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|---|--|
| Taxon: <i>Eustoma grandiflorum</i> | Family: Gentianaceae |
| Common Name(s): lisianthus prairie gentian | Synonym(s): <i>Eustoma andrewsii</i> A.Nelson <i>Eustoma exaltatum</i> subsp. <i>Lisianthus russellianus</i> Hook. |

| | | |
|---------------------------|----------------------------------|------------------------------|
| Assessor: Assessor | Status: Assessor Approved | End Date: 28 Apr 2014 |
| WRA Score: 1.0 | Designation: L | Rating: Low Risk |

Keywords: Annual Wildflower, Ornamental, Cut flower, Self-compatible, Small-seeded

| Qsn # | Question | Answer Option | Answer |
|-------|---|--|--------------|
| 101 | Is the species highly domesticated? | y=-3, n=0 | n |
| 102 | Has the species become naturalized where grown? | | |
| 103 | Does the species have weedy races? | | |
| 201 | Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical" | (0-low; 1-intermediate; 2-high) (See Appendix 2) | Intermediate |
| 202 | Quality of climate match data | (0-low; 1-intermediate; 2-high) (See Appendix 2) | High |
| 203 | Broad climate suitability (environmental versatility) | y=1, n=0 | n |
| 204 | Native or naturalized in regions with tropical or subtropical climates | y=1, n=0 | n |
| 205 | Does the species have a history of repeated introductions outside its natural range? | y=-2, ?=-1, n=0 | y |
| 301 | Naturalized beyond native range | y = 1*multiplier (see Appendix 2), n= question 205 | n |
| 302 | Garden/amenity/disturbance weed | n=0, y = 1*multiplier (see Appendix 2) | n |
| 303 | Agricultural/forestry/horticultural weed | | |
| 304 | Environmental weed | n=0, y = 2*multiplier (see Appendix 2) | n |
| 305 | Congeneric weed | n=0, y = 1*multiplier (see Appendix 2) | n |
| 401 | Produces spines, thorns or burrs | y=1, n=0 | n |
| 402 | Allelopathic | | |
| 403 | Parasitic | y=1, n=0 | n |
| 404 | Unpalatable to grazing animals | y=1, n=-1 | y |
| 405 | Toxic to animals | y=1, n=0 | n |
| 406 | Host for recognized pests and pathogens | | |
| 407 | Causes allergies or is otherwise toxic to humans | y=1, n=0 | n |
| 408 | Creates a fire hazard in natural ecosystems | y=1, n=0 | n |
| 409 | Is a shade tolerant plant at some stage of its life cycle | | |

| Qsn # | Question | Answer Option | Answer |
|-------|--|---|--------|
| 410 | Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island) | y=1, n=0 | n |
| 411 | Climbing or smothering growth habit | y=1, n=0 | n |
| 412 | Forms dense thickets | y=1, n=0 | n |
| 501 | Aquatic | y=5, n=0 | n |
| 502 | Grass | y=1, n=0 | n |
| 503 | Nitrogen fixing woody plant | y=1, n=0 | n |
| 504 | Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers) | y=1, n=0 | n |
| 601 | Evidence of substantial reproductive failure in native habitat | | |
| 602 | Produces viable seed | y=1, n=-1 | y |
| 603 | Hybridizes naturally | | |
| 604 | Self-compatible or apomictic | y=1, n=-1 | y |
| 605 | Requires specialist pollinators | y=-1, n=0 | n |
| 606 | Reproduction by vegetative fragmentation | y=1, n=-1 | n |
| 607 | Minimum generative time (years) | 1 year = 1, 2 or 3 years = 0, 4+ years = -1 | 1 |
| 701 | Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas) | | |
| 702 | Propagules dispersed intentionally by people | y=1, n=-1 | y |
| 703 | Propagules likely to disperse as a produce contaminant | | |
| 704 | Propagules adapted to wind dispersal | y=1, n=-1 | y |
| 705 | Propagules water dispersed | | |
| 706 | Propagules bird dispersed | y=1, n=-1 | n |
| 707 | Propagules dispersed by other animals (externally) | | |
| 708 | Propagules survive passage through the gut | y=1, n=-1 | n |
| 801 | Prolific seed production (>1000/m ²) | | |
| 802 | Evidence that a persistent propagule bank is formed (>1 yr) | | |
| 803 | Well controlled by herbicides | | |
| 804 | Tolerates, or benefits from, mutilation, cultivation, or fire | | |
| 805 | Effective natural enemies present locally (e.g. introduced biocontrol agents) | | |

Supporting Data:

| Qsn # | Question | Answer |
|-------|---|---|
| 101 | Is the species highly domesticated? | n |
| | Source(s) | Notes |
| | Missouri Botanical Garden. 2014. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a576 . [Accessed 27 Apr 2014] | "Garden cultivars typically grow 18-30" tall, although some dwarf varieties (to 6-8" tall) are available. Additionally, cultivars offer a broader range of flower colors including various shades of pink, blue-violet and white. Some double-flowered varieties are also available. Ovate to oblong, 3-5 veined, stem-clasping, gray-green leaves (to 3" long). Excellent cut flower. Synonymous with <i>Lisianthus russellianus</i> ." [Assessment for wild type. Certain cultivars may be highly domesticated] |

| | | |
|-----|---|-------|
| 102 | Has the species become naturalized where grown? | |
| | Source(s) | Notes |
| | WRA Specialist. 2014. Personal Communication | NA |

| | | |
|-----|--|-------|
| 103 | Does the species have weedy races? | |
| | Source(s) | Notes |
| | WRA Specialist. 2014. Personal Communication | NA |

| | | |
|-----|---|--|
| 201 | Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical" | Intermediate |
| | Source(s) | Notes |
| | USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/ . [Accessed 27 Apr 2014] | "Native: North-Central U.S.A.: United States - Kansas [w.], Nebraska, Oklahoma [w.], South Dakota [s.w.] Northwestern U.S.A.: United States - Colorado [e.] South-Central U.S.A.: United States - Texas Northern Mexico: Mexico - Coahuila" [Marginal in subtropical climates] |

| | | |
|-----|--|-------|
| 202 | Quality of climate match data | High |
| | Source(s) | Notes |
| | USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/ . [Accessed] | |

| | | |
|-----|---|-------|
| 203 | Broad climate suitability (environmental versatility) | n |
| | Source(s) | Notes |

| Qsn # | Question | Answer |
|-------|---|---|
| | Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | "...sometimes grown in gardens at higher, cooler elevations." [Suggests lower elevation, tropical climates are unsuitable for cultivation] |
| | Burke, D. 2005. The complete Burke's backyard: the ultimate book of fact sheets. Murdoch Books, Millers Point, Australia | "Climate: Can be grown as an annual from Brisbane to Perth, and south but this is a plant plagued by disease problems. It is at its best in a Mediterranean climate with a dry summer and low humidity." |
| | Dave's Garden. 2014. PlantFiles: Prairie Gentian, Lisianthus, Texas Bluebell - <i>Eustoma grandiflorum</i> . http://davesgarden.com/guides/pf/go/891/ . [Accessed 27 Apr 2014] | "Hardiness: USDA Zone 8b: to -9.4 °C (15 °F) USDA Zone 9a: to -6.6 °C (20 °F) USDA Zone 9b: to -3.8 °C (25 °F) USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11: above 4.5 °C (40 °F)" |

| 204 | Native or naturalized in regions with tropical or subtropical climates | n |
|-----|--|--|
| | Source(s) | Notes |
| | Burke, D. 2005. The complete Burke's backyard: the ultimate book of fact sheets. Murdoch Books, Millers Point, Australia | "It is at its best in a Mediterranean climate with a dry summer and low humidity." |
| | Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | "Native to the southern U.S. in a broad band extending from Texas and Nebraska westward to New Mexico and Colorado..." |
| | Missouri Botanical Garden. 2014. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a576 . [Accessed 27 Apr 2014] | "Prairie gentian, bluebell gentian or lisianthus is native to prairies and fields from northern Mexico north to Colorado and Nebraska." [Northern Mexico might be considered marginally subtropical] |

| 205 | Does the species have a history of repeated introductions outside its natural range? | y |
|-----|---|---|
| | Source(s) | Notes |
| | Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | "This species first found favor in Great Britain and Europe, where its growing requirements were worked out..." ... "In Hawaii, prairie gentian is grown to a limited extent by commercial cut flower growers and sold in supermarkets and florist's shops, and it is sometimes grown in gardens at higher, cooler elevations." |

| 301 | Naturalized beyond native range | n |
|-----|--|---------------------|
| | Source(s) | Notes |
| | Imada, C. 2012. Hawaiian Native and Naturalized Vascular Plants Checklist (December 2012 update). Bishop Museum Technical Report 60. Bishop Museum, Honolulu, HI | No evidence to date |
| | Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia | No evidence to date |

| Qsn # | Question | Answer |
|-------|--|---------------------|
| | Wagner, W.L., Herbst, D.R., Khan, N.& Flynn, T. 2012. Hawaiian Vascular Plant Updates: A Supplement to the Manual of the Flowering Plants of Hawai'i & Hawai'i's Ferns & Fern Allies. Smithsonian Institution and NTBG, Washington, DV & Lihue, HI. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/supplement.htm . [Accessed] | No evidence to date |

| 302 | Garden/amenity/disturbance weed | n |
|-----|---|--|
| | Source(s) | Notes |
| | Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | "This biennial, tap-rooted species has rather exacting growing requirements that must be met if the plant is to be brought o the flowering stage." [Unlikely to become weedy with exacting growing requirements] |
| | Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia | No evidence |

| 303 | Agricultural/forestry/horticultural weed | n |
|-----|--|-------------|
| | Source(s) | Notes |
| | Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia | No evidence |

| 304 | Environmental weed | n |
|-----|--|-------------|
| | Source(s) | Notes |
| | Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia | No evidence |

| 305 | Congeneric weed | n |
|-----|--|-------------|
| | Source(s) | Notes |
| | Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia | No evidence |

| 401 | Produces spines, thorns or burrs | n |
|-----|---|---|
| | Source(s) | Notes |
| | Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | "Annual or perennial herb to 2' tall, glaucous, glabrous; stems branched above. Lvs sessile; blades ovate to elliptic-oblong, to 3.25" x 1.25", strongly 3- or 5-veined from base." [No evidence] |

| Qsn # | Question | Answer |
|-------|--|--------------|
| 402 | Allelopathic | |
| | Source(s) | Notes |
| | WRA Specialist. 2014. Personal Communication | Unknown |

| 403 | Parasitic | n |
|-----|---|--|
| | Source(s) | Notes |
| | Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | "Annual or perennial herb to 2' tall, glaucous, glabrous; stems branched above." [Gentianaceae. No evidence] |
| | Zomlefer, W.B. 1994. Guide to Flowering Plant Families. The University of North Carolina Press, Chapel Hill & London | "Plants of the family are commonly mycorrhizal, and a few species (e.g., <i>Bartonia</i> , <i>Obolaria virginica</i>) presumably are saprophytic or parasitic." [No evidence for <i>Eustoma</i>] |

| 404 | Unpalatable to grazing animals | y |
|-----|---|--|
| | Source(s) | Notes |
| | Edge, R. 2011. <i>Eustoma grandiflorum</i>Texas Bluebell. Monday, January 31. http://ralphedge.blogspot.com/2011/01/eustoma-grandiflorumtexas-bluebell.. [Accessed 27 Apr 2014] | "The foliage is pale green (or sometimes almost a blue-green) and is not palatable to grazing animals. Accordingly, bluebell co-exists quite well with cattle-- they seem to ignore it. In fact, it has been my observation that bluebell seems to do better in pastures than on abandoned and/or vacant land. It could be that this is because the cattle hold down the competing vegetation thus making it easier for the tiny, tiny bluebell seed to germinate and for the young seedlings to become established" |

| 405 | Toxic to animals | n |
|-----|---|--------------|
| | Source(s) | Notes |
| | Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL | No evidence |
| | Cornell University. 2014. Plants Poisonous to Livestock and other Animals. http://www.ansci.cornell.edu/plants/index.html . [Accessed 27 Apr 2014] | No evidence |

| 406 | Host for recognized pests and pathogens | |
|-----|--|--|
| | Source(s) | Notes |
| | Burke, D. 2005. The complete Burke's backyard: the ultimate book of fact sheets. Murdoch Books, Millers Point, Australia | "Climate: Can be grown as an annual from Brisbane to Perth, and south but this is a plant plagued by disease problems. It is at its best in a Mediterranean climate with a dry summer and low humidity." |
| | Missouri Botanical Garden. 2014. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a576 . [Accessed 27 Apr 2014] | "No serious insect or disease problems. Some susceptibility to viruses and stem cankers." |

| Qsn # | Question | Answer |
|-------|---|---|
| | Gilman, E.F. 2007. <i>Eustoma grandiflorum</i> Lisianthus. FPS-206. Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL. http://edis.ifas.ufl.edu/pdffiles/FP/FP20600.pdf . [Accessed] | "Pest resistance: long-term health usually not affected by pests" |

| 407 | Causes allergies or is otherwise toxic to humans | n |
|-----|--|---|
| | Source(s) | Notes |
| | American Lung Association of San Diego and Imperial Counties. 2004. Low-Allergy Plants and Trees. http://asthmasandiego.org/pdfs/asthmafriendly%20landscaping.pdf . [Accessed 27 Apr 2014] | Lisianthus (<i>Eustoma grandiflorum</i>) included in list |
| | Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL | No evidence |

| 408 | Creates a fire hazard in natural ecosystems | n |
|-----|--|---|
| | Source(s) | Notes |
| | Stafford, K. 2011. Firewise Plant List - Texas. http://txmg.wpengine.netdna-cdn.com/ellis/files/2012/03/Texas-Plant-Flammability-List.pdf . [Accessed 27 Apr 2014] | " <i>Eustoma grandiflorum</i> - Flammability = Low" |

| 409 | Is a shade tolerant plant at some stage of its life cycle | n |
|-----|---|---|
| | Source(s) | Notes |
| | Gilman, E.F. 2007. <i>Eustoma grandiflorum</i> Lisianthus. FPS-206. Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL. http://edis.ifas.ufl.edu/pdffiles/FP/FP20600.pdf . [Accessed] | "Light requirement: plant grows in part shade/part sun" |
| | Dave's Garden. 2014. PlantFiles: Prairie Gentian, Lisianthus, Texas Bluebell - <i>Eustoma grandiflorum</i> . http://davesgarden.com/guides/pf/go/891/ . [Accessed 27 Apr 2014] | "Sun Exposure: Sun to Partial Shade" |
| | Missouri Botanical Garden. 2014. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a576 . [Accessed 27 Apr 2014] | "Sun: Full sun" |

| 410 | Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island) | n |
|-----|---|---|
| | Source(s) | Notes |
| | Lady Bird Johnson Wildflower Center. 2014. Native Plant Database - <i>Eustoma exaltatum</i> ssp. <i>russellianum</i> . https://www.wildflower.org/plants/result.php?id_plant=euexr . [Accessed 27 Apr 2014] | "Soil Moisture: Moist Soil Description: Moist, sandy or sandy loams. " |

| Qsn # | Question | Answer |
|-------|---|--|
| | Dave's Garden. 2014. PlantFiles: Prairie Gentian, Lisianthus, Texas Bluebell - <i>Eustoma grandiflorum</i> . http://davesgarden.com/guides/pf/go/891/ . [Accessed 27 Apr 2014] | "Soil pH requirements: 5.6 to 6.0 (acidic) 6.1 to 6.5 (mildly acidic) 6.6 to 7.5 (neutral)" |

| 411 | Climbing or smothering growth habit | n |
|-----|---|--|
| | Source(s) | Notes |
| | Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | "Annual or perennial herb to 2' tall, glaucous, glabrous; stems branched above." |

| 412 | Forms dense thickets | n |
|-----|---|---|
| | Source(s) | Notes |
| | Jennings, W. 2001. Inventory and Status Report for <i>Eustoma grandiflorum</i> , Unpublished report. https://bouldercolorado.gov/links/fetch/16155 . [Accessed 27 Apr 2014] | "A very large population of <i>Eustoma grandiflorum</i> was seen on August 1, 2001. Ms. Weiser personally took us to the site as she did last year. She showed us a bouquet in her kitchen, indicating that the plants were found lying on the ground. Apparently, the cattle had nipped off plants, but then spit them out without chewing them." [Presumably unpalatable] |
| | Edge, R. 2011. <i>Eustoma grandiflorum</i>Texas Bluebell. Monday, January 31. http://ralphedge.blogspot.com/2011/01/eustoma-grandiflorumtexas-bluebell.. [Accessed 27 Apr 2014] | "It will often form extensive colonies -- never forming a continuous, tight sod -- with space (usually about a foot) between the individual plants." |

| 501 | Aquatic | n |
|-----|--|-------------|
| | Source(s) | Notes |
| | WRA Specialist. 2014. Personal Communication | Terrestrial |

| 502 | Grass | n |
|-----|---|--------------|
| | Source(s) | Notes |
| | Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | Gentianaceae |

| 503 | Nitrogen fixing woody plant | n |
|-----|---|--------------|
| | Source(s) | Notes |
| | Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | Gentianaceae |

| Qsn # | Question | Answer |
|-------|---|--|
| 504 | Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers) | n |
| | Source(s) | Notes |
| | Tveten, J., 1997. Wildflowers of Houston and Southeast Texas. University of Texas Press, Austin, TX | "A short-lived perennial, it may be abundant one year and difficult to find the next." |

| 601 | Evidence of substantial reproductive failure in native habitat | |
|-----|--|--|
| | Source(s) | Notes |
| | Colorado Native Plant Society & Rocky Mountain Nature Association. 1997. Rare Plants of Colorado. Falcon Press Publishing Co, Helena, MT | "Tulip gentian requires a fairly high water table in moist open fields and meadows underlain by sandy alluvial soils. Unfortunately, on the dry plains of Colorado this is prime grazing or hay production area. Not only agricultural but gravel mining and urbanization have eradicated most populations near the eastern mountain front." [Reproductive failure may be due to habitat loss] |

| 602 | Produces viable seed | y |
|-----|--|--|
| | Source(s) | Notes |
| | Missouri Botanical Garden. 2014. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a576 . [Accessed 27 Apr 2014] | "Growing from seed can be rather difficult because the seed is dust particle size and it takes about 5 months from planting to first bloom, all of which basically precludes direct sowing in the ground in spring. If grown from seed, start seed indoors at least 10-12 weeks before last frost date." |
| | Lady Bird Johnson Wildflower Center. 2014. Native Plant Database - <i>Eustoma exaltatum</i> ssp. <i>russellianum</i> . https://www.wildflower.org/plants/result.php?id_plant=euexr . [Accessed 27 Apr 2014] | "Propagation Material: Seeds " |

| 603 | Hybridizes naturally | |
|-----|---|--|
| | Source(s) | Notes |
| | Harbaugh, B. K., & Scott, J. W. 2001. 'Florida Silver'—A Semi dwarf Heat-tolerant <i>Lisianthus</i> . <i>HortScience</i> , 36(5), 988-989 | "'Florida Silver' is an F1 hybrid resulting from crossing inbred lines UF99-16 and UF99- 49 (Fig. 1). UF99-16 was chosen for its large white flowers with a vivid violet-blue center, heat tolerance, and lower branching. UF99-49 was chosen for its floriferousness, white flowers with a violet-blue center, heat tolerance, and compact growth habit" [Cultivars bred by "hybridizing" different lines. Unknown if natural hybridization occurs] |

| 604 | Self-compatible or apomictic | y |
|-----|---|---|
| | Source(s) | Notes |
| | Tveten, J., 1997. Wildflowers of Houston and Southeast Texas. University of Texas Press, Austin, TX | "In a strategy call proterandry, the anthers discharge their pollen before the stigma lobes have matured. When the anthers are empty, the style elongates and the stigma lobes expand, ready to receive fresh pollen brought by an insect from another flower. ' [Prevents self-pollination, but unknown if a flower from one plant can pollinate a different flower on the same plant] |

| Qsn # | Question | Answer |
|-------|---|--|
| | Harbaugh, B.K.. 2007. Lisianthus. <i>Eustoma grandiflorum</i> . Pp. 645-664 in N.O. Anderson (ed.). Flower Breeding and Genetics: Issues, Challenges and Opportunities for the 21st Century. Springer, Dordrecht, The Netherlands | "While the crop is self-compatible, it is subject to inbreeding depression." |

| 605 | Requires specialist pollinators | n |
|-----|---|--|
| | Source(s) | Notes |
| | Tveten, J., 1997. Wildflowers of Houston and Southeast Texas. University of Texas Press, Austin, TX | "Flowers of <i>Eustoma</i> are adapted for cross-pollination by bees and other insects." |
| | Zomlefer, W.B. 1994. Guide to Flowering Plant Families. The University of North Carolina Press, Chapel Hill & London | "The brightly colored flowers (often blue, purple, or pink) are some of the world's most beautiful wildflowers. Fringe or scales on the corolla or an eye of contrasting color may serve as nectar guides for various insect pollinators (e.g., bees and lepidopterans) that collect the nectar secreted by glandular tissue at the ovary base (<i>Gentiana</i> , <i>Eustoma</i>)" [No evidence] |
| | The Pollinator Partnership & NAACP. 2009. Selecting Plants for Pollinators. A Regional Guide for Farmers, Land Managers, and Gardeners In the and NAPPC Prairie Parkland (Subtropical) Province. The Pollinator Partnership™/North American Pollinator Protection Campaign, San Francisco, CA | "The following chart lists plants that attract pollinators. It is not exhaustive, but provides guidance on where to start. Annuals, herbs, weeds, and cover crops provide food and shelter for pollinators, too." [<i>Eustoma grandiflorum</i> - Visitation by Pollinator = bees] |

| 606 | Reproduction by vegetative fragmentation | n |
|-----|---|---|
| | Source(s) | Notes |
| | Lady Bird Johnson Wildflower Center. 2014. Native Plant Database - <i>Eustoma exaltatum</i> ssp. <i>russellianum</i> . https://www.wildflower.org/plants/result.php?id_plant=euexr . [Accessed 27 Apr 2014] | "Propagation Material: Seeds " [No evidence of vegetative spread] |

| 607 | Minimum generative time (years) | 1 |
|-----|--|--|
| | Source(s) | Notes |
| | Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | "Annual or perennial herb to 2' tall, glaucous, glabrous" |
| | Missouri Botanical Garden. 2014. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a576 . [Accessed 27 Apr 2014] | "Growing from seed can be rather difficult because the seed is dust particle size and it takes about 5 months from planting to first bloom, all of which basically precludes direct sowing in the ground in spring." |

| Qsn # | Question | Answer |
|-------|--|--|
| 701 | Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas) | |
| | Source(s) | Notes |
| | WRA Specialist. 2014. Personal Communication | No evidence of inadvertent dispersal found, but small, dust-like sides could possibly adhere to mud on vehicles, clothing, or footwear |

| 702 | Propagules dispersed intentionally by people | y |
|-----|---|--|
| | Source(s) | Notes |
| | Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | "Seeds are sold through several mail-order suppliers, and diligent gardeners have succeeded with prairie gentian as a home garden ornamental." ... "In Hawaii, prairie gentian is grown to a limited extent by commercial cut flower growers and sold in supermarkets and florist's shops, and it is sometimes grown in gardens at higher, cooler elevations." |

| 703 | Propagules likely to disperse as a produce contaminant | |
|-----|--|---|
| | Source(s) | Notes |
| | WRA Specialist. 2014. Personal Communication | No evidence that this species has become a contaminant of produce, but its use in the cut flower trade may make this possible |

| 704 | Propagules adapted to wind dispersal | y |
|-----|---|--|
| | Source(s) | Notes |
| | Missouri Botanical Garden. 2014. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a576 . [Accessed 28 Apr 2014] | "Growing from seed can be rather difficult because the seed is dust particle size..." [Small size would presumably aid in dispersal by wind] |

| 705 | Propagules water dispersed | |
|-----|--|--|
| | Source(s) | Notes |
| | Lady Bird Johnson Wildflower Center. 2014. Native Plant Database - <i>Eustoma exaltatum</i> ssp. <i>russellianum</i> . https://www.wildflower.org/plants/result.php?id_plant=euexr . [Accessed 27 Apr 2014] | "Native Habitat: Found in moist places in fields and prairies, especially in areas adjacent to streams and tanks." [Seed dispersal may be aided by water movement] |

| 706 | Propagules bird dispersed | n |
|-----|---|---|
| | Source(s) | Notes |
| | Missouri Botanical Garden. 2014. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a576 . [Accessed 28 Apr 2014] | "Growing from seed can be rather difficult because the seed is dust particle size..." [Not fleshy fruited, and presumably not adapted for bird dispersal] |

| Qsn # | Question | Answer |
|-------|---|---|
| 707 | Propagules dispersed by other animals (externally) | |
| | Source(s) | Notes |
| | Missouri Botanical Garden. 2014. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a576 . [Accessed 28 Apr 2014] | "Growing from seed can be rather difficult because the seed is dust particle size and it takes about 5 months from planting to first bloom, all of which basically precludes direct sowing in the ground in spring." [Unknown, but small seed size might make it possible for seeds to adhere to animal fur or feet, or stick to animals in mud] |
| 708 | Propagules survive passage through the gut | n |
| | Source(s) | Notes |
| | Missouri Botanical Garden. 2014. Missouri Botanical Garden. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a576 . [Accessed 28 Apr 2014] | "Growing from seed can be rather difficult because the seed is dust particle size and it takes about 5 months from planting to first bloom, all of which basically precludes direct sowing in the ground in spring." [Unlikely that small seeds would be consumed, or if so, that they would survive passage through the gut of an animal. Likely dispersed by wind or gravity] |
| 801 | Prolific seed production (>1000/m2) | |
| | Source(s) | Notes |
| | Burke, D. 2005. The complete Burke's backyard: the ultimate book of fact sheets. Murdoch Books, Millers Point, Australia | "Extremely difficult to raise from seed with a low germination rate." |
| 802 | Evidence that a persistent propagule bank is formed (>1 yr) | |
| | Source(s) | Notes |
| | Royal Botanic Gardens Kew. 2008. Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/ . [Accessed 28 Apr 2014] | " <i>Eustoma exaltatum</i> subsp. <i>russellianum</i> (L.) Salisb. ex G. Don" ... "Storage Behaviour: Orthodox Storage Conditions: 94 % viability following drying to mc's in equilibrium with 15 % RH and freezing for 7 weeks at -20C at RBG Kew, WP" |
| | Baskin, C.C. & Baskin, J.M. 2001. Seeds ecology, biogeography, and evolution of dormancy and germination. Academic Press, San Francisco, CA | "Table 8.2" ... " <i>Eustoma grandiflorum</i> " [Possesses physiological dormancy. Unknown if a persistent seed bank forms] |
| 803 | Well controlled by herbicides | |
| | Source(s) | Notes |
| | WRA Specialist. 2014. Personal Communication | Unknown. No information on herbicide efficacy or chemical control of this species |

| Qsn # | Question | Answer |
|-------|---|--|
| 804 | Tolerates, or benefits from, mutilation, cultivation, or fire | |
| | Source(s) | Notes |
| | Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI | "Annual or perennial herb to 2' tall, glaucous, glabrous; stems branched above." [As an annual or short-lived perennial, unlikely to tolerate mutilation or cultivation] |

| | | |
|-----|---|--------------|
| 805 | Effective natural enemies present locally (e.g. introduced biocontrol agents) | |
| | Source(s) | Notes |
| | WRA Specialist. 2014. Personal Communication | Unknown |

Summary of Risk Traits:

High Risk / Undesirable Traits

- Unpalatable to grazing animals
- Self-compatible
- Able to reach maturity in 1 year
- Produces small seeds that are probably wind-dispersed
- Widely and intentionally planted by people

Low Risk Traits

- No reports of naturalization or invasiveness to date
- Unarmed (lacks spines, thorns, or burrs)
- Non-toxic
- Ornamental
- Does not spread vegetatively

Second Screening Results for Herb or low stature shrubby life form

(A) Reported as a weed of cultivated lands?> No

Outcome = Accept (Low Risk)