

The invasive Plant Perennial Sowthistle (*Sonchus arvensis* L. ssp *arvensis*) in Hyder Alaska



Fig. 1 Sowthistle infestation on Stewart Estuary Trail

TOM HEUTTE

Botanist

USDA Forest Service, Ketchikan-Misty Fiords Ranger District

MELINDA LAMB

Biological Science Technician

USDA Forest Service, Alaska Region, Forest Health Protection Juneau Office

Abstract

In the summer of 2006 a large infestation of invasive perennial sowthistle was found growing on an estuarine meadow at the head of Portland Canal in Hyder Alaska in close proximity to the Tongass National Forest. This infestation crosses the international boundary with Canada and represents the second largest known infestations of a non native plant outside of an urbanized area in Southeast Alaska. The site has a history of use as pasture but is also occupied by native plants, and is similar to many estuarine and beach fringe areas in southeast Alaska. The area of the infestation was measured and associated plant species were recorded.

Introduction

The purpose of this report is to document and analyze an infestation of the invasive plant perennial sowthistle (*Sonchus arvensis* L. ssp. *arvensis* Asteraceae) and to characterize plant communities and habitats at risk to future infestations.

Perennial sowthistle (also known as Field sowthistle or Moist sowthistle) usually grows 2-4 feet high and has an extensive horizontal root system that grows up to 10 feet deep. Early in the season, the plant is a basal rosette that could be mistaken for a dandelion. Leaves are alternate, lanceolate and 2-16 inches long, with a clasping base and soft prickly margins that vary from deeply toothed to nearly entire. The flower head is bright yellow and 1-2 inches wide (AKEPIC 2005). At high densities perennial sowthistle can decrease native plant diversity (Butterfield et al. 1996).

Perennial sowthistle reproduces by seed and horizontal roots. Each plant can produce 4,000 to 13,000 seeds that can remain dormant in the soil for up to six years. Spreading rootstocks are the primary means of spread on site as plants are capable of producing new plants from buds on the rhizome up to two feet in depth. Perennial sowthistle seeds have a hairy pappus and are spread by wind or may become attached to animals. Seeds may also be moved on vehicles and equipment and can contaminate commercial seeds and hay. (NWCB 2003, Butterfield et al. 1996). Seeds germinate at ¼-1 ¼ inches depth and the optimal temperature for germination is 77-86 degrees F. Plant cover and litter promote germination. Plants can survive temperatures as low as 3.2 degrees F (AKEPIC 2005)

Perennial sowthistle is listed as a noxious weed in 20 States and five Canadian provinces. It has also been declared a federal noxious weed in the United States and Canada, and a prohibited noxious weed in Alaska

Methods

After initial discovery of the infestation in August of 2006 the site was revisited in late September of 2006. At that time, the condition of plants on site ranged from mature flowering to post-anthesis-senescent.

Qualitative Survey

The infested area was delimited using a GPS receiver to determine the infested area. A floristic survey was conducted on the site to list all associated species of flowering plants, and to delineate plant associations found in the area.

Quantitative Survey

A series of 40 quadrats was examined to determine closely associated species. Twelve quadrats were dropped intuitively on sites where sowthistle was present. The remaining quadrats were placed using a randomized start systematic sampling method along five transects that were placed in the infested area in order to capture the full variation in species composition on the site. Quadrat size was 0.5 m x 1.0 m. Sowthistle stems were counted in each quadrat, associated species were listed for each quadrat, and the dominant species, defined as the species with greatest percent cover, was scored for each quadrat.

Results

The infested area is on an alluvial fan with very little elevation change or topographic relief. Low tides expose an area of about 200 acres. Approximately 16 acres is heavily infested with sowthistle. The meadow is transected by a raised causeway leading to a float dock in the Portland Canal. Several meandering sloughs cut through the meadow as well. The meadow is covered by higher high tides (spring tides) but not by the daily average high tides. Waters at the head of the canal are brackish due to high inputs of fresh water from the Salmon and Bear Rivers. The result of this placement is that the alluvial fan is subject to occasional flooding by water with a low salt content, keeping the alluvial fan in an early successional plant community. Another supratidal meadow is located about one mile away in Stewart BC at the mouth of the Bear River. The meadow in Stewart is also infested with sowthistle, but was not examined for this study.

The infested area is bounded by the neap tide line (inundated daily) and the spring tide line (inundated only by the highest tides). The area above spring tide line is a forest composed of a roughly equal amount of Red alder (*Alnus rubra*), Western hemlock (*Tsuga heterophylla*) and Sitka spruce (*Picea sitchensis*). Below the neap tide line is an extensive area dominated by a monotypic stand of Gmelin's sedge (*Carex gmelinii*). The sedge-dominated area accounts for 80 percent of the emergent alluvial fan. No sowthistle was found in either the sedge dominated or forested areas.

Three plant associations within the infested area were defined. A narrow strip along the forest edge was dominated by dune wild rye (*Elymus mollis*) and pacific water parsley (*Oenanthe sarmentosa*). Higher spots dispersed around the infested area were dominated by Sweet gale (*Myrica gale*). Intervening areas were dominated by fine grasses (*Festuca rubra*, *Agrostis stolonifera*) and Marsh Cinquefoil (*Potentilla anserina*).

Sowthistle stem density in the quadrats ranged from four to 31 stems/m². Average density in the fine grass association was 10.75 stems/m², 12 stems/m² in the dune wild rye association and 5.5 stems/m² in sweet gale. Although the lowest density was in sweet

gale, the largest and most robust plants were observed growing through the sweet gale shrubs.

Two other non-native plant species were found in the infested area, white clover (*Trifolium repens*), and creeping bentgrass (*Agrostis stolonifera*). One species found in 30 of the 40 quadrats was tentatively identified as Red fescue (*Festuca rubra*). Red fescue is native to Alaska, but is also commercially bred and produced as a component of lawn, forage and soil conservation seed mixes.

Discussion

The communities of Hyder Alaska and Stewart British Columbia lie at the head of the Portland Canal, a 90 mile long fiord that lies along the border between Alaska and Canada. The towns developed as mining communities over 100 years ago. In late nineteenth and early twentieth centuries, horses and dairy cattle were allowed to freely roam and graze in the vicinity of the two communities, particularly on the supratidal meadows. Presence of red fescue, creeping bentgrass and white clover suggest that the infested area may have been subject to some level of management as pasture, however it also retains many of the species associated with undeveloped beach fringe and supratidal meadow in other parts of Southeast Alaska.

Infestations of perennial sowthistle have been found on a number of sites around Southeast Alaska. In Admiralty Island, Glacier Bay National Park, Hoonah, and north Douglas Island they are associated with beach fringe and supratidal meadow vegetation. Sowthistle is found on sites disturbed by human activity in the communities of Juneau, Ketchikan, Klawock, and Wrangell

Sowthistles are difficult to control or eradicate once large populations are established. Extensive perennial root systems will break off and establish new plants if not completely removed by mechanical methods. Tillage may break up roots leading to an increase in number of individuals. One plant can produce up to 13,000 seeds and seed remain viable in the soil for up to six years. Sowthistle is resistant to many herbicides. (AKEPIC 2005) For these reasons, coupled with the fact that the infestation spans an international boundary, a control effort on this site does not appear to be feasible.

Sonchus arvensis ssp. *arvensis* is not generally regarded as salt tolerant (NWCB 2003) but is found in close proximity to salt and brackish waters in Southeast Alaska. Measurements of salinity of soils associated with sowthistle infestations in Alaska should be conducted in order to better characterize habitats at risk to infestation.



Figure 2. Sowthistle associated with sweet gale (*Myrica gale*)



Figure 3. Sowthistles associated with dune wild rye (*Elymus mollis*)



Figure 4. Sowthistle associated with dune wild rye (*Elymus mollis*)



Figure 5. Sowthistle associated with fine grasses (*Festuca rubra* and *Agrostis stolonifera*)

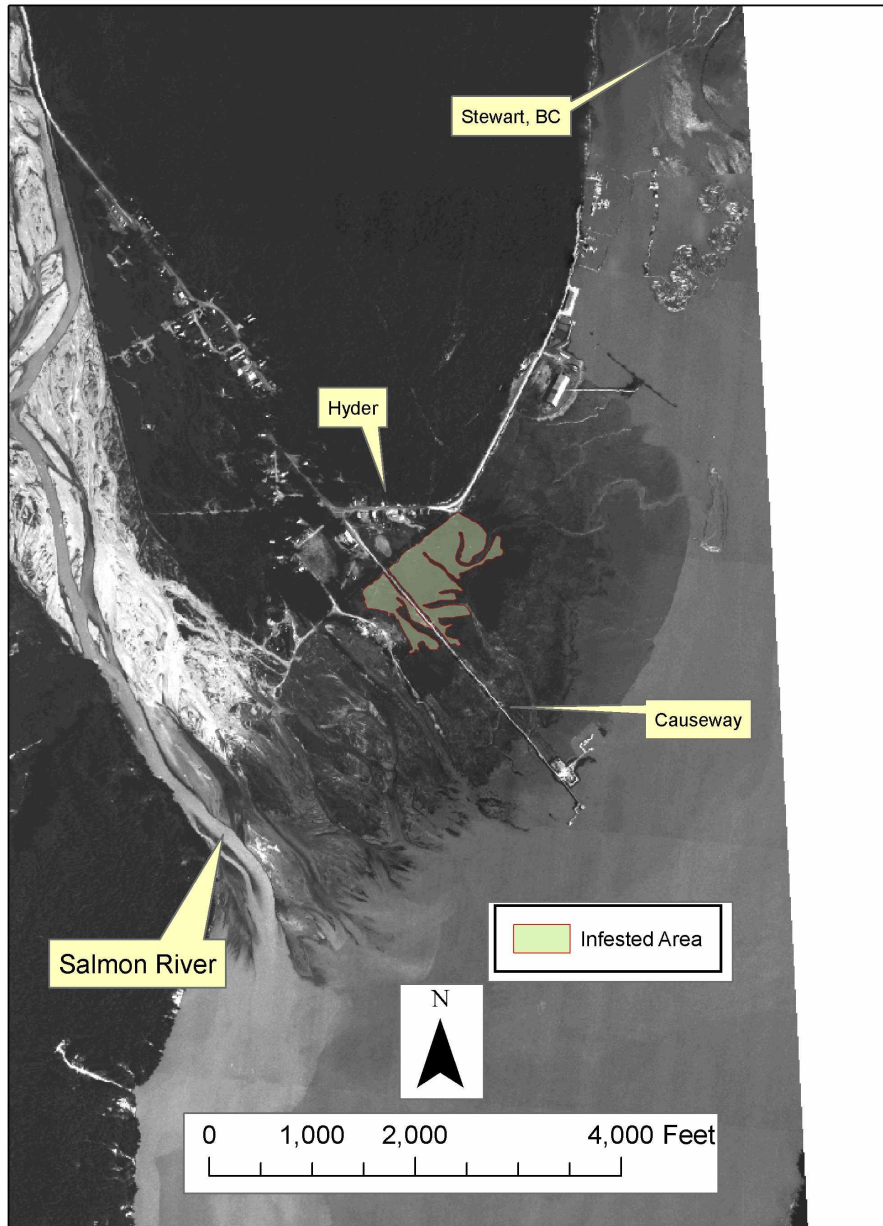


Figure 6. Aerial photo showing town of Hyder, alluvial fan, infested area



Figure 7. 3-D Rendering of Hyder/Stewart Area. Courtesy Google Earth

References:

AKEPIC (2005) AKEPIC-Alaska Exotic Plant Information Clearinghouse. 2005. Invasive Plants of Alaska. Alaska Association of Conservation Districts Publication. Anchorage Alaska.

Butterfield, C., J. Stubbendieck, & J. Stumpf. (1996) Species abstracts of highly disruptive exotic plants. Retrieved from Northern Prairie Wildlife Research Center Web Site: <http://www.npwrc.usgs.gov/resource/plants/exoticab/pipesonc.htm>

NWCB-Noxious Weed Control Board. Washington State (2003). Perennial sowthistle (*Sonchus arvensis* L. ssp. *arvensis*). Retrieved October 10th 2006 from NWCB Web Site http://www.nwcb.wa.gov/weed_info/Sonchus_arvensis.html

Appendix 1. List of plant species found during plant survey

Trees & Shrubs

Scientific name

Myrica gale

Common name

Sweet gale

Forbs

Plantago macrocarpa

Alaska plantain

Plantago maritima ssp. *juncooides*

Seaside plantain

Achillea millefolium

Common yarrow

Taraxacum officinale

Common dandelion

Potentilla anserina ssp. *pacifica*

Silverweed

Lupinus nootkatensis

Nootka lupine

Iris setosa

Wild flag

Heracleum lanatum

Cowparsnip, Pooshka

Trifolium repens

White clover

Honkenya peploides

Seabeach sandwort

Graminoids

Leymus mollis

Dune wildrye

Festuca rubra

Red fescue

Agrostis stolonifera

Creeping bentgrass

Carex gmelinii

Gmelin's sedge

Hordeum brachyantherum

Meadow barley

Juncus sp.

Rush (not keyed to species)