WRITTEN FINDINGS OF THE
WASHINGTON STATE NOXIOUS WEED CONTROL BOARD
(September 2006)

Scientific Name: *Daphne laureola* L.
Synonyms: N/A

Common Name: spurge laurel, daphne, daphne spurge, daphne-laurel, laurel-leaved daphne, olive-spurge, wood laurel, copse laurel

Family: Thymelaeaceae

Legal Status: Proposed as Class B Weed for 2007 WA State Noxious Weed List

Description and Variation: *Daphne laureola* is an evergreen shrub that reaches a height between 0.5-1.5 meters. The shrub habit can be upright or decumbent (arched at the base then spreading upward). Mature bark is gray with a yellow hue, while young branches are green. Alternate leaves are spirally arranged and most abundant at shoot tips and are generally oblanceolate to obovate-oblanceolate, and between 4-13 cm long and 1-3 cm wide. The glabrous leaves are dark green and shiny above and lighter on the leaf underside. Flowers bloom between March and May. Axillary racemes are either sessile or are short-stalked and contain between 5-10 fragrant, yellow-green flowers. Each flower is approximately nine millimeters long, and is apetalous, with four petaloid sepals forming a tubular hypanthium. Pistils are small, and styles are either short or lacking. Stamens occur in two concentric rings. Flower bracts are deltoid, about 9 mm long and 3 mm at the widest point. Fruits are bluish-black drupes, between 8-13 mm long. Each ovoid fruit contains one seed.

Economic Importance:

Detrimental: *Daphne laureola* is considered problematic in Garry Oak and similar ecosystems in British Columbia, due to its ability to rapidly colonize areas, form monotypic stands, outcompete native flora, potentially change soil chemistry, alter natural succession, and due to the difficulty in controlling it (Prasad, 2005; Prasad and Byrne, 2004; GOERT, 2002).

According to Toxic Plants of North America, the leaves, bark, and fruits of *D. laureola* are toxic to humans (Burrows and Tyrl, 2001). Members of the *Daphne* genus contain such irritants as tricyclic daphnane and tigliane diterpenes and coumaris glycosides that may contribute to its toxicity, contact with which can cause dermatitis and digestive irritation. The bitter taste of berries may prevent children from consuming enough of the toxins to become fatally ill, and there are few accounts of poisoning resulting from berry consumption in North America. *D. laureola* is also toxic to dogs and cats (Kiss, 2006)

Beneficial: Because of its shiny, evergreen leaves and fragrant flowers, *Daphne laureola* had been used in the Pacific Northwest as an ornamental shrub (Brown, 2006); however, it

is rarely carried by nurseries in Washington today (J. McNeil, pers. comm.). Although all parts of this shrub are poisonous, some of these toxic compounds have been studied as a potential treatment for leukemia (Bown, 1995, as cited in Plants for a Future, 2006).

Habitat: *Daphne laureola* can tolerate low light levels ranging from partial to deep shade (Brown, 2006). The shrub requires drained, loamy-clay, soils that are neutral to slightly acidic (Brown, 2006) but Stace (1997) notes that this shrub is often found on calcareous soils in its native habitat and Farmer (1918) observes that while *D. laureola* can grow in drained soil, it commonly occurs along the shoreline in its native England. In native Mediterranean regions, it occurs in the shady understory of mountainous forests (Alonso and Hererra, 1996).

Geographic Distribution: *Daphne laureola* is native to England, Wales, and the Channel Islands (Stace, 1997). It is also native to other European countries, including Austria, Belgium, Germany, Hungary, Switzerland, Albania, Bulgaria, Greece, Italy, France, and Spain, as well as to the African countries of Portugal, Algeria, and Morocco (USDA, ARS, National Genetic Resource Program, 2006).

History: In Europe, *Daphne laureola* is an introduced species on some chalky cliffs of Denmark (Smith, 1914). This invasive shrub is considered a "growing problem" in some major cities of the Pacific Northwest (NPSOO, 2002). In the United States, *D. laureola* has been documented in Oregon and Washington (Swearingen, 2005; USDA, NRCS, 2006). It is also spreading in coastal British Columbia, particularly in southern Vancouver Island (Brown, 2006), the Gulf Islands, and the Lower Mainland, and has also established in some coastal areas of eastern Canada (GOERT, 2002).

In Washington State, *Daphne laureola* has been documented in Clallam, Cowlitz (Zika, 2006), Island, Jefferson, King, Kitsap, Lewis (Zika, 2006), Pierce (C. Hovanic, pers. comm.), San Juan, Thurston, and Whatcom counties. It is particularly abundant in Orcas and San Juan Islands and in urban forests of King County.

Growth and Development: *Daphne laureola* plants that have germinated from seed will begin flowering during their second year (GOERT, 2002), although other studies and observations suggest that seed production does not occur for at least four years (Webb, 2006).

Reproduction: *Daphne laureola* shrubs blossom during winter and early spring (GOERT, 2002) and the flowers are pollinated by bees, moths, and butterflies (Plants for a Future, 2005). One-seeded drupes appear in early summer (GOERT, 2002) and are dispersed by fructivorous vertebrates, primarily birds and rodents in its native range (Obeso and Herrera, 1994; Herrera, 1981), and in the Pacific Northwest (Brown, 2006). Observations indicate that seed germination around adult shrubs diminishes substantially after two years following shrub removal, suggesting a short-lived seed bank (Webb, 2006). This shrub can also reproduce vegetatively through the production of root sprouts (GOERT, 2002).

Response to Herbicide: *Daphne laureola* shrubs can be treated with a foliar herbicide (Brown, 2006). Because suckers may sprout following cutting (but see Mechanical Methods, below), it is recommended that herbicide be applied to cut stumps (Brown, 2006) to prevent suckers from sprouting (Saanich, 2005), and triclopyr has been very effective in test plots (Prasad, 2005). Please refer to the PNW Weed Management Handbook, available online at http://weeds.ippc.orst.edu/pnw/weeds for specific herbicide instructions.

Response to Cultural Methods: No information found

Response to Mechanical Methods: **Note: due to the irritating toxins in the sap, stem, leaves, and fruits, it is advisable to wear gloves and other protective gear when removing *D. laureola*.** Seedlings and young plants can be hand-pulled (Brown, 2006) or hoed, although the resulting soil disturbance may promote germination of weed seeds, (Webb, 2006). The removal of the top portion of young plants up to three years old appears to result in very high (>95%) mortality, so the use of a weed whip may be more efficient at controlling large patches of seedlings, but note that **volatile plant toxins** will be released and wear protective gear accordingly (Webb, 2006). Young shrubs can be pulled with a weed wrench, although it is important that all of the taproot be removed to prevent resprouting (GOERT, 2002). Shrubs that are too large for pulling can be effectively controlled by cutting the stem below the soil line, specifically, "where there is a visible color change from brown stem to orange", as reprouting appears to be minimized (Webb, 2006).

Biocontrol Potentials: Although *Daphne laureola* is susceptible to the virus Daphne S (?) *carlavirus*, whose vector is the aphid *Myzus persicae* (Aphididae) in New Zealand, the shrub fails to show any symptoms (Brunt et al., 1996). In regions of its native Europe, noctuid larvae, mainly *Trigonophora flammea* and *Noctua janthe*, consume the leaves (Neuvonen, 1999; Alonso and Herrera, 1996); however, it does not appear that these herbivores have much potential as biocontrol agents, which could be due to a lack of host specificity (*e.g*., Kimber, 2006).

In British Columbia, preliminary studies of the fungus *Phomopsis* indicated that this potential biocontrol agent was very effective under field, greenhouse, and growth chamber setting (Prasad, 2005, Prasad and Byrne, 2004). Unfortunately, funding to continue this research has been discontinued (Prasad, pers. comm.).

Rationale for Listing: *Daphne laureola* is currently a threat to rare Garry Oak-Arbutus ecosystems of British Columbia, and populations appear to be spreading in the Pacific Northwest. Of the fifteen invasive plant candidates, among which experts were asked to select the ten greatest threats of Garry oak ecosystems in British Columbia, *D. laureola* ranked number six (Murray and Jones, 2002). It was included in a detailed management plan targeted to control six invasive ornamental species that had spread from Royals Road University campus into surrounding coniferous forests (Rietkerk and Francis, 2003). It is considered an invasive nonnative plant that should not be used for landscaping or in restoration efforts in the Puget Sound area (Menashe, 2004).

This species has been on the Washington State Noxious Weed Control Board Monitor List for over three years, and its sponsor, Dr. Sarah Reichard from the University of Washington's Center for Urban Horticulture, has observed that its populations in Washington State have been expanding (S. Reichard, pers. comm.). Because this species is not yet widespread in Washington state, a Class B listing will make eradication or prevention feasible in designated regions where the shrub is still limited in distribution or absent, while requiring containment in areas where it is already abundant to prevent its spread. Designated areas will be determined by the Noxious Weed Committee once sufficient data regarding the distribution of *D. laureola* are available.

A close-up of *Daphne laureola* leaves and unripe drupes.	*D. laureola* is rapidly expanding in British Columbia and elsewhere in the Pacific Northwest and is a major threat to the rare Garry Oak-Arbutus ecosystem. Image courtesy of Jake Pool and taken on Vancouver Island

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