

| | |
|---|--|
| Taxon: <i>Vinca major</i> | Family: Apocynaceae |
| Common Name(s): bigleaf periwinkle blue periwinkle greater periwinkle large periwinkle | Synonym(s): <i>Vinca grandiflora</i> Salisb. <i>Vinca ovatifolia</i> Stokes |

| | | |
|--------------------------------|----------------------------------|------------------------------|
| Assessor: Chuck Chimera | Status: Assessor Approved | End Date: 11 Dec 2015 |
| WRA Score: 12.0 | Designation: H(HPWRA) | Rating: High Risk |

Keywords: Perennial Herb, Environmental Weed, Toxic, Smothering, Spreads Vegetatively

| 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 | y |
| 204 | Native or naturalized in regions with tropical or subtropical climates | y=1, n=0 | y |
| 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 | y |
| 302 | Garden/amenity/disturbance weed | n=0, y = 1*multiplier (see Appendix 2) | y |
| 303 | Agricultural/forestry/horticultural weed | | |
| 304 | Environmental weed | n=0, y = 2*multiplier (see Appendix 2) | y |
| 305 | Congeneric weed | n=0, y = 1*multiplier (see Appendix 2) | y |
| 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 | y |
| 406 | Host for recognized pests and pathogens | y=1, n=0 | y |
| 407 | Causes allergies or is otherwise toxic to humans | | |
| 408 | Creates a fire hazard in natural ecosystems | | |

| Qsn # | Question | Answer Option | Answer |
|-------|--|---|--------|
| 409 | Is a shade tolerant plant at some stage of its life cycle | y=1, n=0 | y |
| 410 | Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island) | y=1, n=0 | y |
| 411 | Climbing or smothering growth habit | y=1, n=0 | y |
| 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 | y=1, n=0 | n |
| 602 | Produces viable seed | | |
| 603 | Hybridizes naturally | | |
| 604 | Self-compatible or apomictic | y=1, n=-1 | n |
| 605 | Requires specialist pollinators | | |
| 606 | Reproduction by vegetative fragmentation | y=1, n=-1 | y |
| 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) | y=1, n=-1 | y |
| 702 | Propagules dispersed intentionally by people | y=1, n=-1 | y |
| 703 | Propagules likely to disperse as a produce contaminant | y=1, n=-1 | n |
| 704 | Propagules adapted to wind dispersal | | |
| 705 | Propagules water dispersed | y=1, n=-1 | y |
| 706 | Propagules bird dispersed | y=1, n=-1 | n |
| 707 | Propagules dispersed by other animals (externally) | y=1, n=-1 | n |
| 708 | Propagules survive passage through the gut | y=1, n=-1 | n |
| 801 | Prolific seed production (>1000/m ²) | y=1, n=-1 | n |
| 802 | Evidence that a persistent propagule bank is formed (>1 yr) | | |
| 803 | Well controlled by herbicides | y=-1, n=1 | y |
| 804 | Tolerates, or benefits from, mutilation, cultivation, or fire | y=1, n=-1 | y |
| 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 |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | [Assessment for wild type, with no evidence of being highly domesticated] "Numerous periwinkle cultivars are available [30,66]." |

| | | |
|-----|---|-------|
| 102 | Has the species become naturalized where grown? | |
| | Source(s) | Notes |
| | WRA Specialist. 2015. Personal Communication | NA |

| | | |
|-----|--|-------|
| 103 | Does the species have weedy races? | |
| | Source(s) | Notes |
| | WRA Specialist. 2015. 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 |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Bigleaf periwinkle is native to Mediterranean Europe [1,4], Asia Minor [1], and northern Africa (review by [10])." |

| | | |
|-----|--|-------|
| 202 | Quality of climate match data | High |
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | |

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

| Qsn # | Question | Answer |
|-------|--|--|
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Climate: In their nonnative ranges, periwinkles do best in mild climates [4,99]. Few authors report climate data for sites with periwinkles; therefore, the climate data presented here may not represent climatic conditions throughout the nonnative ranges of periwinkles. Both species occur near Washington, DC, where the average daily temperature is 55.0 °F (12.8 °C) [94]. In Arkansas, periwinkles occur in an area with hot summers and moderately cool winters; only 4 days/year have snowfall >1.0 inch (2.5 cm). The first and last frosts in this region occur in early April and late October, respectively [55]. Bigleaf periwinkle occurs in the Huachuca Mountains, where mean daily temperatures are 79 °F (26 °C) in July and 48 °F (9 °C) in January [83]. Common periwinkle occurs on sites with mean daily temperatures in January as low as -7.8 °F (-22.1 °C) in New York [93], and in July as high as 82.2 °F (27.9 °C) in southwestern Georgia [100]." |
| | Dave's Garden. 2015. Greater Periwinkle - <i>Vinca major</i> . http://davesgarden.com/guides/pf/go/55546/ . [Accessed 10 Dec 2015] | [Able to grow in 5+ hardiness zones] "Hardiness: USDA Zone 6a: to -23.3 °C (-10 °F) USDA Zone 6b: to -20.5 °C (-5 °F) USDA Zone 7a: to -17.7 °C (0 °F) USDA Zone 7b: to -14.9 °C (5 °F) USDA Zone 8a: to -12.2 °C (10 °F) 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 | y |
| | Source(s) | Notes |
| | USDA, ARS, Germplasm Resources Information Network, 2015. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 10 Dec 2015] | "Naturalized: ... Asia-Tropical - Indian Subcontinent: India; Pakistan" |
| | Starr, F., Martz, K., & Loope, L.L. 2002. New plant records from the Hawaiian archipelago. Bishop Museum Occasional Papers. 69:16-27 | " <i>V. major</i> (greater periwinkle, blue buttons) is naturalized in at least the Kula area of East Maui where it can be found trailing through brush and over steep banks." [Mid-elevation tropical climate] |

| | | |
|-----|--|---|
| 205 | Does the species have a history of repeated introductions outside its natural range? | y |
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Both bigleaf [51,55,92,107] and common [29,42,50,55,97,100,103,117] periwinkle are frequently planted in North America and escape from cultivation." |
| | USDA, ARS, Germplasm Resources Information Network, 2015. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 10 Dec 2015] | Widely introduced and naturalized |

| Qsn # | Question | Answer |
|-------|--|--|
| 301 | Naturalized beyond native range | y |
| | <p data-bbox="180 296 810 436">Source(s)</p> <p data-bbox="180 436 810 1073">Booy, O., Wade, M. & Roy, H. 2015. Field Guide to Invasive Plants and Animals in Britain. Bloomsbury Publishing, London / New York</p> <p data-bbox="180 1073 810 1831">USDA, ARS, Germplasm Resources Information Network, 2015. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 10 Dec 2015]</p> | <p data-bbox="823 296 1567 436">Notes</p> <p data-bbox="823 436 1567 1831">"HABITAT: Naturalised in waste places, rubbish tips, rough ground, roadside verges, shaded banks, woodland and hedge banks. IMPACT: Invasive in temperate parts of the USA, Australia and New Zealand."</p> <p data-bbox="823 449 1567 1831">"Naturalized: Africa Macaronesia: Portugal - Azores, - Madeira Islands; Spain - Canary Islands Northeast Tropical Africa: Eritrea; Ethiopia Northern Africa: Morocco Southern Africa: South Africa - KwaZulu-Natal, - Eastern Cape, - Western Cape Asia-Temperate Western Asia: Cyprus; Lebanon; Syria Asia-Tropical Indian Subcontinent: India; Pakistan Australasia Australia: Australia New Zealand: New Zealand Europe East Europe: Ukraine Middle Europe: Austria; Hungary Northern Europe: Norway Southeastern Europe: Bulgaria; Greece - Crete Southwestern Europe: France - Corsica; Portugal Northern America North-Central U.S.A.: United States - Illinois, - Missouri Northeastern U.S.A.: United States - Massachusetts, - Ohio Northern Mexico: Mexico - Coahuila, - Durango, - Nuevo Leon, - San Luis Potosi, - Tamaulipas Northwestern U.S.A.: United States - Oregon, - Washington South-Central U.S.A.: United States - New Mexico, - Texas Southeastern U.S.A.: United States - Alabama, - Arkansas, - Georgia, - Mississippi, - North Carolina, - South Carolina, - Tennessee, - Virginia Southern Mexico: Mexico - Chiapas, - Guanajuato, - Hidalgo, - Mexico, - Morelos, - Oaxaca, - Puebla, - Queretaro, - Tlaxcala, - Veracruz, - Federal District Southwestern U.S.A.: United States - California Western Canada: Canada - British Columbia Pacific North-Central Pacific: United States - Hawaii Southern America Mesoamerica: Costa Rica Northern South America: Venezuela - Aragua Southern South America: Argentina; Chile; Uruguay Western South America: Ecuador - Pichincha; Peru - Cuzco"</p> |

| Qsn # | Question | Answer |
|-------|--|---|
| | Starr, F., Martz, K., & Loope, L.L. 2002. New plant records from the Hawaiian archipelago. Bishop Museum Occasional Papers. 69:16-27 | " <i>Vinca major</i> L. New state record. Native to the W. Mediterranean and widely cultivated as a ground cover, <i>V. major</i> (greater periwinkle blue buttons) is naturalized in at least the Kula area of East Maui where it can be found trailing through brush and over steep banks. This collection represents a new state record for Hawai'i." ... "Material examined. MAUI: E. Maui, Kula, Crater Rd., 4000 ft [1219 m], 5 Jan 1999, Starr & Martz 990105-2." |

| 302 | Garden/amenity/disturbance weed | y |
|-----|---|---|
| | Source(s) | Notes |
| | Harrison, M. 2006. Groundcovers for the South. Pineapple Press Inc., Sarasota, FL | "Both vines are attractive trailing over the edges of container plantings. Care should be exercised, however, even when placing these vines in container plantings because the stems will grow to the ground and then take off into neighboring beds. <i>Vinca</i> is often seen spreading into natural areas from old homesites where it was planted years ago. Once established, it grows into a thick groundcover that overtakes other groundcover herbs." |
| | Dave's Garden. 2015. Greater Periwinkle - <i>Vinca major</i> . http://davesgarden.com/guides/pf/go/55546/ . [Accessed 11 Dec 2015] | [Described as a weed of yards & gardens] "On Jun 13, 2008, tinabeana from Greenville, SC (Zone 8a) wrote: I have both <i>vinca major</i> and <i>minor</i> in my yard. <i>Vinca major</i> is the much more invasive of the two, growing over it's smaller sibling anywhere the two meet. Let me put it this way: you know a plant is invasive when it chokes out the baby bamboo that's randomly growing in your flower bed... I've pulled out a pile that overflowed a wheelbarrow, but unfortunately that was just one 10 x 2 ft area. Living tendrils are difficult to remove from the ground, as they have an extensive and spidery root system. Any root that remains with most assuredly grow into a new plant. As hard as they are to deal with, they're still easier than the dead tendrils found underneath: these dry into cord like whips that seem even more tightly rooted than their living counterparts. To be so invasive, this plant reacts very poorly to the hot and dry summer days in my area: the thin leaves wilt easily leaving me with mounds of what almost look like wilted lettuce greens. While I like the larger flowers of <i>v. major</i> , I much prefer the foliage on <i>v. minor</i> : the leaves are smaller, more closely spaced, darker, and hold up better in the summer." |

| Qsn # | Question | Answer |
|-------|---|--|
| 303 | Agricultural/forestry/horticultural weed | |
| | Source(s) | Notes |
| | Beasley, R.R. and Pijit, P.M. (2010). Invasive plant species in hardwood tree plantations. FNR-230-W. USDA Forest Service, Northern Research Station, Hardwood Tree Improvement & Regeneration Center, & Purdue University, Department of Forestry & Natural Resources. | "Table 1. Invasive species commonly found in tree plantations and forested areas in the Central Hardwood Region" [Includes <i>Vinca major</i> . Impacts unspecified, but may be detrimental to tree plantations] |
| | DiTomaso, J. M., Kyser, G. B., Oneto, et al. 2013. Weed Control in Natural Areas in the Western United States. Weed Research and Information Center, University of California, Davis, CA | [Primarily an environmental weed] "Impacts: Under favorable conditions, plants spread invasively and can develop a dense ground cover that outcompetes other vegetation in natural areas. Big periwinkle is becoming a dominant woodland understory in many areas of California. Infestations around old homesteads have been present for many years and serve as nurseries for further spread." |

| 304 | Environmental weed | y |
|-----|--|--|
| | Source(s) | Notes |
| | Weber, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | "A fast growing plant that spreads mainly by vegetative growth. It is a vigorous creeper, occurring in large infestation in semi-shady conditions. The numerous intertwined stems form dense and thick mats that cover the ground, smother small plants and crowd out native species. Establishment of shrub and tree seedlings is prevented" |
| | Cushman, J. H., & Gaffney, K. A. (2010). Community-level consequences of invasion: impacts of exotic clonal plants on riparian vegetation. <i>Biological Invasions</i> , 12(8): 2765-2776 | "Along the Russian River in northern California, we used both comparative and experimental studies to investigate the influence of two exotic clonal plant species—giant reed (<i>Arundo donax</i>) and blue periwinkle (<i>Vinca major</i>)—on the composition of riparian plant communities." ... "Additional research showed that plots invaded by <i>Arundo</i> and <i>Vinca</i> , both individually and collectively, exhibited significantly lower native and exotic species richness and abundance of both established plants and seedlings than uninvaded plots." ... "In summary, our results indicate that <i>Arundo</i> and <i>Vinca</i> have strongly negative effects on diverse components of a riparian plant community, which must be addressed via effective control and restoration efforts." |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "The tendency of periwinkles to form dense mats under forest canopies (review by [72]) may lead to the exclusion of native species [74]. In Ohio, a dense stand of bigleaf periwinkle covered a 148- × 197-foot (45 × 60 m) terrace above the Ohio River floodplain [4]. Bigleaf periwinkle has replaced native vegetation throughout its nonnative range ([2,27,29,31], reviews by [7,10,111]), and is particularly problematic to managers in riparian and wetland areas of the south and central coasts of California [33]. It may suppress the recruitment of shrub and tree seedlings (reviews by [80,111]). In the northern Diablo Range of California, bigleaf periwinkle was one of a number of nonnative species blocking light to the federally threatened pallid manzanita, resulting in "unhealthy", diseased, and dying pallid manzanita plants in some areas [107]." |

| | | |
|-----|------------------------|----------|
| 305 | Congeneric weed | y |
|-----|------------------------|----------|

| Qsn # | Question | Answer |
|-------|--|---|
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Common periwinkle may replace native species ([28,32], review by [25]). In mixed-hardwood dune successional forests in Michigan, sites with common periwinkle had significantly fewer native tree seedlings than paired sites without common periwinkle (P=0.0045). However, dense mats of common periwinkle formed at only one site despite its establishment in several locations [17]. In field tests where common periwinkle cover was removed, there was increased survival of native tree seedlings. Laboratory tests suggested that common periwinkle allelopathy limited native woody tree seedling growth but not seed germination. However, light competition from common periwinkle was thought to be more important than allelopathy in suppressing native woody tree seedlings [28]. In Michigan, the presence of common periwinkle was associated with reduced abundance of native spiders, as well as changes in spider guilds [17]." |

| 401 | Produces spines, thorns or burrs | n |
|-----|--|---|
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Periwinkles are vines [42,113] with scrambling or trailing stolons up to 3 feet (1 m) long and vertical stems 1 foot (30 cm) high [72]. The succulent stems become somewhat woody at the caudex [72]. Bigleaf periwinkle leaves are semievergreen [78], have a waxy cuticle [10], and are heart-shaped to triangular. They are 1.5 to 2.5 inches (4 to 6 cm) long [72]." |

| 402 | Allelopathic | |
|-----|---|---|
| | Source(s) | Notes |
| | Fujii, Y., Matsuyama, M., Hiradate, S. & Shimozawa, H. 2005. Dish pack method: A new bioassay for volatile allelopathy. In: (Eds.): J.D.I. Harper, M. An, H. Wu and J.H. Kent, Proceedings of the 4th World Congress on Allelopathy, "Establishing the Scientific Base", Fourth World Congress on Allelopathy, Wagga Wagga, New South Wales, Australia. pp. 493-497 | "Table 1. Assessment of Allelopathic Activity of Plant Volatile Compounds by Dish-pack Method" [<i>Vinca major</i> exhibits allelopathic properties in laboratory experiments] |

| 403 | Parasitic | n |
|-----|--|--|
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Periwinkles are vines [42,113] with scrambling or trailing stolons up to 3 feet (1 m) long and vertical stems 1 foot (30 cm) high [72]. The succulent stems become somewhat woody at the caudex [72]. Bigleaf periwinkle leaves are semievergreen [78], have a waxy cuticle [10], and are heart-shaped to triangular. They are 1.5 to 2.5 inches (4 to 6 cm) long [72]." [Apocynaceae. No evidence] |

| 404 | Unpalatable to grazing animals | y |
|-----|--------------------------------|---|
|-----|--------------------------------|---|

| Qsn # | Question | Answer |
|-------|--|---|
| | Source(s) | Notes |
| | DiTomaso, J. M., Kyser, G. B., Oneto, et al. 2013. Weed Control in Natural Areas in the Western United States. Weed Research and Information Center, University of California, Davis, CA | "Grazing is not considered an effective control option. The stems contain milky latex that makes the plant unpalatable to grazing and foraging animals." |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Palatability and/or nutritional value: Periwinkles are generally unpalatable and have little nutritional value. Bigleaf periwinkle is listed as poisonous in South Africa [16]." |

| | | |
|------------|--|--|
| 405 | Toxic to animals | y |
| | Source(s) | Notes |
| | Knight, A. 2007. A Guide to Poisonous House and Garden Plants. CRC Press, Boca Raton, FL | "Cattle and sheep have reportedly developed neurotoxicity from grazing the plant." ... "Animals eating the leaves in quantity develop anorexia, anemia, hypotension, incoordination, muscle tremors, lateral flexion of the neck. and convulsions. Coma and death follow." |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Palatability and/or nutritional value: Periwinkles are generally unpalatable and have little nutritional value. Bigleaf periwinkle is listed as poisonous in South Africa [16]." |

| | | |
|------------|--|---|
| 406 | Host for recognized pests and pathogens | y |
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "In riparian areas of California, bigleaf periwinkle is an important year-round host to the bacteria causing Pierce's disease, a threat to California's vineyards [6]." |

| | | |
|------------|---|--|
| 407 | Causes allergies or is otherwise toxic to humans | |
| | Source(s) | Notes |
| | Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL | "Contact dermatitis" [Sap may be allergenic] |
| | Knight, A. 2007. A Guide to Poisonous House and Garden Plants. CRC Press, Boca Raton, FL | "[Medicinal uses, but potentially toxic] "Numerous alkaloids including alstronine, reserpine, vinblastine, vincristine. and yohimbine are present in all parts of the plant and have hypotensive. digestive and neurotoxic effects if consumed in large doses" |

| | | |
|------------|--|--|
| 408 | Creates a fire hazard in natural ecosystems | |
|------------|--|--|

| Qsn # | Question | Answer |
|-------|--|---|
| | Source(s) | Notes |
| | Kuhns, M. (1998). Firewise Plants for Utah Landscapes. Utah State University Extension. Logan, Utah | "The following table lists plants and groups of plants that can be firewise if used properly in the landscape and properly maintained." [Includes <i>Vinca minor</i> & <i>Vinca major</i>] |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | [Unknown] "Fuels: As of this writing (2009), there was no information available regarding the flammability of periwinkles. Some evidence suggests that periwinkles may alter local fuel characteristics by changing community structure, litter dynamics, fuel arrangement, and understory temperatures." |

| | | |
|-----|--|---|
| 409 | Is a shade tolerant plant at some stage of its life cycle | y |
| | Source(s) | Notes |
| | DiTomaso, J. 2007. Weeds of California and Other Western States, Volume 1. UCANR Publications, Oakland, CA | "Grows best under moist shady conditions. Tolerates deep shade and poor soil." |
| | Harrison, M. 2006. Groundcovers for the South. Pineapple Press Inc., Sarasota, FL | " <i>Vinca major</i> is larger and more aggressive than <i>V. minor</i> . plants grow in sun or shade and can quickly cover an area." |

| | | |
|-----|--|--|
| 410 | Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island) | y |
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Soils: Periwinkles are found on soils with a range of characteristics. Parent material: Bigleaf periwinkle occurs on soils derived from granite, gneiss, or schist in Georgia [22]. In north-central Texas, it is associated with limestone [29]. Texture: In the Huachuca Mountains, bigleaf periwinkle occurs mainly on sandy-loam and sandy clay-loam riparian soils [83]. In its native range, common periwinkle is associated with soils of varying textures [35,44,53]. Common periwinkle occurs on silt loams in Ohio [58] and Illinois [88], clayey, loamy, and sandy soils in the Northeast [68], and rocky, sandy soil in Missouri [99]. Other soil characteristics: A review states that bigleaf periwinkle grows most vigorously in moist soil with only partial sun but may grow in deep shade with "poor" soil [7]. In Georgia, bigleaf periwinkle is associated with acidic clays [22]. Common periwinkle prefers moist sites [28,76,88], though it tolerates moderately well-drained soil [68]. While some sources suggest common periwinkle prefers fertile soil ([28], review by [25]), one source states that common periwinkle tolerates soils of low fertility [68]. In the oak-beech forest region of France, common periwinkle occurred on shallow soils ranging from 5.7 to 8.7 inches (14.4-22.1 cm) deep [35]. In its nonnative range, common periwinkle occurs on acid soils [18,68,88]. In France, common periwinkle occurred on soils with pH ranging from 6.7 to 7.2 [35]." |

| | | |
|-----|--|--------------|
| 411 | Climbing or smothering growth habit | y |
| | Source(s) | Notes |

| Qsn # | Question | Answer |
|-------|---|---|
| | Weber, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | "A fast growing plant that spreads mainly by vegetative growth. It is a vigorous creeper, occurring in large infestation in semi-shady conditions. The numerous intertwined stems form dense and thick mats that cover the ground, smother small plants and crowd out native species. Establishment of shrub and tree seedlings is prevented" |

| 412 | Forms dense thickets | n |
|-----|---|--|
| | Source(s) | Notes |
| | Weber, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | [Smothering vine] "The numerous intertwined stems form dense and thick mats that cover the ground, smother small plants and crowd out native species." |

| 501 | Aquatic | n |
|-----|---|--|
| | Source(s) | Notes |
| | Weber, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | [Terrestrial vine] "Forests, grassland, riparian habitats, coastal dunes." |

| 502 | Grass | n |
|-----|---|--|
| | Source(s) | Notes |
| | USDA, ARS, Germplasm Resources Information Network, 2015. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 10 Dec 2015] | "Family: Apocynaceae Juss., nom. cons. subfam. Rauvolfioideae tribe Vinceae" |

| 503 | Nitrogen fixing woody plant | n |
|-----|---|------------------------|
| | Source(s) | Notes |
| | USDA, ARS, Germplasm Resources Information Network, 2015. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 10 Dec 2015] | "Family: Apocynaceae " |

| 504 | Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers) | n |
|-----|--|---|
| | Source(s) | Notes |
| | DiTomaso, J. 2007. Weeds of California and Other Western States, Volume 1. UCANR Publications, Oakland, CA | "Perennial rootstock tough, ± woody." |
| | Booy, O., Wade, M. & Roy, H. 2015. Field Guide to Invasive Plants and Animals in Britain. Bloomsbury Publishing, London / New York | "Slightly woody, evergreen spreading perennial herb up to 35cm high; stems green, rarely branching, trailing and arching, up to 1.5m long rooting at the tips." ... "Roots: Produced at tip of stem." |

| 601 | Evidence of substantial reproductive failure in native habitat | n |
|-----|--|---|
| | | |

| Qsn # | Question | Answer |
|-------|--|--|
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Bigleaf periwinkle is native to Mediterranean Europe [1,4], Asia Minor [1], and northern Africa (review by [10])." [No evidence. Widespread distribution] |

| 602 | Produces viable seed | |
|-----|--|--|
| | Source(s) | Notes |
| | DiTomaso, J. 2007. Weeds of California and Other Western States, Volume 1. UCANR Publications, Oakland, CA | "Fruits and seeds rarely develop." ... "Fruits with viable seeds rarely develop on cultivated and naturalized plants in California and elsewhere. However, seedlings have been observed near one population in Sunol, Alameda County. In England in the early 1960s, after decades of rarely developing fruits, several colonies of big periwinkle and common periwinkle [<i>Vinca minor</i> L.] produced numerous fruits with seeds during one particularly dry summer." |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | [Unknown if plants in Hawaii produce seeds] "Most periwinkle reproduction occurs through vegetative spread. Seeds are rarely produced [7,45,113], and seedlings are rarely observed in the field ([21], " |

| 603 | Hybridizes naturally | |
|-----|--|--------------|
| | Source(s) | Notes |
| | WRA Specialist. 2015. Personal Communication | Unknown |

| 604 | Self-compatible or apomictic | n |
|-----|--|---|
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Pollination and breeding system: Periwinkles are cross-pollinating plants [38]." |

| Qsn # | Question | Answer |
|-------|--|---|
| 605 | Requires specialist pollinators | |
| | Source(s) | Notes |
| | Moré, M., Séršic, A.N. & Cocucci, A.A. (2006) Restriction of pollinator assemblage through flower length and width in three longtongued hawkmoth-pollinated species of <i>Mandevilla</i> (Apocynaceae, Apocynoideae). <i>Annals of the Missouri Botanical Garden</i> 94: 485–504 | "... <i>Carissa spinarum</i> L., <i>Hancornia speciosa</i> Gomes, <i>Nerium oleander</i> L., and <i>Vinca major</i> L., are pollinated by diurnal insects in addition to hawkmoths (APOPOL database; Darrault & Schindwein, 2005)." |
| | Booy, O., Wade, M. & Roy, H. 2015. <i>Field Guide to Invasive Plants and Animals in Britain</i> . Bloomsbury Publishing, London / New York | "Flowers: Purplish-blue, solitary in leaf axils 3-5cm long; flowering stems to 30cm. Pollinated by long-tongued bees." |

| 606 | Reproduction by vegetative fragmentation | y |
|-----|--|--|
| | Source(s) | Notes |
| | Weber, E. 2003. <i>Invasive Plant Species of the World. A Reference Guide to Environmental Weeds</i> . CABI Publishing, Wallingford, UK | "A fast growing plant that spreads mainly by vegetative growth." |
| | Webb, C. J., Sykes, W. R., & Garnock-Jones, P. J. 1988. <i>Flora of New Zealand Volume IV</i> . Botany Division, DSIR, Christchurch, New Zealand | "Periwinkle can be troublesome in gardens because the long shoots run over the ground and root at the nodes" |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: <i>Fire Effects Information System</i> , [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Vegetative regeneration is very important to the establishment and spread of both bigleaf ([74,113], reviews by [81,111]) and common ([66,88], review by [81]) periwinkles. Bigleaf periwinkle spreads with "great rapidity" by arching stolons, which root at the tips (review by [7]). Periwinkles form mats and extensive infestations even under forest canopies ([32], review by [72])." |

| 607 | Minimum generative time (years) | 1 |
|-----|--|---|
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: <i>Fire Effects Information System</i> , [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 11 Dec 2015] | "Most periwinkle reproduction occurs through vegetative spread. Seeds are rarely produced" ... "Bigleaf periwinkle spreads with "great rapidity" by arching stolons, which root at the tips (review by [7])." [Whether or not plants set seed, the ability to spread rapidly by vegetative means suggests plants will be able to reproduce within one year] |

| 701 | Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas) | y |
|-----|--|---|
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: <i>Fire Effects Information System</i> , [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Given their ability to spread with the dumping of yard waste ([17,37], review by [10]), it is likely that periwinkles establish from plant fragments." |
| | Harrison, M. 2006. <i>Groundcovers for the South</i> . Pineapple Press Inc., Sarasota, FL | "Spread is ca used by floating vegetation and debris and by dumping of garden refuse." |

| Qsn # | Question | Answer |
|-------|---|--|
| 702 | Propagules dispersed intentionally by people | y |
| | Source(s) | Notes |
| | Harrison, M. 2006. Groundcovers for the South. Pineapple Press Inc., Sarasota, FL | " <i>Vinca major</i> is larger and more aggressive than <i>V. minor</i> . plants grow in sun or shade and can quickly cover an area. Both plants are easily obtained at garden centers and mail-order or on-line sources." |

| 703 | Propagules likely to disperse as a produce contaminant | n |
|-----|--|--|
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | [No evidence, and unlikely given limited or absent seed dispersal] "Most periwinkle reproduction occurs through vegetative spread. Seeds are rarely produced [7,45,113], and seedlings are rarely observed in the field ([21]" |

| 704 | Propagules adapted to wind dispersal | |
|-----|--|---|
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Most periwinkle reproduction occurs through vegetative spread. Seeds are rarely produced" |
| | Global Invasive Species Database. 2005. <i>Vinca major</i> . http://www.issg.org/ . [Accessed 10 Dec 2015] | "Seed dispersal by wind has been recorded in warmer climates" [But seeds rarely, if ever, produced] |

| 705 | Propagules water dispersed | y |
|-----|--|---|
| | Source(s) | Notes |
| | DiTomaso, J. 2007. Weeds of California and Other Western States, Volume 1. UCANR Publications, Oakland, CA | "In riparian areas, water currents can fragment stems and carry them downstream where they may root if lodged in a suitable place." |
| | Harrison, M. 2006. Groundcovers for the South. Pineapple Press Inc., Sarasota, FL | "Spread is ca used by floating vegetation and debris and by dumping of garden refuse. Stem fragments root wherever they land." |

| 706 | Propagules bird dispersed | n |
|-----|--|--|
| | Source(s) | Notes |
| | Webb, C. J., Sykes, W. R., & Garnock-Jones, P. J. 1988. Flora of New Zealand Volume IV. Botany Division, DSIR, Christchurch, New Zealand | [Seeds rarely produced. No adaptations for bird dispersal] "Follicles 3.5-5 cm long, the apical part very narrow and pointed, constricted between seeds. Seeds 7-8 mm long, oblong, strongly corrugated; margins inrolled" |

| 707 | Propagules dispersed by other animals (externally) | n |
|-----|--|--------------|
| | Source(s) | Notes |

| Qsn # | Question | Answer |
|-------|--|--|
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | [Unlikely. Seeds rarely produces & lack means of external attachment] "Most periwinkle reproduction occurs through vegetative spread. Seeds are rarely produced" |

| 708 | Propagules survive passage through the gut | n |
|-----|--|--|
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | [Unlikely. Not fleshy-fruited, & plants unpalatable & unlikely to be consumed] "Periwinkle fruits are slender, cylindrical follicles up to 2 inches (5 cm) long [72]. Follicles dry, split, and release 3 to 5 seeds (review by [72]). Periwinkle seeds are naked and without a coma [29]." ... "Periwinkles are generally unpalatable and have little nutritional value." |

| 801 | Prolific seed production (>1000/m2) | n |
|-----|--|--|
| | Source(s) | Notes |
| | Booy, O., Wade, M. & Roy, H. 2015. Field Guide to Invasive Plants and Animals in Britain. Bloomsbury Publishing, London / New York | "Fruit: Forked, up to 2.5cm long, rarely produced." |
| | DiTomaso, J. 2007. Weeds of California and Other Western States, Volume 1. UCANR Publications, Oakland, CA | "Fruits and seeds rarely develop." |
| | Dreistadt, S.H. 2004. Pests of Landscape Trees and Shrubs: An Integrated Pest Management Guide. UCANR Publications, Oakland, CA | "Periwinkle apparently does not reproduce by seed in California." |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Seed production: One review states that bigleaf periwinkle does not reproduce by seed in the wild in California [7], though occasional seedlings have been found [21]." |

| 802 | Evidence that a persistent propagule bank is formed (>1 yr) | |
|-----|--|--|
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Seed banking: There is limited information on seed banking in periwinkles. Though bigleaf periwinkle was the most abundant species in riparian areas in the Huachuca Mountains of Arizona, it was a minor component of the soil seed bank. Perennial, herbaceous native species dominated soil seed bank samples [83]." |
| | Royal Botanic Gardens Kew. (2015) Seed Information Database (SID). Version 7.1. Available from: http://data.kew.org/sid/ . [Accessed 10 Dec 2015] | [Potentially] "Storage Behaviour: Orthodox p Storage Conditions: Seeds maintained for 2-3 years in commercial storage conditions (Priestley, 1986)" |

| 803 | Well controlled by herbicides | y |
|-----|-------------------------------|---|
|-----|-------------------------------|---|

| Qsn # | Question | Answer |
|-------|---|--|
| | Source(s) | Notes |
| | California Invasive Plant Council. 2015. Invasive Plants of California's Wildland - <i>Vinca major</i> . http://www.cal-ipc.org . [Accessed 11 Dec 2015] | "Glyphosate (as Round up®) has been tested on large infestations of periwinkle at Ramsey Canyon, Arizona. Greatest success is achieved if plants are cut first and then sprayed immediately afterward. Cutting with a weed whip or brush cutter breaks through the waxy cuticle and allows better foliar penetration of the herbicide. Using the cut and spray method, a 5 percent glyphosate solution gave nearly 100 percent control. To reduce native plant death in the area, a 3 percent solution provides 70-75 percent control and yields good results if followed by spot applications (Bean and Russo 1986). A wick applicator is suggested for spot treatments, and a backpack sprayer is recommended for treating large areas. To aid chemical distribution throughout the plant, use surfactant and apply herbicide during an optimal growing period of good moisture and warm temperatures (70-80 degrees F) usually in late spring or early fall." |
| | Weber, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | "Larger infestations can be mown or slashed and the regrowth treated with herbicide. Effective herbicides are glyphosate or triclopyr. Follow-up treatments are necessary to control seedlings and regrowth" |
| | DiTomaso, J. M., Kyser, G. B., Oneto, et al. 2013. Weed Control in Natural Areas in the Western United States. Weed Research and Information Center, University of California, Davis, CA | Picloram, Triclopyr, Glyphosate, & Imazapyr are listed as effective at controlling <i>Vinca major</i> |

| 804 | Tolerates, or benefits from, mutilation, cultivation, or fire | y |
|-----|--|--|
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "Given their ability to spread with the dumping of yard waste ([17,37], review by [10]), it is likely that periwinkles establish from plant fragments." [Cuttings will resprout & spread plant] |
| | Kubiak, P. J. 2009. Fire responses of bushland plants after the January 1994 wildfires in northern Sydney. <i>Cunninghamia</i> , 11(1): 131-165 | [<i>Vinca major</i> Fire Response: R = majority of adult plants resprouted after the fires] "Appendix 1. Observations on fire responses (after 100% leaf scorch) of vascular plants in the Lane Cove River (LCR) (observations mainly Jan 1994 – Oct 1999) and Narrabeen Lagoon (NL) (Mar – Oct 1994) catchments, following the fires of January 1994." |
| | Weber, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK | [Will resprout if not treated with herbicide] "Larger infestations can be mown or slashed and the regrowth treated with herbicide." |

| Qsn # | Question | Answer |
|-------|--|--|
| 805 | Effective natural enemies present locally (e.g. introduced biocontrol agents) | |
| | Source(s) | Notes |
| | Stone, K. R. 2009. <i>Vinca major</i> , <i>V. minor</i> . In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ . [Accessed 10 Dec 2015] | "While no specific biological control programs existed for periwinkles as of 2009, common periwinkle is susceptible to fungal foliar diseases that cause leaf and stem lesions and stem death [63]." |

Summary of Risk Traits:

High Risk / Undesirable Traits

- Broad climate suitability
- Naturalized in areas with tropical climates
- Widely naturalized, including Maui, Hawaiian Islands
- Yard weed & environmental weed, reducing native plant biodiversity
- *Vinca minor* is also invasive
- Relatively unpalatable to browsing & grazing animals
- Toxic to animals & potentially toxic, & allergenic to humans
- Alternate host of the bacteria causing Pierce's disease, a threat to California's vineyards
- Shade tolerant
- Tolerates many soil types
- Forms thick mats that smother the ground & low-growing vegetation
- Reproduces rapidly by vegetative means
- Vegetative fragments spread in garden waste, & by water
- Able to resprout after cutting, or fires

Low Risk Traits

- Unarmed (no spines, thorns or burrs)
- Ornamental & medicinal uses
- Rarely, if ever, produces seeds in introduced range
- Lack of seed production may limit ability to disperse & spread
- Certain herbicides may provide effective control