MN NWAC Risk Assessment Worksheet (04-2017)	Common Name	*Latin Name* (Full USDA Nomenclature)
	Hoary alyssum	***Berteroa incana* (L.) DC.**
Original Reviewer: Roger Becker	**Affiliation/Organization: Univ. of MN**	**Original Review: (08/04/2017)**
Current Reviewer: Roger Becker	**Univ. of MN**	**Current Review Date: (08/04/2017)**

Species Description:

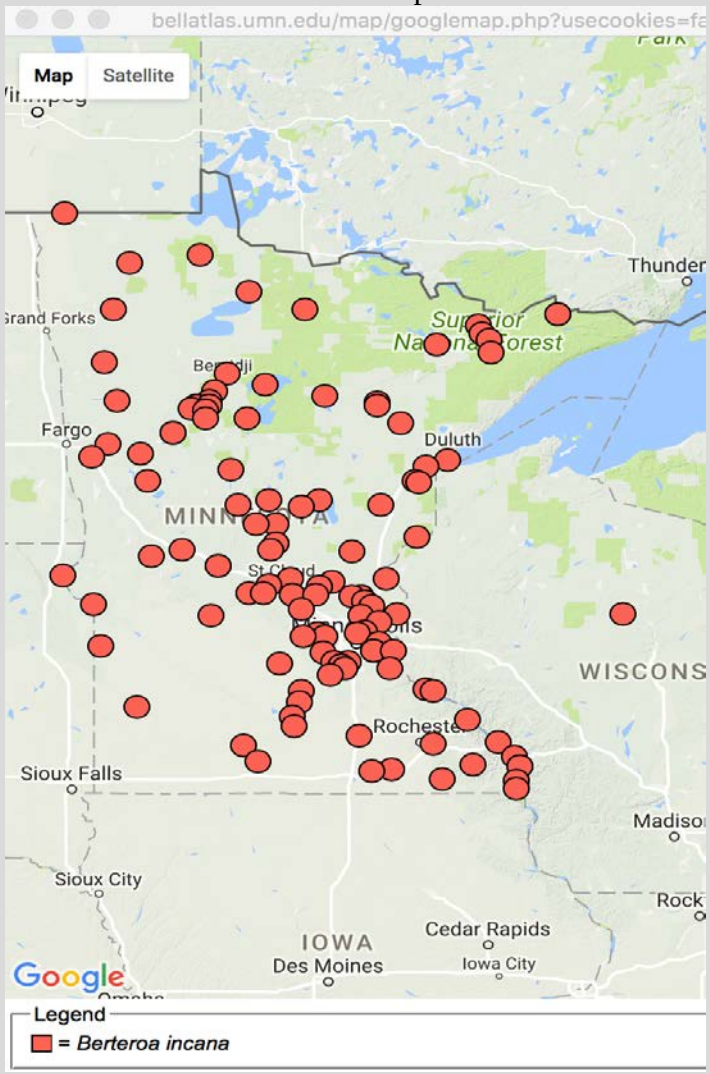
https://en.wikipedia.org/wiki/Berteroa_incana

Appearance: Annual, biennial, or occasionally a short-lived perennial herbaceous plant 1 1/2 - 2' tall with an erect, branched, downy stem.
Leaves: Alternate, small lance-shaped and covered with a grayish down.
Flowers: Tiny white flowers are arranged in elongated clusters along a central stem, each flower with four deeply divided petals; blooming June through August.
Seeds: Seeds are round to oblong narrowly winged. Little pods (silicles) containing 4 to 12 seeds in two rows separated by a septum.
Roots: Taproot.
Ecological Threat: Hoary alyssum, a native of Europe, does not pose a threat to intact native grasslands at this time. It displaces native species particularly in dry prairies and sand blowouts where vegetation is sparse. It is most abundant in disturbed dry areas, fields and waste places. It can be a nuisance in prairie reconstruction but declines as prescribed burns are administered.
Adapted from: http://www.dnr.state.mn.us/invasives/terrestrialplants/herbaceous/hoaryalyssum.html

Current Regulation: 2017 Not Listed. Reviewed and voted in 2017 by NWAC to not list. (Currently listed in Becker County, MN so can be managed as a Prohibited Noxious Weed within the jurisdiction of that county.)

NOTE: (Additional supporting information may be added to a box even when the decision tree process bypasses that question. Text used for the Answer box for this non-required text should be **BOLD AND ITALIC**. Furthermore, whenever text is entered for an answer to a question not required by the risk assessment decision tree process, the outcome box should contain the following statement: **This text is provided as additional information not directed through the decision tree process for this particular risk assessment.**)

Box	Question	Answer	Outcome
1	Is the plant species or genotype non-native?	Yes. Introduced, native to Europe and Asia. (Warwick and Francis 2006).	Go to box 3.
2	Does the plant species pose significant human or livestock concerns or has the potential to significantly harm agricultural production?		
	A. Does the plant have toxic qualities that pose a significant risk to livestock, wildlife, or people?		
	B. Does the plant cause significant financial losses associated with decreased yields, reduced quality, or increased production costs?		
3	Is the plant species, or a related species, documented as being a problem elsewhere?	Yes. Montana (Parkinson et al. 2010), naturalized throughout southern Canada (Warick and Francis 2006) and northern U.S. (USDA Plants Database, accessed July 2017). State Noxious Weed in Michigan (USDA Plants 2017). Currently listed in Becker County, MN so can be managed as a Prohibited Noxious Weed within the jurisdiction of that county (MDA, personnel communiqué).	Go to box 6.
4	Is the plant species' life history & Growth requirements understood?		
5	Gather and evaluate further information:	(Comments/Notes)	
6	Does the plant species have the capacity to establish and survive in Minnesota?		

Box	Question	Answer	Outcome
	A. Is the plant, or a close relative, currently established in Minnesota? http://bellatlas.umn.edu/collections/map/mapinterface.php?db%5B%5D=all&db%5B%5D=8&db%5B%5D=7&db%5B%5D=4&d5B%5D=5&db%5B%5D=10&db%5B%5D=11&db%5B%5D=6&db%5B%5D=9&db%5B%5D=12&db%5B%5D=1&recordlimit=5000&maptype=occquery&gridSizeSetting=60&minClusterSetting=10&clusterSwitch=n&pointlat=&pointlong=&radius=&upperlat=&rightlong=&bottomlat=&leftlong=&poly_array=&display2=&type=1&taxa=Berteroa+incana&country=United+States&state=Minnesota&county=&local=&distFromMe=&collector=&collnum=&eventdate1=&eventdate2=&catnum=&othercatnum=&reset=1 Accessed July 2017 (See also Appendix 1)	Yes. See U of M Herbarium map below. 	Go to box 7.

Box	Question	Answer	Outcome
	B. Has the plant become established in areas having a climate and growing conditions similar to those found in Minnesota?		
7	Does the plant species have the potential to reproduce and spread in Minnesota?		
	A. Does the plant reproduce by asexual/vegetative means?	No.	Go to 7C.
	B. Are the asexual propagules effectively dispersed to new areas?		
	C. Does the plant produce large amounts of viable, cold-hardy seeds?	Yes. Up to 2640 seeds per plant (Reichman 1988, Warwick and Francis 2006).	Go to 7F.
	D. If this species produces low numbers of viable seeds, does it have a high level of seed/seedling vigor or do the seeds remain viable for an extended period?		
	E. Is this species self-fertile?		
	F. Are sexual propagules – viable seeds – effectively dispersed to new areas?	Yes, judging by the wide distribution throughout the state. Spread via hay, mowing, etc.	Go to 7I.
	G. Can the species hybridize with native species (or other introduced species) and produce viable seed and fertile offspring in the absence of human intervention?		
	H. If the species is a woody (trees, shrubs, and woody vines) is the juvenile period less than or equal to 5 years for tree species or 3 years for shrubs and vines?		
	I. Do natural controls exist, species native to Minnesota, that are documented to effectively prevent the spread of the plant in question?	No.	Go to box 8.
8	Does the plant species pose significant human or livestock concerns or has the potential to significantly harm agricultural production, native ecosystems, or managed landscapes?		
	A. Does the plant have toxic qualities, or other detrimental qualities, that pose a significant risk to livestock, wildlife, or people?	Yes. Can cause laminitis to death in horses. (Becker et al 1991, Geor et al 1992), reduce alfalfa yields on sandy soils (Kust 1969), and reduced forage utilization in goats (Leroux et al 1985)	Go to box 9.

Box	Question	Answer	Outcome
	B. Does, or could, the plant cause significant financial losses associated with decreased yields, reduced crop quality, or increased production costs?		
	C. Can the plant aggressively displace native species through competition (including allelopathic effects)?		
	D. Can the plant hybridize with native species resulting in a modified gene pool and potentially negative impacts on native populations?		
	E. Does the plant have the potential to change native ecosystems (adds a vegetative layer, affects ground or surface water levels, etc.)?		
	F. Does the plant have the potential to introduce or harbor another pest or serve as an alternate host?		
9	Does the plant species have clearly defined benefits that outweigh associated negative impacts?		
	A. Is the plant currently being used or produced and/or sold in Minnesota or native to Minnesota?	No.	Go to box 10.
	B. Is the plant an introduced species and can its spread be effectively and easily prevented or controlled, or its negative impacts minimized through carefully designed and executed management practices?		
	C. Is the plant native to Minnesota?		
	D. Is a non-invasive, alternative plant material commercially available that could serve the same purpose as the plant of concern?		
	E. Does the plant benefit Minnesota to a greater extent than the negative impacts identified at Box #8?		
10	Should the plant species be enforced as a noxious weed to prevent introduction &/or dispersal; designate as prohibited or restricted?		
	A. Is the plant currently established in Minnesota?	Yes. (see box 6A)	Go to 10B.
	B. Does the plant pose a serious human health threat?	No.	Go to 10C.

Box	Question	Answer	Outcome
	C. Can the plant be reliably eradicated (entire plant) or controlled (top growth only to prevent pollen dispersal and seed production as appropriate) on a statewide basis using existing practices and available resources?	No. Too widespread. Very well adapted to dry, sandy soils. Can be controlled with herbicides, tillage, and hand rouging, but seedbank present in many areas of the state will make it a constant challenge to control where well adapted (sandy, droughty soils). (if Yes, can easily be controlled in grass pastures, roadsides, etc. with broadleaf herbicides.) However, risk assessment author recommends do not list. Is present almost everywhere in the state, is very common in the 11 county Anoka Sand Plains area of MN, and common in the rest of the state at lower densities precluding eradication. Risk to horses is widely known and can be managed where needed to protect horses. If made a Restricted Noxious Weed would prohibit the sale of infested hay for any livestock, even though is not known to be toxic to other grazers such as sheep, cattle, goats, etc. Also, listing hoary alyssum as a Restricted Noxious Weed would pose enforcement challenges because it is common to find scattered plants in hay and pasture which could end up affecting a significant portion of MN hay.	List as a Restricted Noxious Weed. (List as a Prohibited / Eradicate Noxious Weed.)
11	Should the plant species be allowed in Minnesota via a species-specific management plan; designate as specially regulated?		

Final Results of Risk Assessment			
	Review Entity	**Comments**	**Outcome**
	NWAC Listing Subcommittee		Do not list 2017.
	NWAC Full-group		Do not list 2017.
	MDA Commissioner		
	FILE # **MDARA00061HA_12_06_2017**		

Risk Assessment Current Summary (*Current Year* – 08/04/2017):

- Do not list.
- Is present almost everywhere in the state.
- Is very common in the 11 county Anoka Sand Plains area of MN, and common in the rest of the state at lower densities precluding eradication.
- Risk to horses is widely known and can be managed where needed to protect horses. A Restricted Noxious Weed listing would prohibit the sale of infested hay for any livestock, even though is not known to be toxic to other grazers such as sheep, cattle, goats, etc. and could affect a significant portion of MN hay.

References:

Becker RL, Martin NP, Murphy MJ. (1991) Hoary alyssum: Toxicity to horses, forage quality, and control. University of Minnesota Extension WW-05567. 1991. 4pp.

EDDMapS. Hoary alyssum (*Berteroa incana* (L.) DC) http://www.eddmaps.org/distribution/uscounty.cfm?sub=5177&map=density http://www.eddmaps.org/distribution/uscounty.cfm?sub=5177&map=literature

Ellison, SP. (1992) Possible toxicity caused by hoary alyssum (*Berteroa incana*). Equine Practice. May 1992. Pp. 472-475.

Geor, RJ, Becker RL, Kanara EW, Hovda LR, Sweeney WH, Winter TF, Rorick JK, Ruth GR, Hope E, Murphy MJ. (1992) Toxicosis in horses after ingestion of hoary alyssum. Journal of the American Veterinary Medical Association. July 1, 1992. 201(1) p. 63-67.

Kust CA. (1969) Selective control of hoary alyssum in alfalfa. Weed Science. 17:99-101.

Leroux GD, Harvey RG, Jorgensen NA, Collins M. (1985) Influence of hoary alyssum (*Berteroa incana*) on quality of alfalfa (*Medicago sativa*) forage and its utilization by goats. Weed Science. 33:280-284.

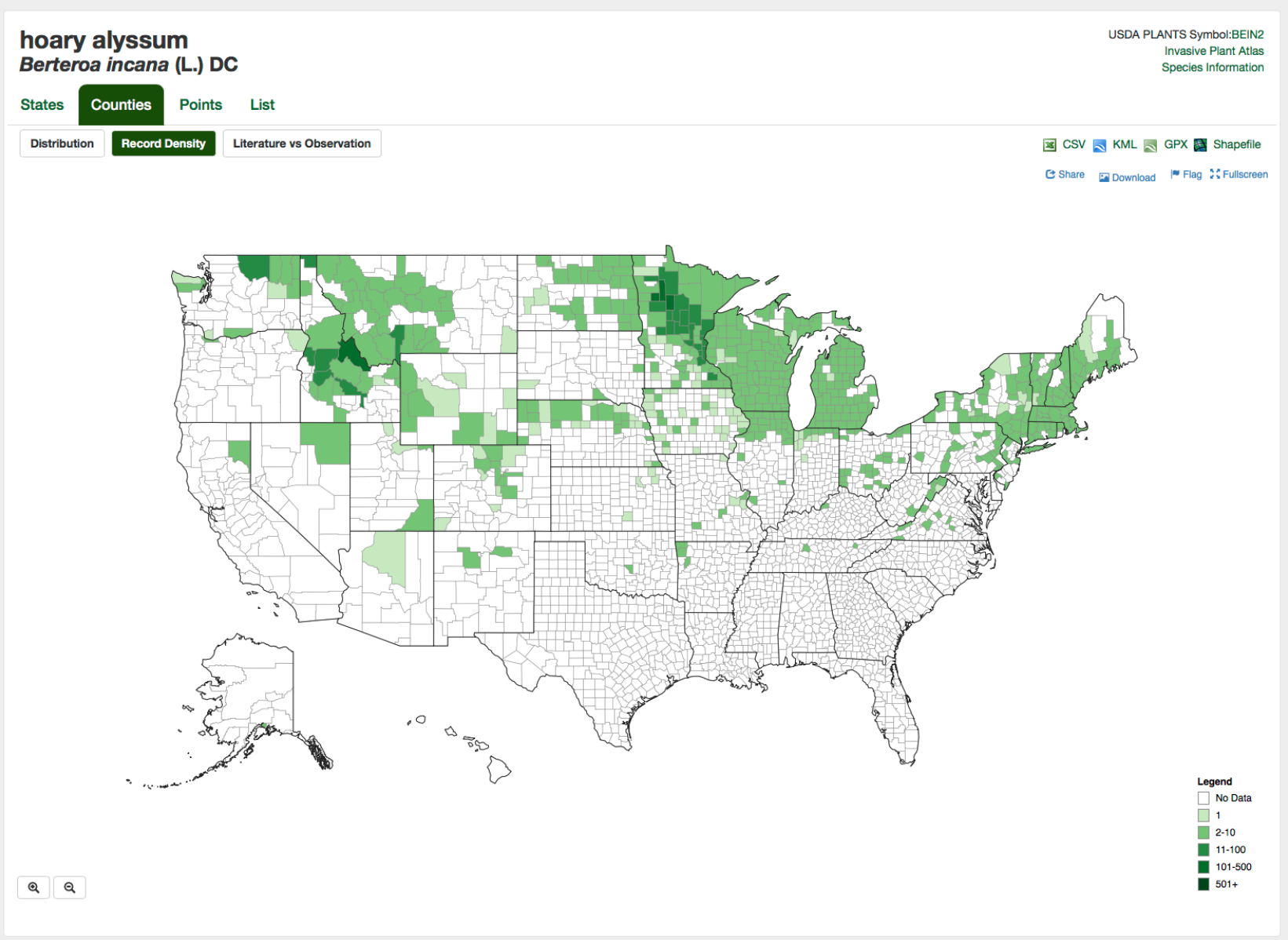
Parkinson H, Mangold J, Jacobs J. (2010) Biology, Ecology, and Management of Hoary alyssum (*Berteroa incana* L.). EB0194 March 2010. 16 pp.

Reichman 0J. (1988) Comparison of the effects of crowding and pocket gopher disturbance on mortality, growth and seed production of *Berteroa incana.* American Midlands Naturalist Journal. 120:58-69.

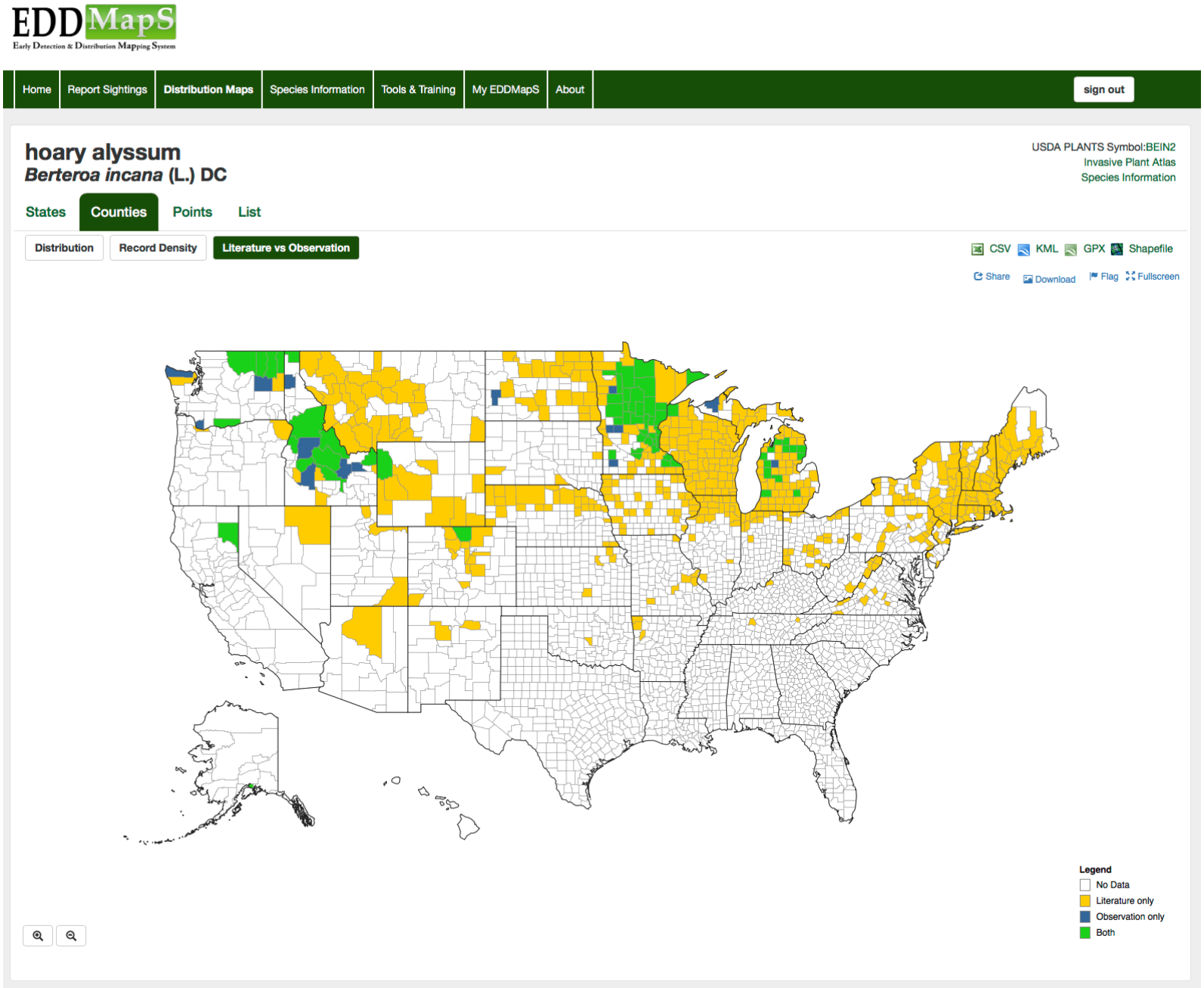
USDA Natural Resources Conservation Service. Plants Database. Introduced, Invasive, and Noxious Plants. https://plants.usda.gov/core/profile?symbol=BEIN2 Accessed July 2017.

Warwick SI, Francis A. (2006) The Biology of Invasive Alien Plants in Canada. 6. *Berteroa incana* (L.) DC. Canadian Journal of Plant Science. Oct. 86(4) p. 1297-1309.

Appendix:



EDDMapS. 2017. Early Detection & Distribution Mapping System. The University of Georgia - Center for Invasive Species and Ecosystem Health. Available online at http://www.eddmaps.org/; last accessed July 18, 2017. http://www.eddmaps.org/distribution/uscounty.cfm?sub=5177&map=density



EDDMapS. 2017. Early Detection & Distribution Mapping System. The University of Georgia - Center for Invasive Species and Ecosystem Health. Available online at http://www.eddmaps.org/; last accessed July 18, 2017. http://www.eddmaps.org/distribution/uscounty.cfm?sub=5177&map=literature

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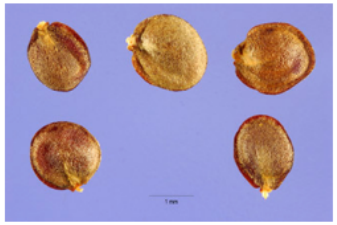
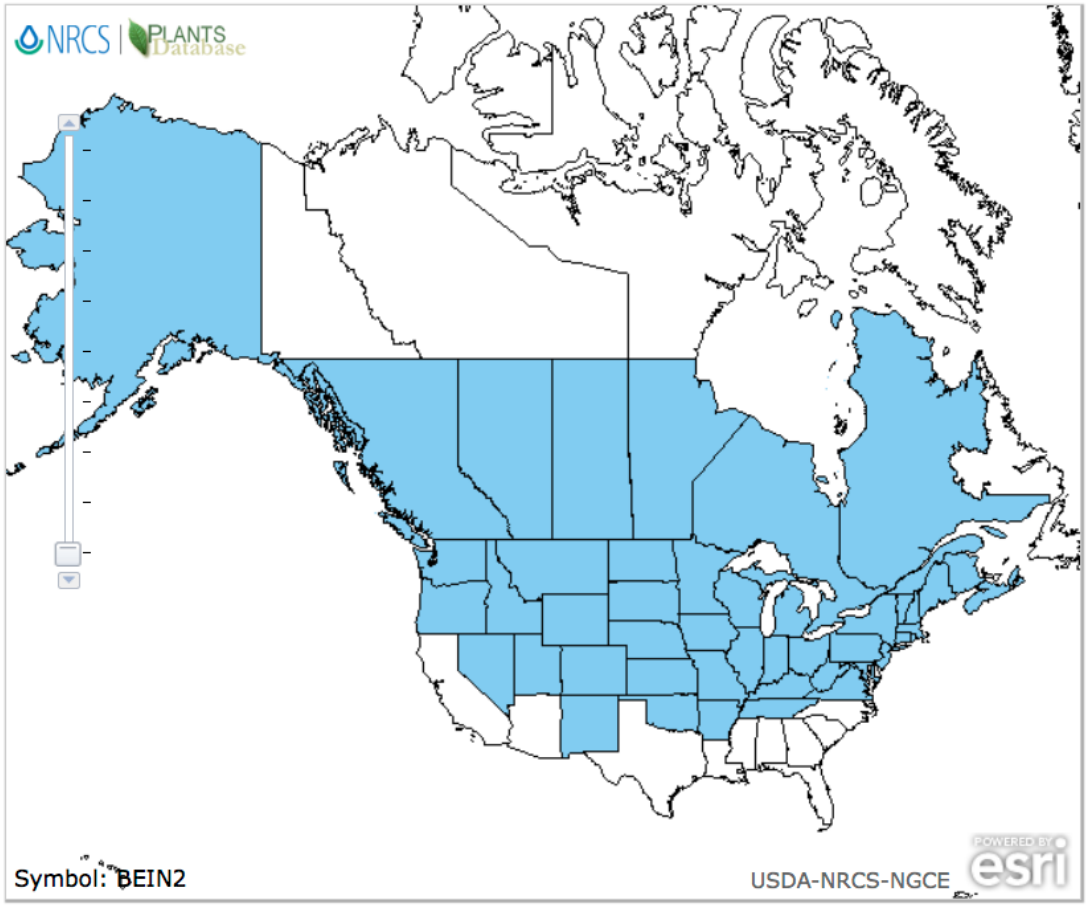
***Berteroa incana* (L.) DC.**
hoary alyssum

Show Tabs



General Information	
Symbol:	BEIN2
Group:	Dicot
Family:	Brassicaceae
Duration:	Annual Biennial Perennial
Growth Habit:	Forb/herb
Native Status:	AK I CAN I L48 I
Other Common Names:	hoary false madwort
Fact Sheet (pdf) (doc)	
Data Source and Documentation	

About our new maps



Native
Native, No County Data
Introduced
Introduced, No County Data
Both
Both, No County Data
Absent/Unreported

Native Status:
L48 AK HI PR VI NAV CAN GL SPM NA

USDA, NRCS. 2017. The PLANTS Database (http://plants.usda.gov, 18 July 2017). National Plant Data Team, Greensboro, NC 27401-4901 USA. https://plants.usda.gov/core/profile?symbol=BEIN2 https://plants.usda.gov/core/profile?symbol=BEIN2

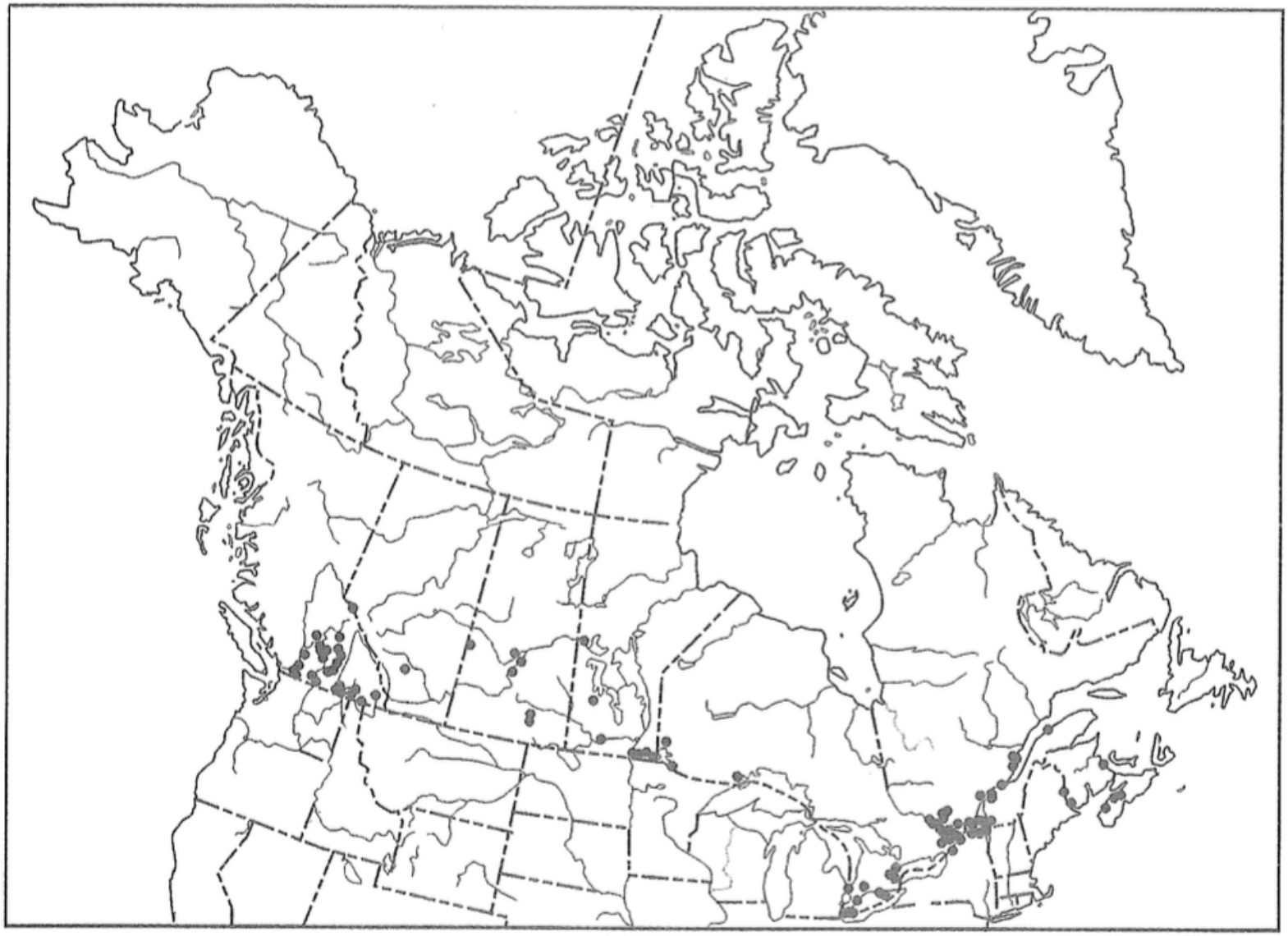


Fig. 2. Distribution of *Berteroa incana* in Canada, based on 6, 110, 21, 3, 37, 26, 8, and 3 herbarium specimens from ALTA, DAO, MT, NSPM, QFQ, RBCM, SASK, and UNB. respectively. Herbarium abbreviations in Holmgren et al. (1990).

(From Warwick SI, Francis, A. (2006) The Biology of Invasive Alien Plants in Canada. 6. *Berteroa incana* (L.) DC. Canadian journal of plant science. Oct. 86(4) p. 1297-1309.)