

WHAT IS SPARTINA?

Spartina refers to four species of non-native perennial, salt-tolerant cordgrasses invasive to the Pacific Northwest: *Spartina anglica* (English cordgrass), *S. densiflora* (dense-flowered cordgrass), *S. patens* (salt meadow cordgrass) and *S. alterniflora* (smooth cordgrass). All except *S. alterniflora* have been found in British Columbia (B.C.).

WHY IS SPARTINA A PROBLEM?

If permitted to expand along B.C.’s coast, *Spartina* infestations are likely to:

- Significantly decrease habitat for shorebirds, waterfowl, fish, and shellfish;
- Eliminate important intertidal nursery grounds for juvenile fish, clams, mussels, Dungeness crab and other invertebrates;
- Cause sediment accumulation;
- Disrupt tidal drainage patterns;
- Impact coastal based industries, such as shellfish growers, fisheries and tourism (significant risk of losing rearing habitat for clams, mussels and oysters);
- Disrupt the ecology, structure, and function of mudflats, salt marshes, and other intertidal habitats that provide the basis for a complex food web, and;
- Alter estuary hydrology resulting in elevation changes that can affect navigation and cause coastal flooding.

HOW WIDESPREAD IS SPARTINA IN B.C.?

These invasive grasses can form massive single species stands in ecologically critical habitat in the intertidal and low marsh communities of estuaries, outlets, and shoreline. They are invading thousands of hectares (ha) of intertidal mudflat along the west coast of the United States (US) and rapidly spreading into the Strait of Georgia.

As of Dec. 31, 2024, B.C. *Spartina* known occurrences are limited to approximately 4,400 individual plants, impacting less than 2.5 ha (6 acres) dispersed across a total project area of 20,619 ha (50,950 acres)(area of proposed PUP boundary). Multiple small sites along B.C.’s coastline create unique challenges in detecting, accessing, and eradicating. Impacted areas include the Fraser River Delta (Boundary Bay, Robert’s Bank, Sturgeon Bank), Burrard Inlet) and Baynes Sound (Comox Harbour to Deep Bay; Hornby, Denman, and Sandy Islands and the Seal Islets) (Table 1, Figure 1, 1a, 1b).

Left uncontrolled, *Spartina* will likely spread in distribution and density across tens of thousands of hectares, leading to loss of migratory bird habitat as observed in estuaries in Washington and California.

Table 1. Invasive *Spartina* spp Distributions in B.C.

	<i>S. ANGLICA</i>	<i>S. DENSIFLORA</i>	<i>S. PATENS</i>	<i>S. ALTERNIFLORA</i>
B.C. Locations	Fraser River Delta mudflats (Boundary Bay and Robert’s Bank).	Vancouver Island (Baynes Sound, Comox Harbour), and Gulf Islands (Denman, Hornby, Sandy Islands and the Seal Islets).	Burrard Inlet, Sturgeon Bank Vancouver Island (Baynes Sound, Comox Harbour), Sandy Island and the Seal Islets.	None known. (Present in WA State)

CORDGRASSES (*SPARTINA ANGLICA*, *S. DENSIFLORA*, *S. PATENS*)
FREQUENTLY ASKED QUESTIONS



Figure 1. Invasive *Spartina* B.C. Distribution By Species, Dec. 31, 2024.



Figure 1a. Invasive *Spartina* Distribution for Baynes Sound, Dec. 31, 2024.



Figure 1b. Invasive *Spartina* Distribution for Lower Mainland, Dec. 31, 2024.

HOW DOES *SPARTINA* REPRODUCE?

Spartina reproduces by root fragments (rhizomes) and viable seeds. In early spring, new seedlings germinate, and rhizomes sprout new shoots. Rapid growth occurs from May to August, with the majority of plants flowering in July and seed setting in September (Table 2).

Table 2. Invasive *Spartina* spp. Flowering Timelines.

	<i>S. ANGLICA</i>	<i>S. DENSIFLORA</i>	<i>S. PATENS</i>	<i>S. ALTERNIFLORA</i>
Flowering Time	June-Sept.	April-July	Late summer	July-Nov.

HOW DOES *SPARTINA* SPREAD?

Spartina forms thick mats of above and below ground plant material, including reproductive roots, rhizomes, and seeds. Root fragments and seeds are spread mainly by tidal currents, but also by water birds, ballast water, dredging, aquaculture and intentional plantings for erosion control.

HOW MUCH OF B.C. IS AT RISK OF BEING INVADED BY *SPARTINA*?

A drift card study concluded in 2008 found that ocean currents could carry *Spartina* seeds and root fragments to the full extent of B.C.’s coastline, much of it possessing suitable habitat for *Spartina* establishment.

B.C. has over 27,000 km of coastline, including 59,300 ha (146,500 acres) of tidal flats and marsh in over 440 estuaries. Approximately 25,000 ha of B.C. tidal mud flats in the Fraser River Delta are internationally recognized as important habitat for fish and migratory birds and support Canada’s highest density of wintering waterfowl, shorebirds, and raptors.

WHAT DOES *SPARTINA* LOOK LIKE?

In B.C., *Spartina* is an erect perennial grass, growing up to 1.5 m tall. It has large, smooth, often in-rolled leaves, angularly orientated along the stems. Flower clusters (inflorescences) occur at the top of the stem and are 2-24 cm long. A single *Spartina* plant, grown from seed, spreads into a circular clone. The clone spreads outward by rhizome, eventually combining with other clones to form a dense meadow mat (Table 3).

Table 3. Invasive *Spartina* spp. Key Identification Characteristics.

	<i>S. ANGLICA</i>	<i>S. DENSIFLORA</i>	<i>S. PATENS</i>	<i>S. ALTERNIFLORA</i>
LEAVES	Alternate; bright green blades grow at distinctive 45-90° angle to stems; 5-40 cm long; 5-12 millimetre (mm) wide.	Alternate; rolled inwards; greyish-green, narrow leaves; 12-43 cm long; 4-8 mm wide.	Alternate; rolled inward; 10-50 cm long; 1-4 mm wide.	Alternate; robust, green-grey; 20-55 cm long; 4-25 mm wide.
STEMS	5 mm diameter at base; 1 m tall; reddish colour.	3-16 mm diameter at base; 1.5 m tall.	Thin and pliant; 1.5-4 mm diameter at base; 1.2 m tall.	5-14 mm wide at base; up to 3 m tall.
INFLORESCENCES (FLOWERHEADS)	Erect 2-12 “spikes” along one side only (resemble wheat).	2-13 “spikes” grow 60° from central axis.	Droopy, reddish colour.	Many spikes grow tightly together; 10-40 cm long.

WHERE DOES *SPARTINA* GROW?

Spartina grows in intertidal salt marshes and mudflats (Table 4).

Table 4. Invasive *Spartina* spp. Preferred Habitat.

	<i>S. ANGLICA</i>	<i>S. DENSIFLORA</i>	<i>S. PATENS</i>	<i>S. ALTERNIFLORA</i>
HABITAT	High marsh zone to intertidal mudflats, where native plant species will not grow.	Cobble beach to high marsh zone to upper mudflats.	High marsh zone.	High to low marsh zones, incl. mudflats where beneficial species will grow.

HOW CAN I TELL *SPARTINA* APART FROM NATIVE PLANTS?

It can be difficult to differentiate between *Spartina* and beneficial plants growing in cobble beach and coastal marsh zones. The best time to locate *Spartina* is in mid to late fall, as it remains green longer than most native intertidal plants. *Spartina anglica* is the only plant that will grow in inter-tidal mudflats. Here is a key to common native plant look-alikes (Table 5):

DON'T MISTAKE THESE BENEFICIAL PLANTS FOR INVASIVE SPARTINA!

Table 5. Key for Differentiating Invasive *Spartina* spp from Beneficial Inter-Tidal Plants

	<i>SPARTINA</i> (INVASIVE CORDGRASS)	<i>DISTICHLIS</i> <i>SPICATA</i> (SEASHORE SALTGRASS)	<i>TRIGLOCHIN</i> <i>MARITIMUM</i> (SEASIDE ARROW- GRASS)	<i>LEYMUS MOLLIS</i> (AMERICAN DUNEGRASS)	<i>PLANTAGO</i> <i>MARITIME</i> (SEASIDE PLANTAIN)
HABITAT	Cobble beach to marsh zone to intertidal mudflats.	Salt marsh zone.	High intertidal zone only.	Coastal sand dunes, above stranded log line on beaches.	Marsh zone on beaches and rocky areas.
LEAVES	Large, smooth, often in-rolled; branch at 45-90° angle from stem.	Yellowish-green, 2-4 mm wide; finer than <i>S. anglica</i> .	Dark green; narrow, fleshy and vertical (2-120 cm long); do not branch like <i>S. anglica</i> .	Greyish-green; 6-15 mm wide.	Bright, green, fleshy; only 5-25 cm long.
STEM	Up to 1.5 m tall.	Solid, short (10-40 cm); much smaller than mature <i>S. anglica</i> .	Round (it is a rush, not a grass); flowering stem often taller than leaves.	Grows up to 1.8 m tall; smaller plants can be mistaken for <i>S. anglica</i> or <i>S. alterniflora</i> .	Leaves protrude from base of plant rather than branching out from vertical stem as in <i>S. anglica</i> .
LIGULE (JOINT BETWEEN LEAF BALDE AND STEM)	Fine straight hairs.	Ridge with small, dense bristles.	No ligule.	No fine hairs or bristles.	No ligule (it is a herb, not a grass).

ARE THERE ANY NATIVE *SPARTINAS* IN B.C.?

Spartina gracilis (alkali cordgrass) is a native perennial grass known to occur in wet ditches and meadows to dry (often alkaline) areas in the steppe and montane zones; infrequent in south central and southeast B.C., rare in northeast B.C.

WHERE DO THE INVASIVE *SPARTINAS* COME FROM?

Along the Pacific Coast, there are several species of invasive cordgrass that have invaded thousands of hectares of intertidal mudflats along the west coast of the U.S. (Washington, Oregon and California) and are currently spreading in the Strait of Georgia, mainly by tidal currents.

Table 6. Invasive *Spartina* spp Points of Origin.

	<i>S. ANGLICA</i>	<i>S. DENSIFLORA</i>	<i>S. PATENS</i>	<i>S. ALTERNIFLORA</i>
ORIGIN	Fertile hybrid species of <i>S. maritime</i> (native to England) and <i>S. alterniflora</i> (native to eastern US and introduced to England)	South America.	Atlantic Coast of North America.	Atlantic Coast of North America.

HOW LONG HAS *SPARTINA* BEEN IN B.C. AND HOW DID IT GET HERE?

Anecdotal evidence suggests *S. patens* has been present in B.C. since the 1980s, while *S. anglica* was detected more recently in 2003. Historically in other jurisdictions, *Spartina* has established through unintentional planting with other plants during ecosystem restoration, intentionally planted as a grazing crop for animals, as packing for shellfish, and range expansion (rhizome and seedlings).

WHAT IS THE MOST EFFECTIVE WAY TO CONTROL *SPARTINA*?

Rhizomatous plants, such as *Spartina*, may develop new plants by the dispersal of seed or a single root fragment. It is extremely difficult to ensure all root fragments are removed when hand digging *Spartina*. For this reason, manual control is difficult, labour intensive and often ineffective. Digging and burying with an excavator is a more thorough method of removing all root fragments; however, using an excavator in sensitive tidal areas can have unintentional impacts.

The most targeted, effective method of containing and eradicating *Spartina* is systemic herbicide treatment. Systemic herbicides are absorbed by the target plant through the leaves and/or roots and transported throughout the internal system of the plant. These herbicides travel through the plant’s vascular system and, depending on the mode of action, inhibit and/or eliminate plant growth.

WHAT IS THE COST OF DOING NOTHING?

Delay in addressing the *Spartina* invasion will increase the eradication costs to B.C. several fold. The current eradication plan estimates an annual cost of \$350,000 for 5 years to eradicate *Spartina* from B.C. Washington State initiated an eradication program once infestations had already reached several thousand hectares in area. This has required spending of over \$1 million USD annually since 2003 to control *Spartina*.

WHAT IS THE PROVINCE DOING ABOUT *SPARTINA*

Building on the *West Coast Governor's Agreement on Ocean Health* and the *Pacific Coast Collaborative Agreement* – cross border partnerships with the States of Washington, Oregon, and California that aim to reduce the ecological and economic impacts of invasive species and promote ocean health – B.C. has committed to the containment, reduction, and eventual eradication of *Spartina* from the province. With success in the first stage (containment), B.C. is now pushing towards reduction and eradication.

Since 2004, the B.C. *Spartina* Working Group has mapped infestations, removed plants by machine and by hand, conducted evaluations on effectiveness and undertaken public education and training, including development of the www.spartina.ca website. In 2010, a *Spartina* Response Plan outlined the issues, treatment options, required funding and recommended next steps. Since its beginning, the Working Group has developed a strong, cooperative relationship with the Washington State Department of Agriculture - the leading manager of *Spartina* for Washington State.

Since 2013, the Province has acquired Pesticide Use Permits (PUPs) and Emergency Use Registrations (EUR) for the use of Habitat (active ingredient imazapyr) herbicide to treat infestations of *S. anglica*, *S. densiflora* and *S. patens* along the Lower Mainland infested coastal areas. This work was expanded to include the east coast of Vancouver Island (Baynes Sound and Comox Harbour) and the North Gulf Islands (Denman, Hornby, Sandy Island, and the Seal Islets) in 2019. Aquatic herbicide Habitat Aqua (active ingredient imazapyr) was registered by Health Canada in Winter 2021, eliminating the need for further Emergency Use Registrations. Habitat Aqua is the preferred herbicide for treating invasive *Spartina spp* in B.C.

The Province of B.C. is seeking establishment of a new Pesticide Use Permit for the management of invasive *Spartina spp* for the period of June 2025 to June 2028. The proposed boundary of the Pesticide Use Permit will include all known occurrences of invasive *Spartina* species located in the inter-tidal areas of the Fraser River Delta and Baynes Sound (Figure 2).



Figure 2. Invasive *Spartina* Proposed Pesticide Use Permit Boundary 2025-2028.

SPARTINA PROGRESS IN B.C.

From 2003 to 2012, mechanical removal (digging by hand and with machinery) was the only method used to control *Spartina* in B.C. Detailed monitoring indicated that this approach alone was not containing or reducing *Spartina*, with only 10% being removed annually due to limited funds and remaining infestations continuing to expand.

In 2013, based on the recommendations of the *Spartina* Response Plan, the B.C. *Spartina* Working Group, with the support of the Province of BC, incorporated herbicide into the integrated pest management approach in the Fraser Delta. After three years of herbicide use, the reproductive plant parts (propagules) on actively growing plants and those embedded in the substrate were significantly depleted. Between 2016 and 2024, this adapted approach has resulted in the reduced abundance of all invasive *Spartina* species in B.C. from over 27,000 individual plants to approximately 4,400. The total impacted area has been reduced by 36% (1400 ha to under 500 ha) and the total area (leaf surface) of *Spartina* requiring treatment is now only 2.14 ha.

The abundance of *Spartina anglica*, which was originally the most prevalent *Spartina* species present in B.C. has declined by 96% since 2016 (Figure 3).

In areas of Burrard Inlet, the east coast of Vancouver Island and the Northern Gulf Islands, several trials of various treatment methods were tested on *S. patens* to determine the most efficacious and cost-effective treatment for this species. These methods include manual and mechanical digging, shading plots, mowing and, the use of herbicide. To date, only herbicide treatments have been shown to reduce the spread and distribution of *S. patens* and has been the main form of treatment since 2018. *S. patens* has been slower to receive herbicide treatment due to a higher need for public education, and the abundance has increased overtime (Figure 4). That said, *S. patens* populations receiving only a single season of treatment have shown a decline in abundance of up to 80%, and up to 94% following consecutive annual treatments. For this reason, the BC *Spartina* Working Group plans to treat all *S. patens* in BC with herbicide, including the east coast of Vancouver Island, Hornby Island, Sandy Island and the Seal Islets, as infestations in these areas continue to expand despite the various mechanical treatment efforts used to date.

S. densiflora, the only invasive *Spartina* spp that can be effectively controlled by manual removal methods, has shown an overall decline in abundance of 76% (Figure 5). Since 2015, the Vancouver Island *S. densiflora* infestations have been reduced from an estimated 3.0 ha and 14,090 plants to 0.01 ha and 982 plants. The BC *Spartina* Working Group will therefore continue using manual removal methods as the primary treatment method for this species and will incorporate herbicide treatments only if necessary.

Similar approaches in Washington, Oregon and California have resulted in *Spartina* reductions of up to 85%. In Willapa Bay, Washington, the removal of *Spartina* from mudflats by either mechanical or chemical means resulted in dramatic increases in shorebird and waterfowl use within several years of treatment.

From 2013 to 2024, the integrated pest management approach for invasive *Spartina* spp, which includes herbicide where necessary, has resulted in significant reductions in plant abundance and impacts to sensitive intertidal ecosystems. This trend is expected to continue with the consistent application of integrated pest management principles. The BC *Spartina* Working Group and Province of BC is now seeking to further this work and establish a new three-year Pesticide Use Permits to replace the existing ones, which expire June 28, 2025.

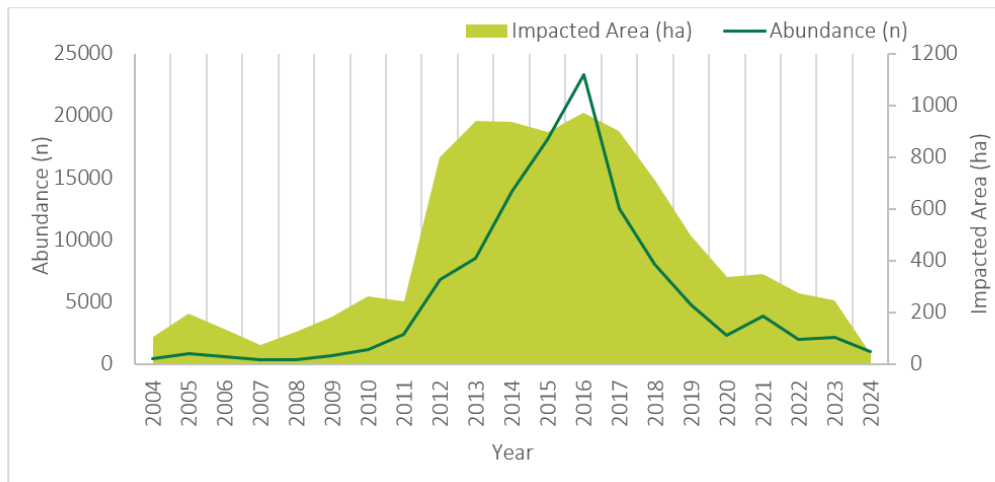


Figure 3. *S. anglica* impacted area and abundance in BC since 2005 (B.C. Spartina Working Group, 2024)

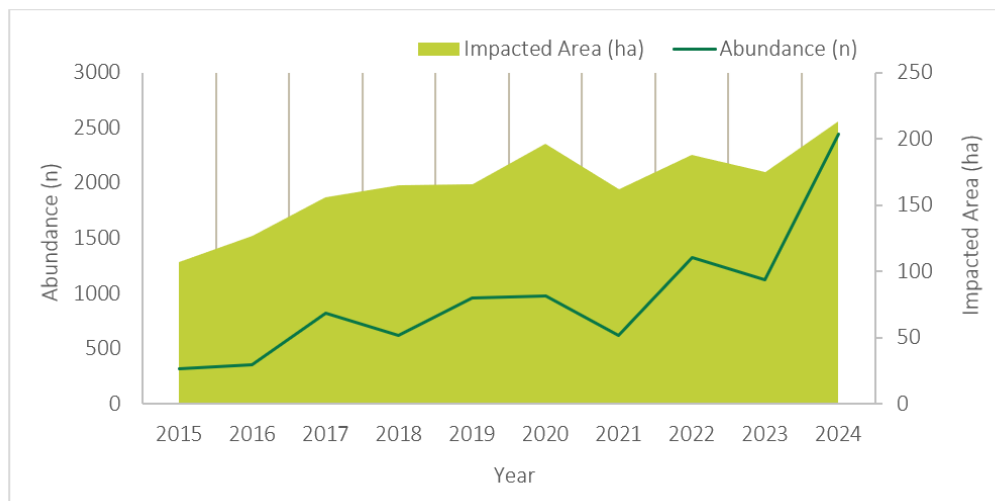


Figure 4. *S. patens* impacted area and abundance in BC since 2015 (B.C. Spartina Working Group, 2024)*
 *The increase in abundance of *S.patens* can be attributed to the discovery of new occurrences, difficult site access, inclement weather during Fall treatment season, and delays to herbicide treatments due to increased need for public education.

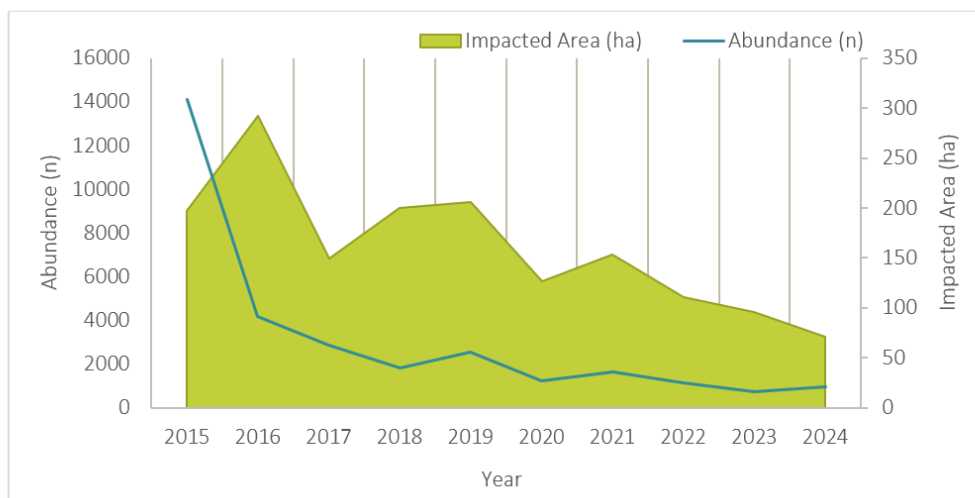


Figure 5. *S. densiflora* impacted area and abundance in BC since 2015 (B.C. Spartina Working Group, 2024).

WHAT IS THE PURPOSE & SCOPE OF THE PESTICIDE USE PERMIT

Support for the use of integrated pest management principles for the purpose of eradicating invasive intertidal cordgrasses (*Spartina anglica*, *S. patens*, *S. densiflora*) from the coast of B.C.

The Pesticide Use Permit (PUP) public consultation will be completed as required by the B.C. Ministry of Environment and Parks, and will include First Nations, stakeholders and the public in the geographic area of Metro Vancouver (including Boundary Bay, Robert's Bank, Sturgeon Bank, and Burrard Inlet), and the east coast of Vancouver Island and the Gulf Islands (including Comox, Courtenay, Deep Bay, Denman Island, Hornby Island, and Sandy Island)(Figure 2). Specific locations are refined following annual mapping of individual plants and clones. Mapping occurs each year and will identify the specific treatment locations in each area.

The total impacted area is under 500 ha and the total area requiring herbicide treatment is approximately 2.5 ha, dispersed across more than 20,619 coastal ha (area of proposed PUP boundary). Treatments will occur in summer and fall between June 2025, and May 2028. Beyond the scope of the PUP consultation, general *Spartina* management information will be communicated to impacted land occupiers and stakeholders province wide.

WHO IS THE B.C. SPARTINA WORKING GROUP?

The B.C. *Spartina* Working Group formed in 2004 as a partnership of different government and non-government organizations and industries collaborating to eradicate invasive *Spartina* species from B.C.'s shores. The Working Group expanded significantly when invasive *Spartina* spp were confirmed outside of the Lower Mainland in Baynes Sound. Today, the B.C. *Spartina* Working Group represents diverse responsibilities and interests from local, provincial, federal and First Nations governments, transportation and natural resource industries, conservation organizations and the general public. The B.C. *Spartina* Working Group is jointly coordinated by Ducks Unlimited Canada (DUC) and the B.C. Ministry of Forests Invasive Plant Program.

HOW DO I GET INVOLVED IN THE B.C. SPARTINA WORKING GROUP, MAPPING OR ERADICATION EFFORTS?

To get involved in the B.C. *Spartina* Working Group, mapping or eradication efforts in your community, contact:

Ducks Unlimited Canada
Email: Taylor Marriott
t_marriott@ducks.ca

HOW DO I REPORT A SPARTINA SIGHTING?



Free online smartphone applications or desktop reporting form: www.gov.bc.ca/invasive-species



FrontCounter BC (toll free) **1-877-855-3222**, ask for a provincial invasive plant specialist.