**Standardized Impact Monitoring Protocol (SIMP) for the Yellow Starthistle Root-crown Weevil (Pre-release):**

**Overview:**
A critical part of successful weed biological control programs is monitoring the impact of biological control agents on the target weed. Monitoring should be conducted on an annual basis for a number of years to show trends. Gathering baseline monitoring information before a new biological control agent is released is critical to determining impacts. The Idaho State Department of Agriculture, in conjunction with the University of Idaho, Nez Perce Biocontrol Center, and federal land management agencies, has developed the Standard Impact Monitoring Protocol (SIMP) to enable land managers to take a more active role in pre-release monitoring in preparation for the new biological control agent, *Ceratapion bascicorne* (CEBA), a root-crown weevil. This monitoring protocol was designed to be implemented by land managers in a timely manner and to provide pre-release monitoring data which will enable land managers and researchers to accurately quantify the impact of CEBA once it is released.

**Yellow Starthistle:**
Yellow starthistle is an herbaceous annual reproducing entirely by seed. A large plant is capable of producing up to 100,000 seeds which can remain viable in the soil for up to ten years. In the Pacific Northwest, its flowers bloom from July through October, with seed disseminating by late August. The bracts of yellow starthistle are spiny, often exceeding two cm in length. This plant produces two types of seeds, both of which are shiny and 0.3 cm long. Plumed seeds are mottled tan and brown in color and occur in the center of the flower head. Non-plumed seeds are black in color and occur around the periphery of the flower head. Stems are winged and typically grow between 60 – 120 cm tall. Basal leaves are lobed while upper leaves are linear and attach to the stem with wings. Yellow starthistle is common in rangelands, along roadsides, and in other disturbed habitats such as hayfields, orchards, vineyards and abandoned areas. Six insects and one rust have been released as biological control agents for this plant in the western U.S that have had varying levels of impacts.
**Permanent Site Set-up:**
To set up the vegetation monitoring transect, you will need:
1) a 25 x 50 cm Daubenmire frame made from PVC (preferred) or rebar,
2) a 20 m tape measure for the transect line and plant height,
3) 10 permanent markers (road whiskers and 16-penny nails – see above picture),
4) a post (stake or piece of rebar) to monument the starting point at the site (see pictures for examples of field equipment), and
5) 30-45 minutes at the site during the **third week in July**.

To set up the transect, place the 20 m tape randomly within the infestation. Mark the beginning of the transect with a post. Place permanent markers every 2 m (for a total of 10 markers) beginning at the 2 m mark and ending with the 20 m mark on the tape measure. Place the Daubenmire frame parallel to the tape on the 50 cm side with the permanent marker in the upper left corner starting at 2 m (see pictures). **Refer to the data sheet for how to conduct monitoring.** Repeat the frame placement at 2 m intervals for a total of 10 measurements (one at each permanent marker).