WRITTEN FINDINGS OF THE
WASHINGTON STATE NOXIOUS WEED CONTROL BOARD
(December 1999)

Scientific Name: *Lepidium latifolium* L.

Common Name: perennial pepperweed

Family: Cruciferae (Brassicaceae)

Legal Status: Class B:
(a) regions 1, 2, 3, 4, 5, 7, 8, 10
(b) Intercounty Weed Districts No. 51 and 52.
(c) Kittitas County of region 6.
(d) Adams County of region 6 except for the area west of Highway 17 and north of Highway 26.

Description and Variation: Perennial pepperweed normally grows 1 to 3 feet tall, but may reach up to 6 feet. The plant has many stems that emerge from a somewhat woody root crown. The alternate, waxy leaves may have smooth or toothed margins and a prominent, whitish midvein. Basal leaves are lance-shaped and up to 12 inches long; they are attached by a stalk that can be almost as long as the leaf blade. Stem leaves are smaller, with shorter stalks. The milky white flowers grow in dense, rounded clusters at branch tips. Each flower has 4 sepals and 4 petals. Fruits are small (1/16 inch), round or egg-shaped, and contain 2 reddish-brown seeds (Callihan and Miller 1998; Whitson 1987; Bureau of Land Management).

Economic Importance: *Beneficial:* Perennial pepperweed is collected for use in dry flower arrangements.

Detrimental: An aggressive plant, perennial pepperweed tends to establish and rapidly colonize pastures, riparian habitats, and waste places in wetter areas. The plant can also be a problem in roadside, rangeland, and field crop situations. It often reaches fields via irrigation ditches from riparian areas. Dense infestations of the plant can form near monocultures. Annual biomass production by perennial pepperweed builds a dense organic layer on the soil surface, which may have a significant consequence on carbon-nitrogen ratios over time. The plant is adapted to using water with a high salt content. The salts build up in the plant biomass. As a result, perennial pepperweed may act as a salt pump in some areas, as it removes salts from the soil solution and deposits the on the soil surface (Young et al. 1997).

In riparian zones, the weed interferes with the regeneration of willow and cottonwood species. Accumulations of perennial pepperweed's semi-woody stems degrade nesting habitat for wildlife. The extremely competitive plant may also completely displace more desirable species, which poses a particular threat to natural areas and hay meadows. Perennial pepperweed lowers the digestibility and protein content of hay, and the accumulation of old pepperweed stems inhibits grazing. Livestock avoid eating this weed if other forage is available (Young et al. 1995).

Geographical Distribution: The native range of perennial pepperweed extends from the Mediterranean basin, to temperate Europe, and east to the Middle East, Asia and the Himalayas (Kloot 1973). In North America, it has been introduced to diverse locations from New England to Mexico (Miller et al. 1986), and now covers thousands of acres across the West. It occurs in all far-western states (Young et al. 1997). In Washington, scattered populations are found throughout the state, with heavy infestations in central Washington (Washington State Noxious Weed Control Board, unpublished data).

Habitat: Perennial pepperweed is adapted to a wide range of habitats. The plant occurs in waste areas, wet areas, ditches, roadsides, cropland, and in dry habitats, such as road cuts and fills (Bureau of Land Management). In coastal areas, the plant invades brackish marshes (Young et al. 1998). In the Intermountain West, it occurs along river systems from higher elevation coniferous forests to saline or alkaline deltas. The plant is very tolerant of salty soils, but it is not restricted to these habitats (Young et al. 1995).

History: Perennial pepperweed may have been inadvertently introduced to North America in contaminated sugar beet seed imported from Europe near the turn of the century (Corliss 1993).

Growth and Development: A perennial with creeping rhizomes, established perennial pepperweed plants have shoots that emerge in late winter and early spring (Fisher and McCaskill 1990; Young et al. 1997). Initially, the plant forms a rosette. Stem elongation is rapid during May (Young et al. 1997). The large amounts of semi-woody herbage produced by the plant can persist for several years (Young et al. 1995). Seeds germinate in February and March. The plant flowers from early summer through fall (Whitson 1987). Rosette leaves die back by flowering time. Fruits do not open at maturity; instead, they fall at irregular intervals throughout the winter (Young et al. 1995).

Reproduction: Perennial pepperweed can spread by seed or rhizome. The plant produces abundant seed, which has a high germination rate. California studies have indicated that perennial pepperweed can produce over 16 million seeds per hectare (Young et al. 1997). Seeds have no heavy seed coat and no dormancy requirement. A wide and fluctuating temperature range produces the highest germination rates. Constant cold temperatures produce the lowest germination rates; constant warm temperatures also produce a low germination rate (Miller et al. 1986). There is no definitive information on the persistence of the soil seed bank, but the seeds appear to have a very short half-life (Young et al. 1997).

Although the plant can spread by seed, populations more commonly expand by creeping rhizomes, which may advance 3 to 6 feet from the parent plant (Young et al. 1997). The plant may be spread by root fragments. Movement of contaminated agricultural products and the transportation of root fragments on earth-moving and tillage equipment can spread the weed (Young et al. 1995).

Response to mechanical methods: Mechanical control of this plant is very difficult because very small sections of root contain buds that will sprout into new plants. Plant tops are easily killed, but root and crown buds can sprout and continue the infestation (Young et al. 1995; Young et al. 1998). Small infestations may be hand-pulled or dug, but as much of the root must be removed as possible.

After control work, it is important to continue to monitor sites and remove all regrowth and seedlings.

Response to cultural methods: Planting competitive vegetation aids in controlling perennial pepperweed (Beck 1996).

Response to herbicides: Herbicides may be useful for controlling infestations. However, great care must be used, since many infestations occur close to open water. The plants are most susceptible to herbicides at the initiation of flowering (Young et al. 1997). 2,4-D amine, metsulfuron (Escort), and chlorsulfuron (Telar) all reportedly control perennial pepperweed. A surfactant is necessary with metsulfuron and chlorsulfuron (Beck 1996). However, even with herbicide applications, stands may regenerate from creeping rhizomes. Young et al. (1997) estimated that even with 98% control, resprouting plants in the spring would result in total stand dominance by the end of the growing season. For specific chemical control recommendations, refer to the *Pacific Northwest Weed Control Handbook*, an annually revised publication available from Washington State University Cooperative Extension.

Biocontrol potentials: No biocontrol agents are available. Prospects for classical biocontrol development are not promising because the plant is closely related to valuable crops and native *Lepidium* species, some of which are endangered (Beck 1996; Young et al. 1995).

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