

Species Dataform and Scoresheet for *Buddleja davidii* Franch. (syn. *Buddleia davidii*) Butterfly-bush

| Species Dataform and Scoresheet | | |
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| <i>Buddleja davidii</i> Franch. (syn. <i>Buddleia davidii</i>) Butterfly-bush | | |
| Native range: China | | |
| Date evaluated: March 19, 2009 | | |
| | Answer Choices | Response |
| Introductory Questions | | |
| 1. Current federal and state regulations | Y/N | N |
| Comments: Appears on invasive species or noxious weed lists in the Pacific Northwest (Tallent-Halsell and Watt 2009). <i>Buddleja davidii</i> is listed as a class “B” noxious weed by the Oregon Department of Agriculture and the Washington State Noxious Weed Control Board (Tallent-Halsell and Watt 2009). | | |
| 2. Occurrence in the horticultural trade | Y/N | Y |
| Comments: Grown for ornamental properties and ability to attract butterflies (Weakley 2008). | | |
| 3. North Carolina nativity | Y/N | N |
| Comments: Native to China (Weakley 2008). | | |
| 4. Presence in natural areas | Y/N | Y |
| Comments: Readily establishes in disturbed sites (Tallent-Halsell and Watt 2009). Weedy in a variety of habitats including coastal forest edges, stream and river banks (USDA Forest Service 2005) and disturbed places (Weakley 2008). Colonizes disturbed sites along roads, river banks, and railways (Ebeling et al. 2008). Invasive along roadsides, abandoned railroads, rural dumps (USDA Forest Service 2005). Problematic in riparian areas in Oregon and Washington (Tallent-Halsell and Watt 2009). Generally not found in natural areas in North Carolina. | | |
| 5. Non-invasive cultivars | Y/N | N |
| Comments: | | |
| | Maximum Point Value | Number of Points Assigned |
| Section 1. Ecological Impact | | |
| 1a. Impact on abiotic ecosystem processes | 10 | 5 |
| Comments: <i>Buddleja davidii</i> impacts soil nutrients by accumulating P, N, and organic matter, but the long-term effects of these alterations on successional trajectories are unknown (Bellingham et al. 2005). <i>Buddleja davidii</i> appears to be a better competitor for limited resources early in primary succession but is eventually replaced by native shrubs (Bellingham et al. 2005). | | |
| 1b. Impact on plant community structure | 20 | 0 |
| Comments: Dense infestations may compete with native species, especially along streams and river banks (Brunel 2006). Monospecific stands may restrict access to waterways (Brunel 2006). Thrives in nutrient poor soils and quickly grows into dense thickets (Thomas et al. 2008). Grows rapidly to suppress and displace native pioneer plants (Anisko and Im 2001). Most dense infestations observed within first ten years of colonization, since plants have a fairly short lifespan (Brunel 2006). Primarily a shade intolerant pioneer | | |

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| species that is mostly found along roadsides, railroad tracks, and other disturbed sites. Over time, <i>Buddleja</i> is typically outcompeted through natural succession. | | |
| 1c. Impact on species of special concern | 5 | 0 |
| Comments: Unknown impacts on species of special concern. | | |
| 1d. Impact on higher trophic levels | 5 | 0 |
| Comments: Unknown impacts on higher trophic levels. | | |
| Section 1. Subrank | 40 | 5 |
| Section 2. Current Distribution and Potential for Expansion | | |
| 2a. Local range expansion | 7 | 0 |
| Comments: | | |
| 2b. Long-distance dispersal potential | 13 | 8 |
| Comments: Wind-dispersed seeds (Bellingham et al. 2005). Seeds are small and long-winged and dispersed by wind and water (Ebeling et al. 2008). | | |
| 2c. Reproductive characteristics | 8 | 6 |
| Comments: <i>Buddleja davidii</i> produces a very large number of seeds, and a single plant can produce up to several million seeds (Ebeling et al. 2008). Seeds are wind and water dispersed (Ebeling et al. 2008). Resprouts vigorously after damage (Ebeling et al. 2008). Seeds germinate readily at high rates (Ebeling et al. 2008). Basal and stem sprouts allow the shrub to recover after the original stems have been damaged (Anisko and Im 2001). Propagated by cuttings or by seed (Starr et al. 2003). Seedlings have superficial roots and are easily carried away in floods (Brunel 2006). Propagated along rivers by stem cuttings (Brunel 2006). | | |
| 2d. Range of communities | 6 | 2 |
| Comments: Thrives in fairly dry conditions (USDA Forest Service 2005). Roots may perish in wet soil (USDA Forest Service 2005). Invasive in a variety of habitats including coastal forest edges, stream and river banks (USDA Forest Service 2005). Natural communities of North Carolina (Shafale and Weakley 1990) = river floodplains. | | |
| 2e. Similar habitats invaded elsewhere | 6 | 0 |
| Comments: | | |
| Section 2. Subrank | 40 | 16 |
| Section 3. Management Difficulty | | |
| 3a. Herbicidal control | 5 | 0 |
| Comments: Plants should be cut and treated with glyphosate or triclopyr (USDA Forest Service 2005). | | |
| 3b. Nonchemical control methods | 2 | 2 |
| Comments: Small seedlings may be hand-picked (USDA Forest Service 2005). Goats eat this plant and can treat infested areas over 3-4 year time span (USDA Forest Service 2005). Cut plants will resprout (Starr et al. 2005). Hand-picking seedlings may result in increased soil disturbance and facilitate recolonization, so disturbance at invaded sites should be minimized (Starr et al. 2005). Biological control options are being explored in New Zealand (Starr et al. 2005). | | |
| 3c. Necessity of individual treatments | 2 | 2 |

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| Comments: Herbicides should be applied to cut stems (USDA Forest Service 2005). Herbicides must be applied repeatedly to individual stems (Tallent-Halsell and Watt 2009). | | |
| 3d. Average distribution | 2 | 1 |
| Comments: May form dense infestations and monospecific stands (Brunel 2006). | | |
| 3e. Likelihood for reestablishment | 2 | 2 |
| Comments: Easily recovers after damage (Thomas et al. 2008). Cut plants will resprout (Starr et al. 2003). Seeds remain dormant in soil for many years (Washington State Noxious Weed Control Board). <i>Buddleja davidii</i> can regenerate and spread from buried stems, stumps, and cut debris, following removal attempts (Tallent-Halsell and Watt 2009). | | |
| 3f. Accessibility of invaded areas | 2 | 1 |
| Comments: Often colonizes river and stream banks (Brunel 2006) that may be difficult to access. | | |
| 3g. Impact on native species and environment | 5 | 2 |
| Comments: The nonselective herbicides glyphosate and triclopyr may impact non-target species. Grazing is also a nonselective treatment. | | |
| Section 3. Subrank | 20 | 10 |
| Section 4. Benefits and Value | | |
| 4a. Estimated wholesale value | -7 | -4 |
| Comments: The annual estimated wholesale value attributed to this species is \$10,447,400 (Trueblood 2009). | | |
| 4b. Percentage of total sales | -5 | -1 |
| Comments: Among the producers that sell this species, the highest percentage of total sales attributed to this species from any one grower is estimated to be 1-5% (Trueblood 2009). | | |
| 4d. Ecosystem services | -1 | 0 |
| Comments: | | |
| 4e. Wildlife habitat | -1 | 0 |
| Comments: | | |
| 4f. Cultural and social benefits | -1 | 0 |
| Comments: | | |
| Section 4. Subrank | -15 | -5 |
| Overall Score | 100 | 26 |
| Overall Recommendation: Noninvasive and recommended for use – These species have limited ecological impact, distribution and invasive potential, and management difficulty in relation to economic value. They may be locally problematic but their reproductive biology and other traits limit their rate of invasion to natural areas. (Overall Score: 0 – 33) | | |
| Summary: <i>Buddleja davidii</i> (Butterfly-bush) is noninvasive in North Carolina and may be recommended for horticultural use by the North Carolina Nursery and Landscape Association. <i>Buddleja davidii</i> is a shade intolerant pioneer species that may be eliminated through natural plant succession. <i>Buddleja davidii</i> readily colonizes disturbed areas, and it is rarely found in natural areas. While environmental impacts associated with <i>Buddleja davidii</i> have been documented in the Pacific Northwest, <i>B. davidii</i> has not been shown to have negative ecological impacts in natural areas in North Carolina. <i>Buddleja davidii</i> is economically valuable to the nursery industry in North Carolina. | | |

References:

Anisko, T. and U. Im. (2001) Beware of Butterfly bush. *American Nurseryman* 194: 46-50.

Bellingham, P., D. Peltzer, and L. Walker. (2005) Contrasting impacts of a native and an invasive exotic shrub on floodplain succession. *Journal of Vegetation Science* 16: 135-142.

Brunel, S. (2006) Global Invasive Species Database. *Buddleja davidii* (shrub). (<http://www.issg.org/database/species/ecology.asp?si=650&fr=1&sts=sss&lang=EN>) Accessed: March 19, 2009.

Ebeling, S.K., Hensen, I., and H. Auge. (2008) The invasive shrub *Buddleja davidii* performs better in its introduced range. *Diversity and Distributions* 14: 225-233.

Shafale, M.P. and A.S. Weakley. (1990) Classification of the Natural Communities of North Carolina. 3rd Approximation. North Carolina Natural Heritage Program. Raleigh, NC.

Starr, F., Starr, K., and L. Loope. (2003) *Buddleia davidii*. United States Geological Survey - Biological Resources Division. Maui, Hawaii.

Tallent-Halsell, N.G. and M.S. Watt. (2009) The invasive *Buddleja davidii* (Butterfly bush). *The Botanical Review* 75:292-325.

Thomas, M.M., Millard, P., Watt, M.S., Turnbull, M.H., Peltzer, D. and D. Whitehead. (2008) The impact of defoliation on nitrogen translocation patterns in the woody invasive plant, *Buddleia davidii*. *Functional Plant Biology* 35: 462-469.

Trueblood, C.E. (2009) Chapter 3. An estimate of the commercial value of potentially invasive ornamental nursery crops grown in North Carolina. In *An Invasive Species Assessment System for the North Carolina Horticultural Industry*, a thesis submitted to the Graduate Faculty of North Carolina State University. North Carolina State University, Raleigh, NC.

USDA Forest Service. (2005) Weed of the Week: Butterfly Bush. WOW 09-27-05. Newton Square, PA (http://www.na.fs.fed.us/fhp/invasive_plants/weeds/butterfly_bush.pdf) Accessed: March 19, 2009.

Washington State Noxious Weed Control Board. (2006) Written Findings of the Washington State Noxious Weed Control Board. *Buddleja* (*Buddleia*) *davidii* Franch.

Weakley, A.S. "Flora of the Carolinas, Virginia, Georgia, northern Florida, and surrounding areas." University of North Carolina. Working draft. 7 April 2008.

Trueblood, C.E. 2009. Results of the North Carolina Invasive Species Assessment System and Individual Species Evaluations. In An Invasive Species Assessment System for the North Carolina Horticultural Industry. MS Thesis. North Carolina State University, Raleigh, pp. 90-94.