



Western Water-Hemlock seedling and hollow root



## Water-Hemlock vs. Water Parsnip

- Water Parsnip (*Sium suave*) has a very similar ecology to Western Water-Hemlock in that it too is found in wet meadows and thickets, as well as along muddy shores. Both are native, indigenous perennials from the *Apiaceae* (parsley/carrot) family.
- Europeans brought the parsnip to the United States in the early 1600s, but this creamy-white root has never become an Ameri-

can culinary favorite. Parsnips are suitable for almost any method of cooking including baking, boiling, sauteing and steaming. They are often boiled, then mashed like potatoes.

- The first frost of the year converts the parsnip's starch to sugar and gives it a pleasantly sweet flavor.
- Due to the difficulty in clearly identifying similar plants from the *Apiaceae* family, it is best to use caution and due diligence.



Water Parsnip



## Comparing Western Water-Hemlock with Water Parsnip

### Western Water-Hemlock

Western Water-Hemlock has an asymmetrical bulb with narrow chambers containing a clear oil (cicutoxin) which turns bright orange when it is exposed to the air. The bulb has fleshy side roots that allow the bulb to float in times of high water.

**POISON**



Western Water-Hemlock

### Bulbs

### Leaves

Water Parsnip

### Water Parsnip

Water Parsnip has a symmetrical root with large chambers containing no oil, and it has fibrous roots which anchor the bulb into the soil.

Western Water-Hemlock has compound leaves with the veins usually ending in the notches along the leaf margins. The arrow in the second photo shows the vein ending at the notches of the leaf margin.

**POISON**



Western Water-Hemlock

### Flower Head

Water Parsnip

Western Water-Hemlock has white-to-greenish-colored flowers formed in a compound umbrel (umbrella-shaped flower head). It is bractless (no leaves at the base of the flower heads).

**POISON**



Water Parsnip has white-colored flowers formed in an umbrel. It has bracts (leaves at the base of large umbrel and at the base of small umbrels making up the flower head).

## Western and Spotted Water-Hemlock

# Western and Spotted Water-Hemlock

Water-Hemlock, the most poisonous plant in North America, is found in all parts of Lincoln County, along streams, ponds, irrigation ditches, wet pastures, and marshy areas. It is a threat to humans, livestock and animals that eat any part of the plant or drink water from a standing pool of water near the plant.

Water-Hemlock contains the unsaturated alcohol cicutoxin that is found in all parts of the plant, but especially in the roots and base of the stem. All animals, including humans, are highly susceptible to the potent cicutoxin, one of the most poisonous plant toxins known. The poison



Western Water-Hemlock



Distinctive veined leaves



Western Water-Hemlock's asymmetrical bulb and tuberous roots

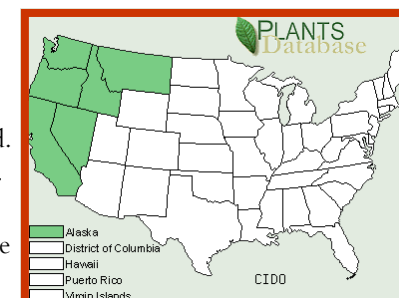


deaths have occurred from people mistaking Water-Hemlock for edible members of the carrot family and from children putting the hollow stems into their mouths. Death can occur in as short as 15 minutes, although 3 to 4 hours is more common.

There are two forms of Water-Hemlock in Lincoln County: the more-prevalent Western Water-Hemlock, *Cicuta douglasii*; and Spotted Water-Hemlock, *Cicuta maculate L.*, so-called due to purple spots along the stems and leaf nodes. Both are native, perennial forbs and are not on the state noxious weed list.

Poison Hemlock, *Conium maculatum*, another poisonous perennial also common in Lincoln County, is on the state weed list, and so control is mandated. Please refer to "Poison Hemlock: Options for Control" for more

information on this noxious weed. While control of Western Water-Hemlock and Spotted Water-Hemlock are not mandated by the weed board, landowners are encouraged to avoid inadvertent poisonings and deaths due to ingestion of either plant.



Distribution of Western Water-Hemlock, *Cicuta douglasii*

## Managing Western Water-Hemlock

- Western Water-Hemlock is a problem on rangelands because of its toxicity.
- The forb is one of the first plants to emerge in the spring, making it attractive to grazing animals. The plant is likely to be grazed because of its green growth, and attractive smell (unlike Poison Hemlock which has a musty smell).
- Western Water-Hemlock grows where water is abundant, and such areas usually receive heavy grazing pressure. Increased grazing pressure leads to livestock consuming much of the available forage.
- Western Water-Hemlock is easily pulled out of the ground in moist areas where the ground is soft, and grazers may consume the whole plant.
- Control and avoidance of

Western Water-Hemlock are the only methods to prevent livestock loss from poisoning. Grazing of these areas should be delayed until the ground has dried, so whole plants are not easily pulled out of the ground by livestock.

- Controlling access of animals to habitats where the herb grows may reduce the risk of poisoning.
- Hand grubbing and chemical application are the most effective methods of removing the plant. Roots must be completely removed from the site if grubbing or cultivation are used for control, as roots are attractive to grazing livestock.
- Chemical application is best done in late spring or early summer when the herb is growing. Application of 2,4D or glyphosate at 2 pounds an acre, or picloram at 1 pound an acre will give good control of Western Water-Hemlock.



Western Water-Hemlock in bloom



Distinctive leaves



Blossoms of Western Water-Hemlock  
Lincoln County Noxious Weed Control Board  
405 Ross Street  
Davenport, Wash. 99122  
509-725-3646





Spotted Water-Hemlock umbrel



Distinctive leaves and umbrels



Hollow chambers in root hold highly-toxic liquid poison.



Water-Hemlock along the roadside, steps from children



Spotted Water-Hemlock seed



The hollow, bulbous root of both forms of Water-Hemlock

## Biology of Water-Hemlock

- **Scientific Name:** Western Water-Hemlock: *Circuta douglasii*; Spotted Water-Hemlock: *Cicuta maculata*.
- **Origin:** North America: USA, Canada. See maps.
- **Where Found:** Only in wet places: marshes, stream banks slough margins, ditches, wet pastures.
- **Identification:** Often called "Cowbane." A perennial forb in the carrot-parsley (*Apiaceae*) family that grows 2 to 8 feet tall with hollow, smooth, pale green stems (purple spots on Spotted Water-Hemlock), enlarged at the base. Very appealing odor.
- **Leaves:** Leaf veins usually ending in the notches along the leaf margins, or the bottom of leaf serrations, and not at the tips. Several lance-shaped to oblong, sharply-pointed, toothed



- leaflets.
- **Flowers & Seeds:** Greenish-white and grouped in umbrella-shaped clusters. Each flower is two-seeded, and the tea-colored seeds are somewhat kidney-shaped with corky ridges. Seeds disperse by way of wind, water, machinery, on clothing and through transported soil. Seeds are covered with a spongy coat that allows the seed to float until it is saturated with water. Flooding spreads the seeds. The seeds germinate in spring and form a rosette. Flowers mature near the end of June. Rootstalks may also break off forming new plants.
- **Root:** Thick, tuberous rootstalk that contains many small chambers. The hollow chambers allow the plant to float in times of flooding. These chambers hold a highly-poisonous clear, brown or straw-colored liquid called cicutoxin, that is released when the stem is broken or cut. Cicutoxin has a strong carrot-like odor. Thick, fleshy tubers and slender individual roots grow from the bottom of the main rootstalk.



Distribution of *Cicuta maculata* form of Spotted Water-



Umbrels of *Cicuta maculata*



*Cicuta maculata* is often called Spotted Water-Hemlock due to the purple spots on stem nodes.



Spotted Water-Hemlock, *Cicuta maculata*, with purple stem nodes on plant stems.

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## Toxicity of Water-Hemlock

- Water-Hemlock is considered the most toxic plant in the United States since so little of it needs to be consumed to cause death. Humans have been killed after only one or two bites of what they thought were "parsnips."
- Cicutoxin is the toxin that makes Water-Hemlock so poisonous.
- A consumption of 0.1 percent of body weight of the green material (leaves and stems) is lethal. However, the oil in a single bulb is enough to kill a 1,600-pound cow.
- Cicutoxin is a yellowish liquid that oozes from cut roots. It is concentrated in secretory canals in the rootstocks. The toxin is a highly-unsaturated higher alcohol that acts on the central nervous system.
- Roots are most poisonous early in the growing season. Cicutoxin rapidly decomposes at temperatures above 95 degrees F. The herb may contain more cicutoxin in the spring and fall.
- Always wear gloves when handling the plant. Always sanitize knives that may have come in contact with this plant.
- Cattle are the primary species affected, hence the name "cowbane." Animals have been poisoned by drinking water contaminated by trampled Water-Hemlock roots. Pools of water by Water-Hemlock are probably just as deadly as the plant itself.
- Symptoms of the early stages of cicutoxin-poisoning are excessive salivation, frothing at the mouth, nervousness, and incoordination. Later stages of poisoning bring about tremors, muscular weakness, seizures, and respiratory failure.

## Toxicity of Water-Hemlock



Spotted Water-Hemlock



Western Water-Hemlock

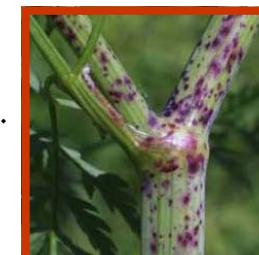
- Water-Hemlock roots contain 0.75 mg of cicutoxin per gram of root material.
- **Lethal doses** of cicutoxin by percent of body weight are: sheep: 0.2-0.5%; cattle: 0.1%; horses: 0.5%; swine: 0.3%.
- Effects of cicutoxin are rapid, with death occurring 15 minutes after ingestion, leaving little time for treatment. Treatments used with

some success are intravenous injection of pentobarbital and morphine to control convulsions.

- Symptoms of cicutoxin poisoning in humans are similar to those reported for livestock. From 1900-1980, 88 people died in North America from cicutoxin poisoning.
- A single bite of the root or 2.8 mg cicutoxin/kg of body weight is a lethal dose for humans.



Poison Hemlock



## Comparing Western Water-Hemlock with Poison Hemlock

### Western Water-Hemlock

### Bulbs

### Poison Hemlock

Western Water-Hemlock has an asymmetrical bulb with narrow chambers containing a clear oil (cicutoxin) which turns bright orange when it is exposed to the air. The second photo shows its tuberous roots.



Western Water-Hemlock



Poison Hemlock

Poison Hemlock has smooth, branching stems that are hollow, with purple spots or blotches especially near the base. There are no hairs on the stem. The root is a simple carrot-like tap root.

POISON

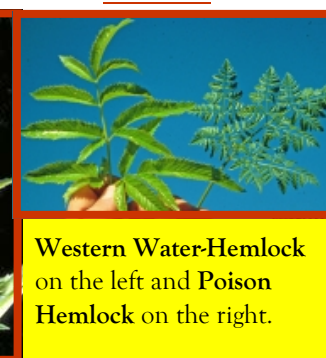


### Leaves

Western Water-Hemlock has compound leaves with the veins usually ending in the notches along the leaf margins.



Western Water-Hemlock



Western Water-Hemlock on the left and Poison Hemlock on the right.



Poison Hemlock

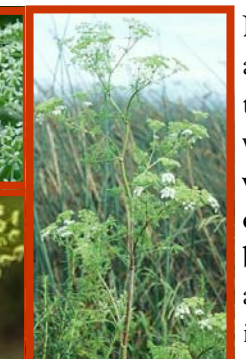
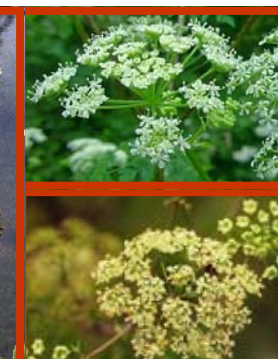
Poison Hemlock is a coarse, erect, 4-6 feet-tall, biennial or perennial plant. Its leaves are 3-4 times pinnately dissected, coarsely toothed with a fern-like appearance.

POISON



### Flower Head

Western Water-Hemlock, in only the first photo, has white-to-greenish-yellow-colored flowers formed in a compound umbrel. It is bractless (no leaves at the base of the flower heads).



Poison Hemlock has a compound flat-topped, loose, umbel with multiple, small, white-5-petaled flowers. Fruits are grey-brown ovoid, ridged and easily separated into two parts.

POISON



POISON

POISON