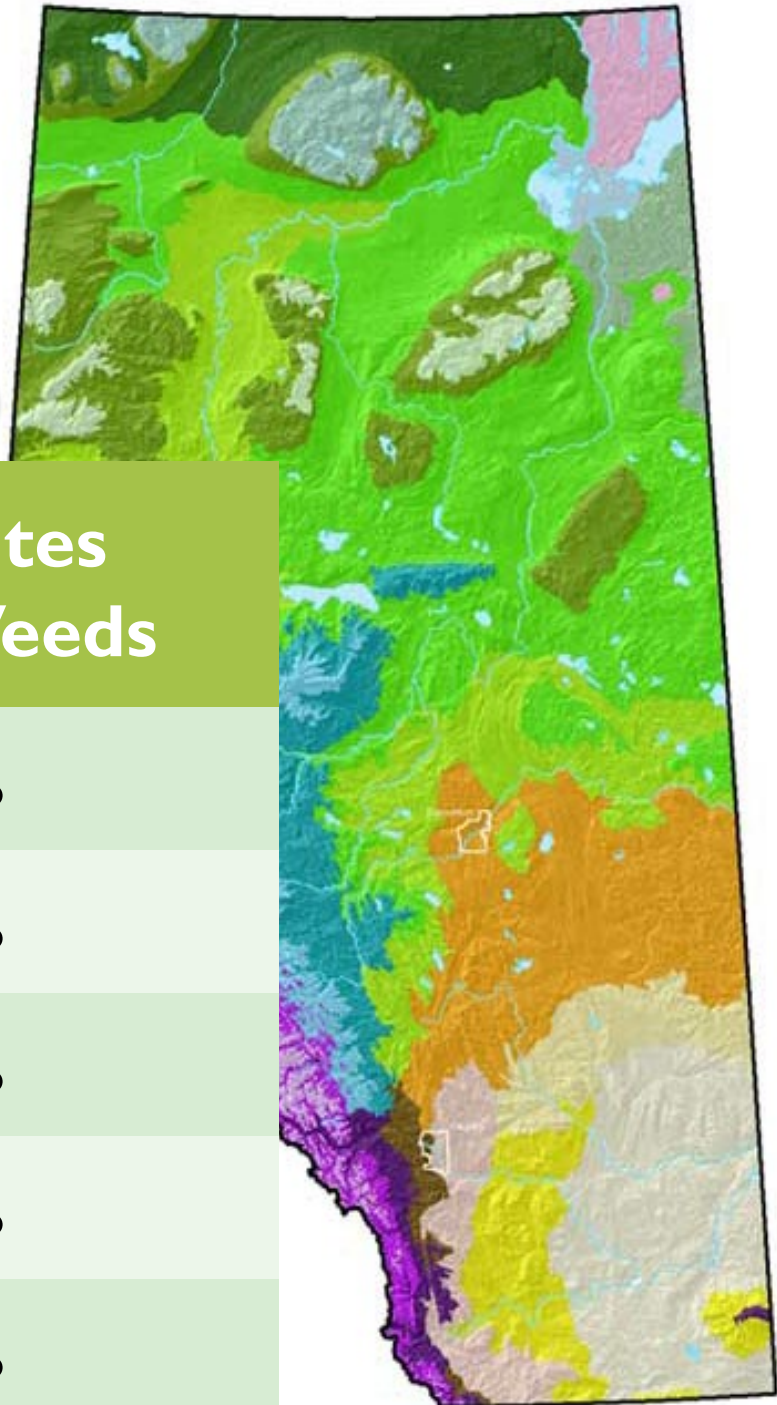
**% of sites with
no weeds
observed
(n=126)**

Healthy	61%
Healthy, but with Problems	26%
Unhealthy	13%

(Cows and Fish Alberta RHI sites 2001 to 2022)



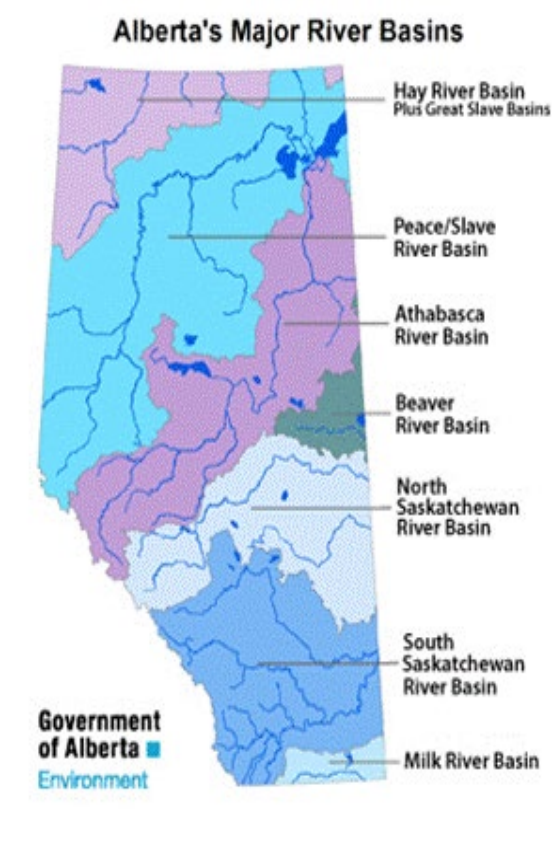
Riparian Weeds by Natural Region – Lentic & Lotic (2739 sites)



Natural Region	% of Sites With Weeds
Boreal Forest	97%
Foothills	72%
Grassland	98%
Parkland	98%
Rocky Mountain	87%

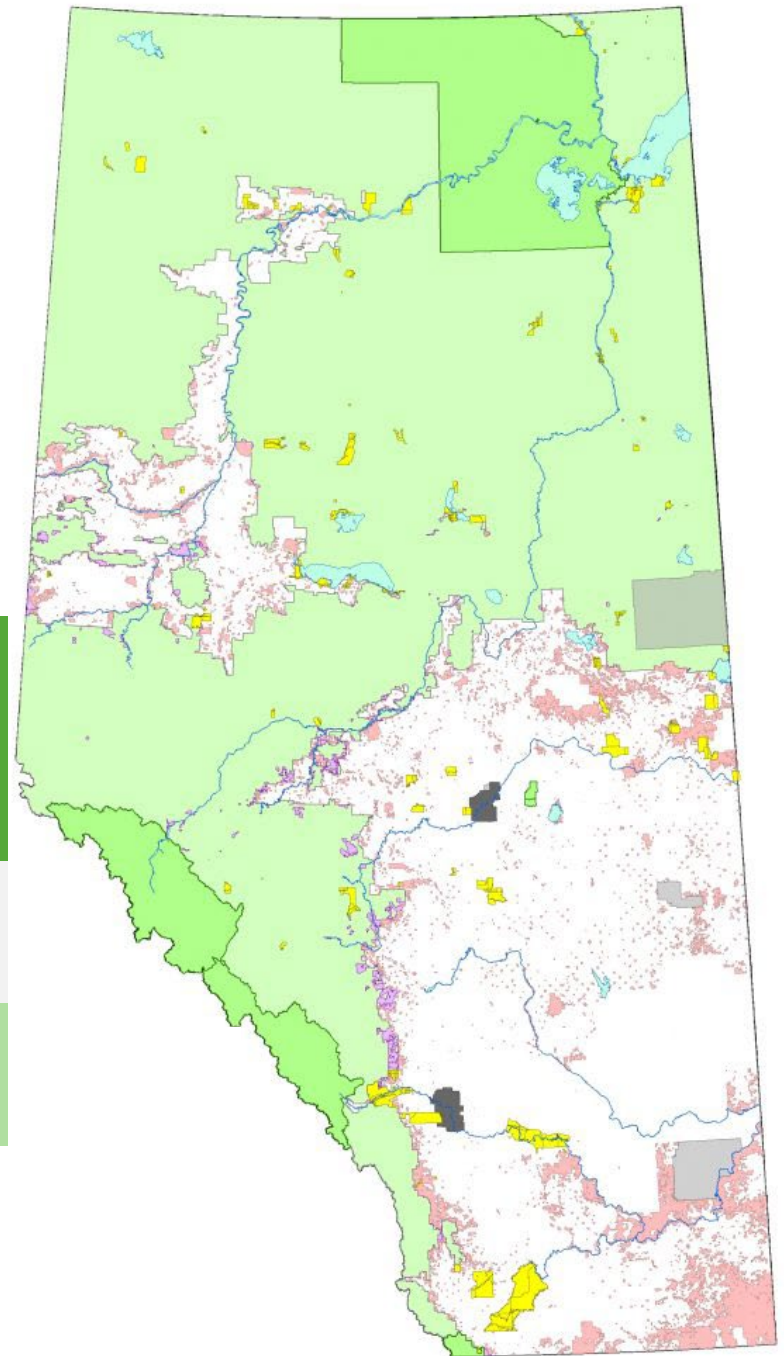
Riparian Weeds by Watershed – Lentic & Lotic (2739 sites)

Watershed / Basin	% of Sites With Weeds
Athabasca	97%
Churchill (Beaver)	100%
Milk (Missouri)	95%
North Saskatchewan	97%
Peace River	82%
South Saskatchewan	95%



Riparian Weeds by Land Ownership – Lentic & Lotic (2739 sites)

Land Ownership	% of Sites With Weeds
Private Land	98%
Public Land	88%



Riparian Weed Occurrences on Lentic Sites

- Heart-podded Hoary Cress
- Marsh Thistle
- Pale Yellow Iris



alberta.ca

(Cows and Fish Alberta RHI sites 2001 to 2022, n=2613)

Riparian Weed Occurrences on Lotic Sites

(Cows and Fish Alberta RHI sites 2001 to 2022, n=2613)

- Annual Sow-thistle
- Black Henbane
- Blue Buttons
- Blueweed
- Broad-leaved Pepper Grass
- Dalmatian Toadflax
- Dame's Rocket
- Diffuse Knapweed

- European Buckthorn
- Meadow Hawkweed
- Meadow Knapweed
- Mouse-ear Hawkweed
- Nodding Thistle
- Purple Loosestrife

- Russian Knapweed
- Spotted Knapweed
- Woolly Burdock
- Yellow Clematis



UN-WANTED: Riparian Weeds

Let's keep
it that way!

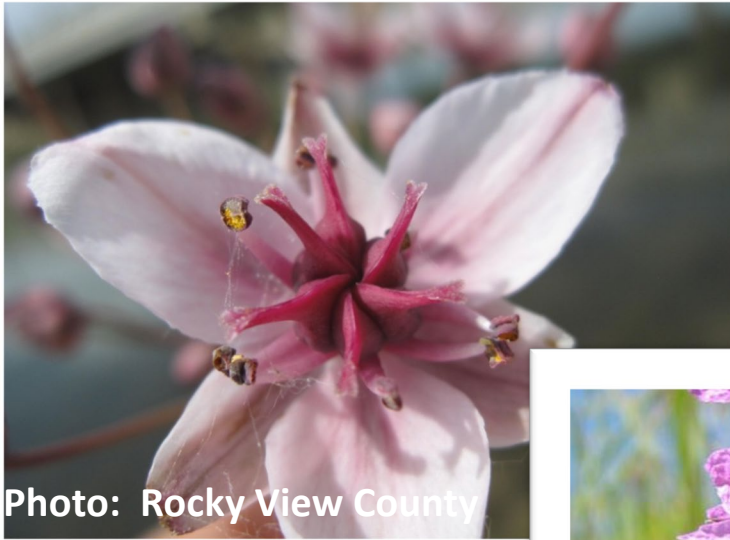


Photo: Rocky View County



Photo: AISC



Photo: Wheatland County

Riparian Weeds - Trends

- 25 species of invasive weeds found in lentic sites, compared to 41 species in lotic sites
- sampling of lotic sites is approximately 4.5 times greater than lentic (507 vs. 2232 sites)
- Most prevalent are Canada thistle and perennial sow thistle
- Leafy spurge is #2 in cover on lotic and all sites together though not in top 10 presence
- Although there are a greater number of lotic than lentic sites, approximately 5% of each type have no weeds present.

(Cows and Fish Alberta RHI sites 2001 to 2022)



Riparian Weeds - Trends

- RHI Re-visit Sites (n=467)
- First (Baseline) RHI:
 - Overall health average = 67%
 - Cover of weeds = 4.0%
- Second (Most Recent) RHI:
 - Overall health average = 70%
 - Cover of weeds = 6.4%

static score
trend

2020



2015

Increasing
cover trend

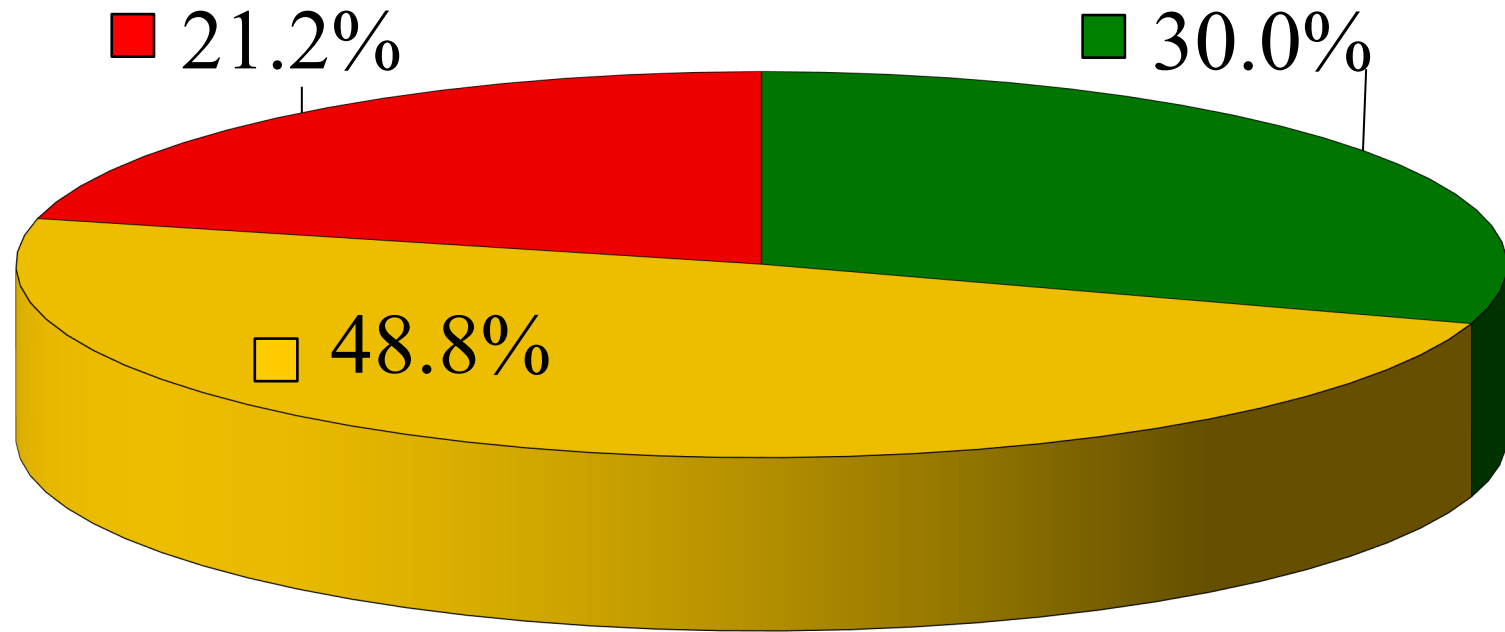


THE FAR SIDE • Gary Larson

The woods were dark and foreboding, and Alice sensed that sinister eyes were watching her every step. Worst of all, she knew nature abhorred a vacuum



2002 to 2022 Revisited Riparian Inventory Health Sites (n = 467)



Riparian Health - Trends

■ Healthy ■ Healthy but with Problems ■ Unhealthy

POPOMATIC™

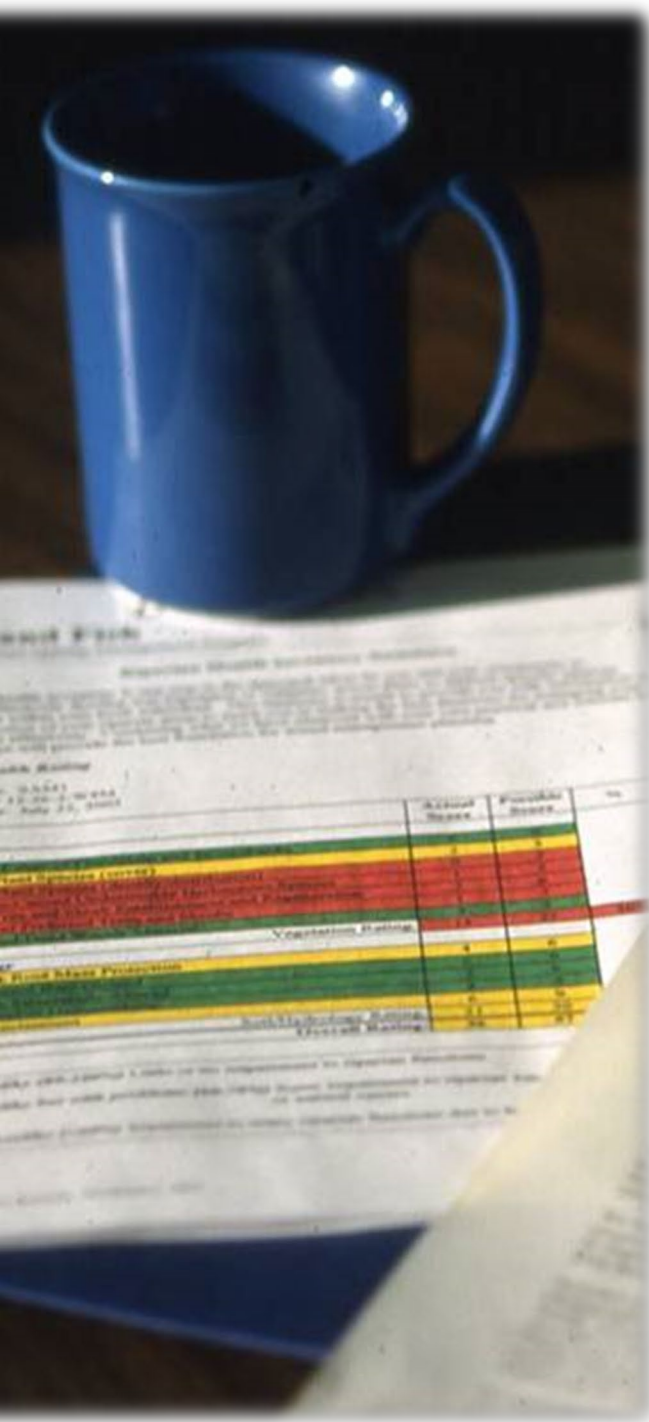
TROUBLE



TROUBLE

TROUBLE

TROUBLE



Riparian Health Reports

Priority Management Goals:

- ❑ Continue to monitor and reduce invasive plant cover,
- ❑ Increase native tree and shrub cover, and,
- ❑ Improve natural shoreline vegetation and minimize new physical alterations to the riparian area.

Riparian Health Reports

- **Monitor and control invasive plants.** Ensure that invasive plant control efforts avoid harm to desirable native plants. Minimizing ground disturbance will help reduce the potential for invasive plants to spread. Mowing and hand-pulling are also management techniques useful in riparian sites*. Please contact ____, Agricultural Fieldman at County of ____, (Ph: 780-____-____, Email ____@____) for further information. For additional information on invasive plant management and identification refer to the Alberta Invasive Species Council website: www.abinvasives.ca.

* Species dependent



Forbs
cont'd

Riparian Health Reports

broad-leaved water-plantain (<i>Alisma plantago-aquatica</i>)	native	NO	0.5
Canada anemone (<i>Anemone canadensis</i>)	native	NO	0.5
Canada goldenrod (<i>Solidago canadensis</i>)	native	NO	3.0
Canada thistle (<i>Cirsium arvense</i>)	invasive, introduced	0.5	0.5
cleavers (<i>Galium aparine</i>)	invasive, introduced	0.5	NO
common chickweed (<i>Stellaria media</i>)	<i>disturbance, introduced</i>	0.5	NO
common dandelion (<i>Taraxacum officinale</i>)	<i>disturbance, introduced</i>	3.0	3.0
common groundsel (<i>Senecio vulgaris</i>)	<i>introduced</i>	0.5	NO
common horsetail (<i>Equisetum arvense</i>)	native, <i>poisonous</i>	NO	0.5
common mullein (<i>Verbascum thapsus</i>)	invasive, introduced	0.5	NO
common nettle (<i>Urtica dioica</i>)	native	0.5	0.5
common tansy (<i>Tanacetum vulgare</i>)	invasive, introduced, poisonous	0.5	0.5
creeping bellflower; garden bluebell (<i>Campanula rapunculoides</i>)	invasive, introduced	0.5	0.5
dotted blazingstar (<i>Liatris punctata</i>)	native	NO	0.5
flixweed; tansy mustard (<i>Descurainia sophia</i>)	<i>disturbance, introduced</i>	0.5	0.5
Fremont's goosefoot (<i>Chenopodium fremontii</i>)	native	NO	0.5
gaillardia (<i>Gaillardia aristata</i>)	native	NO	0.5
goosefoot (<i>Chenopodium spp.</i>)	<i>unknown, not unique</i>	0.5	NO
harebell (<i>Campanula rotundifolia</i>)	native	NO	0.5
heart-leaved Alexanders (<i>Zizia aptera</i>)	native	NO	0.5
hemp-nettle (<i>Galeopsis tetrahit</i>)	<i>disturbance, introduced</i>	3.0	0.5
Himalayan balsam (<i>Impatiens glandulifera</i>)	invasive, introduced	0.5	NO
mouse-ear chickweed (<i>Cerastium spp.</i>)	<i>unknown, not unique</i>	0.5	NO
narrow-leaved collomia (<i>Collomia linearis</i>)	native	NO	0.5

Taking Action on Riparian Weeds



Wetlands, Streams and Weeds Oh My!



The Cowardly Lion - The Wizard of Oz (6/8) Movie CLIP (1939) HD

The background of the slide features several pink thistle flowers in various stages of bloom. The flowers have numerous thin, spiky petals radiating from a central point. The stems are green and covered in small, reddish-brown thorns. The background is a soft, out-of-focus green, suggesting a natural outdoor setting.

Thank You!

Questions?

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Contact Us

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- donations



Cows and Fish

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