

TIPPC Plant Assessment Form

For use with "[Criteria for Categorizing Invasive Non-Native Plants that Threaten Wildlands](#)"

by the California Invasive Plant Council and the Southwest Vegetation Management Association

Version February 2003, modified July 2009 for the Texas Invasive Plant & Pest Council –
www.texasinvasives.org

Table 1. Species and Evaluator Information

Species name (Latin binomial):	<i>Alternanthera philoxeroides</i> (Mart.) Griseb
Synonyms:	
Common names:	Alligatorweed
Evaluation date (mm/dd/yy):	10/29/2009
Evaluator #1 Name/Title:	Kimberly Mighell
Affiliation:	University of North Texas
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Evaluator #2 Name/Title:	Bishnu Twanabasu
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Address:	enter text here

Section below for list committee use—please leave blank

List committee members:	enter text here
Committee review date:	enter text here
List date:	enter text here
Re-evaluation date(s):	enter text here

General comments on this assessment:

enter text here

Table 2. Criteria, Section, and Overall Scores

Species: *Alternanthera philoxeroides*

Region: Texas

<u>1.1</u>	Impact on abiotic ecosystem processes	B	Other Pub. Mat'l
<u>1.2</u>	Impact on plant community	B	Other Pub. Mat'l
<u>1.3</u>	Impact on higher trophic levels	C	Other Pub. Mat'l
<u>1.4</u>	Impact on genetic integrity	D	Rev'd Sci. Pub'n

Impact

Enter four characters from Q1.1-1.4 below:

BBCD

Using matrix, determine score and enter below:

B

<u>2.1</u>	Role of anthropogenic and natural disturbance	B	Other Pub. Mat'l
<u>2.2</u>	Local rate of spread with no management	A	Other Pub. Mat'l
<u>2.3</u>	Recent trend in total area infested within state	B	Rev'd Sci. Pub'n
<u>2.4</u>	Innate reproductive potential <u>Wksht A</u>	B	Other Pub. Mat'l
<u>2.5</u>	Potential for human-caused dispersal	B	Rev'd Sci. Pub'n
<u>2.6</u>	Potential for natural long-distance dispersal	B	Other Pub. Mat'l
<u>2.7</u>	Other regions invaded	C	Rev'd Sci. Pub'n

Invasiveness

Enter the sum total of all points for Q2.1-2.7 below:

14

Use matrix to determine score and enter below:

B

Plant Score

Using matrix, determine Overall Score and Alert Status from the three section scores and enter below:

Med

No Alert

<u>3.1</u>	Ecological amplitude/Range	A	Other Pub. Mat'l
<u>3.2</u>	Distribution/Peak frequency <u>Wksht C</u>	B	Other Pub. Mat'l

Distribution

Using matrix, determine score and enter below:

A

Documentation

Average of all questions

Other Pub. Mat'l

Table 3. Documentation (List all references at end of PAF. Short citations may be used in Table 3.)

Impacts	
Question 1.1 Impact on abiotic ecosystem processes	B Other Pub. Mat'l back
Identify ecosystem processes impacted: The dense floating mats will restrict light penetration (1, 2, 3, 4) and can create anoxic conditions (1, 4). It can cause an increase in sedimentation (3). The thick mats will cause flooding by preventing proper drainage of water from ditches and small waterways (3, 4).	
Sources of information:	
<ol style="list-style-type: none"> 1. DiTomaso, Joseph and Evelyn Healy. <i>Weeds of California and Other Western States Vol. 1: Aizonaceae-Fabaceae</i>. Regents of the University of California: 2007. 2. Pan et al. 2006. The influence of abiotic stress and phenotypic plasticity on the distribution of invasive <i>Alternanthera philoxeroides</i> along a riparian zone. <i>Acta Oecologica</i>: 30 (2006). Pg. 333-341. 3. Buckingham, G.R. US department of Agriculture, Agriculture Research Service, Invasive Plants Research Laboratory. Gainesville, Florida. (Accessed October 21, 2009) http://invasive.org/eastern/biocontrol/1Alligatorweed.html. 4. Holm et al. <i>World Weeds: Natural Histories and Distribution</i>. John Wiley, New York: 1997. 	
Question 1.2 Impact on plant community composition, structure, and interactions	B Other Pub. Mat'l back
Identify type of impact or alteration: It crowds out native species with dense floating mats (1). The canopy shades out seedlings (2). It is able to outcompete other species for light (3). Light restricting mats and anoxic conditions will interfere with the growth of submerged flora (4).	
Sources of information:	
<ol style="list-style-type: none"> 1. DiTomaso, Joseph and Evelyn Healy. <i>Weeds of California and Other Western States Vol. 1: Aizonaceae-Fabaceae</i>. Regents of the University of California: 2007. 2. Pan et al. 2006. The influence of abiotic stress and phenotypic plasticity on the distribution of invasive <i>Alternanthera philoxeroides</i> along a riparian zone. <i>Acta Oecologica</i>: 30 (2006). Pg. 333-341. 3. NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, VA. Available http://natureserve.org/explorer. (Accessed Oct 19, 2009). http://natureserve.org/explorer/servlet/NatureServe?searchName=Alternanthera%20philoxeroides. 4. Holm et al. <i>World Weeds: Natural Histories and Distribution</i>. John Wiley, New York: 1997. 	
Question 1.3 Impact on higher trophic levels	C Other Pub. Mat'l back
Identify type of impact or alteration: It provides a breeding ground for mosquitoes (1, 2) and disease vectors (2).	
Sources of information:	
<ol style="list-style-type: none"> 1. DiTomaso, Joseph and Evelyn Healy. <i>Weeds of California and Other Western States Vol. 1:</i> 	

<i>Aizonaceae-Fabaceae</i> . Regents of the University of California: 2007.	
2. Holm et al. <i>World Weeds: Natural Histories and Distribution</i> . John Wiley, New York: 1997.	
Question 1.4 Impact on genetic integrity	D Rev'd Sci. Pub'n back
Identify impacts: <i>Alternanthera philoxeroides</i> is not known to reproduce sexually/produce viable seeds under field conditions (1, 2). There are also no known native <i>Alternanthera</i> species.	
Sources of information:	
<ol style="list-style-type: none"> 1. DiTomaso, Joseph and Evelyn Healy. <i>Weeds of California and Other Western States Vol. 1: Aizonaceae-Fabaceae</i>. Regents of the University of California: 2007 2. Sainty, McCorkelle, and Julien. 1998. Control and spread of Alligatorweed <i>Alternanthera philoxeroides</i> (Mart.) Griseb., in Australia: lessons for other regions. <i>Wetlands Ecology and Management</i> (1998) 5:195-201. 	
Invasiveness	
Question 2.1 Role of anthropogenic and natural disturbance in establishment	B Other Pub. Mat'l back
Describe role of disturbance: It grows best under eutrophic conditions (1). It can spread if not all plant parts are removed during mechanical separation (1). Plant fragments can spread during storms and high water levels (2) as well as with water current (3). Cattle and horses may facilitate spread of fragments in their hooves or from their mouths while grazing (3).	
Sources of information:	
<ol style="list-style-type: none"> 1. DiTomaso, Joseph and Evelyn Healy. <i>Weeds of California and Other Western States Vol. 1: Aizonaceae-Fabaceae</i>. Regents of the University of California: 2007. 2. Holm et al. <i>World Weeds: Natural Histories and Distribution</i>. John Wiley, New York: 1997. 3. Oosterhout, Elissa. <i>Weeds of National Significance: Alligatorweed Control Manual</i>. NSW Department of Primary Industries: 2007. 	
Question 2.2 Local rate of spread with no management	A Other Pub. Mat'l back
Describe rate of spread: <i>Alternanthera philoxeroides</i> exhibits a doubling time of 41-50 days under normal growing conditions (1, 2) between fifteen and twenty degrees Celsius (3). Primary growth is vegetative as no reproduction via seeds has been noted in the United States (1).	
Sources of information:	
<ol style="list-style-type: none"> 1. Holm et al. <i>World Weeds: Natural Histories and Distribution</i>. John Wiley, New York: 1997. 2. Julien, M. H. and M. W. Griffiths (eds.). 1998. <i>Biological Control of Weeds: A World Catalogue of Agents and Their Target Weeds</i>, 4th ed. CAB International, Wallingford, United Kingdom. 3. Julien M.H., Bourne, A.S. and V.H.K. Low. 1992. Growth of the weed <i>Alternanthera philoxeroides</i> (Martius) Grisebach, (alligator weed) in aquatic and terrestrial habitats in Australia. <i>Journal of Aquatic Botany</i> (1992) 7: 102-108. 	

Question 2.3 Recent trend in total area infested within state	B Rev'd Sci. Pub'n back
Describe trend: The coverage of <i>Alternanthera philoxeroides</i> has remained stable due to the effectiveness of control measures across the state since 1964 (1). Population control has been most heavily affected by the release of the Alligator Weed Flea Beetle, <i>Agasicles hygrophila</i> , since 1964 (2). To this day, the Texas Department of Wildlife maintains the release of the Flea Beetle across the state. Chemical control measures using 2,4-D and Glycophosphate are also used to control local outbreaks on the Texas River (3, 4). It should be noted that very little documentation exists regarding cover class, vegetation surveys or reliable data regarding population and spread of <i>Alternanthera philoxeroides</i> in Texas.	
Sources of information:	
<ol style="list-style-type: none"> 1. Buckingham, G. R. 1996. Biological control of alligatorweed, <i>Alternanthera philoxeroides</i>, the world's first aquatic weed success story. <i>Castanea</i> 61: 231-243. 2. Maddox, D. M., L. A. Andres, R. D. Hennessey, R. D. Blackburn, and N. R. Spencer. 1971. Insects to control alligatorweed: an invader of aquatic ecosystems in the United States. <i>Bioscience</i> 21: 985-991. 3. Allen, S.L., G.R. Hepp, and J.H. Miller. 2007. Use of herbicides to control alligatorweed and restore native plants in managed marshes. <i>Wetlands</i> 27(3):739-748. 4. Sainty, G., G. McCorkelle, and M. Julien. 1998. Control and spread of alligator weed <i>Alternanthera philoxeroides</i> (Mart.) Griseb., in Australia: Lessons for other regions. <i>Wetlands Ecology and Management</i> (1998) 5:195-201. 	
Question 2.4 Innate reproductive potential	B Other Pub. Mat'l back
Describe key reproductive characteristics: <i>Alternanthera philoxeroides</i> is known to reproduce only through vegetative means and disperse by fragmentation (1, 2). Fragments with at least one node can produce a new plant (1). Aquatic forms have hollow, floating stems that break off easily and form new colonies (1). It spreads horizontally by stolons and rhizomes (2).	
Sources of information:	
<ol style="list-style-type: none"> 1. Holm et al. <i>World Weeds: Natural Histories and Distribution</i>. John Wiley, New York: 1997. 2. Sainty, McCorkelle, and Julien. 1998. Control and spread of Alligatorweed <i>Alternanthera philoxeroides</i> (Mart.) Griseb., in Australia: lessons for other regions. <i>Wetlands Ecology and Management</i> (1998) 5:195-201. 	
Question 2.5 Potential for human-caused dispersal	B Rev'd Sci. Pub'n back
Identify dispersal mechanisms: Fragments are able to be moved by earthmoving machinery (1), watercrafts (1,3), slashing and mowing (1), gravel/turf extraction (1,3) and control activities involving improper disposal, incomplete removal of plants (1,3), or root fragmentation (2).	
Sources of information:	
<ol style="list-style-type: none"> 1. Oosterhout, Elissa. <i>Weeds of National Significance: Alligatorweed Control Manual</i>. NSW Department of Primary Industries: 2007. 2. Xin, Jia et al. 2009. Allometric growth, disturbance regime, and dilemmas of controlling invasive plants: a model analysis. <i>Biological Invasions</i> (2009) 11: 743-752. 3. Sainty, McCorkelle, and Julien. 1998. Control and spread of Alligatorweed <i>Alternanthera philoxeroides</i> 	

(Mart.) Griseb., in Australia: lessons for other regions. <i>Wetlands Ecology and Management</i> (1998) 5:195-201.	
Question 2.6 Potential for natural long-distance dispersal	B Other Pub. Mat'l back
Identify dispersal mechanisms: Natural spread aquatically is by the movement of fragments by water flow or floods. Terrestrial spread is through competition and eventual domination of other vegetation. (1, 2).	
Sources of information:	
<ol style="list-style-type: none"> 1. Oosterhout, Elissa. <i>Weeds of National Significance: Alligatorweed Control Manual</i>. NSW Department of Primary Industries: 2007. 2. Holm et al. <i>World Weeds: Natural Histories and Distribution</i>. John Wiley, New York: 1997. 	
Question 2.7 Other regions invaded	C Rev'd Sci. Pub'n back
Identify other regions: Native to South America. Invasive weed in 30 countries, including the US, China, Australia, Thailand, Indonesia, Japan and India (1, 2).	
Sources of information:	
<ol style="list-style-type: none"> 1. Oosterhout, Elissa. <i>Weeds of National Significance: Alligatorweed Control Manual</i>. NSW Department of Primary Industries: 2007. 2. Julian, Skarratt, and Maywald. 1995. Potential Geographic Distribution of Alligatorweed and its Biological Control by <i>Agasicles hygrophila</i>. <i>Journal of Aquatic Plant Management</i> (1993)33: 55-60. 	
Distribution	
Question 3.1 Ecological amplitude/Range	A Other Pub. Mat'l back
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: <i>Alternanthera philoxeroides</i> is known to grow rapidly in both terrestrial and aquatic habitats. It requires a moist habitat. It is most troublesome on warm regions, as it limited by frost, but can be found in a variety of microclines (1). It can tolerate salt water at 10% sea strength in still water and 30% in flowing water (1, 2). As aquatic, it is able to root near water's edge and form a floating mat out onto the water's surface (2).	
Sources of information:	
<ol style="list-style-type: none"> 1. Holm et al. <i>World Weeds: Natural Histories and Distribution</i>. John Wiley, New York: 1997. 2. Sainty, McCorkelle, and Julien. 1998. Control and spread of Alligatorweed <i>Alternanthera philoxeroides</i> (Mart.) Griseb., in Australia: lessons for other regions. <i>Wetlands Ecology and Management</i> (1998) 5:195-201. 	
Question 3.2 Distribution/Peak frequency	B Other Pub. Mat'l back
Describe distribution: Colonization has occurred along southeast and central TX (1, 2). It is known to occupy Hunt, Collin, Orange, Jefferson, Chambers, Galveston, Brazoria, Harris, Walker, Madison, Brazos, Williamson, Travis and Freestone counties (2). Of these, it is found to be in East Texas Pineywoods, Gulf Coast Prairies and Marshes, Post Oak Savannah, Blackland Prairie, and Cross Timbers and Prairies (2).	
Sources of information:	

1. USDA Plants Database. US Department of Agriculture, Natural Resource Conservation Service. (Accessed October 14, 2009)

<http://plants.usda.gov/java/nameSearch?keywordquery=alligatorweed&mode=comname&submit.x=22&submit.y=5>
2. Turner, Billie Lee et al. *Texas Atlas of Vascular Plants, Vol 1: Dicots*. Botanical Research Institute of Texas. 2003.

References

List full citations for all references used in the PAF (short citations such as DiTomaso and Healy 2007 may be used in table above). **Websites** should include the name of the organization and the date accessed. **Personal communications** should include the affiliation of the person providing the observation. Enter each reference on a separate line; the table will expand as needed.

Examples:

Mitich, L. W. 1995. Intriguing world of weeds: Tansy ragwort. *Weed Technology*. 9: 402-404.

HEAR. Date unknown. *Emex spinosa*. Hawaiian Ecosystems at Risk.
www.hear.org/pier/species/emex_spinosa.htm. Accessed March 17, 2009

DiTomaso, J. M. Personal communication from Dr. Joe DiTomaso, Dept. of Plant Science, UC Davis. Email received 3/17/09.

Allen, S.L., G.R. Hepp, and J.H. Miller. 2007. Use of herbicides to control alligatorweed and restore native plants in managed marshes. *Wetlands* 27(3):739-748

Buckingham, G. R. 1996. Biological control of alligatorweed, *Alternanthera philoxeroides*, the world's first aquatic weed success story. *Castanea* 61: 231-243.

Buckingham, G.R. US department of Agriculture, Agriculture Research Service, Invasive Plants Research Laboratory. Gainesville, Florida. (Accessed October 21, 2009).

<http://invasive.org/eastern/biocontrol/1Alligatorweed.html>.

DiTomaso, Joseph and Evelyn Healy. *Weeds of California and Other Western States Vol. 1: Aizonaceae-Fabaceae*. Regents of the University of California: 2007.

Holm et al. *World Weeds: Natural Histories and Distribution*. John Wiley, New York: 1997

Julien M.H., Bourne, A.S. and V.H.K. Low. 1992. Growth of the weed *Alternanthera philoxeroides* (Martius) Grisebach, (alligator weed) in aquatic and terrestrial habitats in Australia. *Journal of Aquatic Botany* (1992) 7: 102-108.

Julien, M. H. and M. W. Griffiths (eds.). 1998. *Biological Control of Weeds: A World Catalogue of Agents and Their Target Weeds*, 4th ed. CAB International, Wallingford, United Kingdom.

Julian, Skarratt, and Maywald. 1995. Potential Geographic Distribution of Alligatorweed and its Biological Control by *Agasicles hygrophila*. *Journal of Aquatic Plant Management* (1993)33: 55-60.

Holm et al. *World Weeds: Natural Histories and Distribution*. John Wiley, New York: 1997.

Maddox, D. M., L. A. Andres, R. D. Hennessey, R. D. Blackburn, and N. R. Spencer. 1971. Insects to control

alligatorweed: an invader of aquatic ecosystems in the United States. *Bioscience* 21: 985-991.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, VA. Available <http://natureserve.org/explorer>. (Accessed Oct 19, 2009).

Oosterhout, Elissa. *Weeds of National Significance: Alligatorweed Control Manual*. NSW Department of Primary Industries: 2007.

Pan et al. 2006. The influence of abiotic stress and phenotypic plasticity on the distribution of invasive *Alternanthera philoxeroides* along a riparian zone. *Acta Oecologica*: 30 (2006). Pg. 333-341.

Sainty, McCorkelle, and Julien. 1998. Control and spread of Alligatorweed *Alternanthera philoxeroides* (Mart.) Griseb., in Australia: lessons for other regions. *Wetlands Ecology and Management* (1998) 5:195-201.

Turner, Billie Lee et al. *Texas Atlas of Vascular Plants, Vol 1: Dicots*. Botanical Research Institute of Texas. 2003.

USDA Plants Database. US Department of Agriculture, Natural Resource Conservation Service. (Accessed October 14, 2009)

<http://plants.usda.gov/java/nameSearch?keywordquery=alligatorweed&mode=comname&submit.x=22&submit.y=5>

Xin, Jia et al. 2009. Allometric growth, disturbance regime, and dilemmas of controlling invasive plants: a model analysis. *Biological Invasions* (2009) 11: 743-752.

Worksheet A

Reaches reproductive maturity in 2 years or less	Yes
Dense infestations produce >1,000 viable seed per square meter	No
Populations of this species produce seeds every year.	No
Seed production sustained over 3 or more months within a population annually	No
Seeds remain viable in soil for three or more years	No
Viable seed produced with <i>both</i> self-pollination and cross-pollination	No
Has quickly spreading vegetative structures (rhizomes, roots, etc.) that may root at nodes	Yes
Fragments easily and fragments can become established elsewhere	Yes
Resprouts readily when cut, grazed, or burned	Yes
	5 Total Pts. 0 Total Unknown
	B
Note any related traits: enter text here	

Worksheet B - Texas Ecoregions

Code	Ecoregion	Score*
ER01	East Texas Pineywoods	C
ER02	Gulf Coast Prairies and Marshes	B
ER03	Post Oak Savannah	C
ER04	Blackland Prairies	C
ER05	Cross Timbers and Prairies	D
ER06	South Texas Plains	score
ER07	Edwards Plateau	score
ER08	Rolling Plains	score
ER09	High Plains	score
ER10	Trans Pecos	score

* A. means >50% of type occurrences are invaded; B means >20% to 50%; C. means >5% to 20%; D. means present but ≤5%; U. means unknown (unable to estimate percentage of occurrences invaded).