



A Proposal for Restoring Healthy Forests on Sidney Island

Parks Canada is proposing to collaborate with Sidney Island landowners on an island-wide approach to restoring a globally unique forest ecosystem. Following the winter newsletter for Sidney Island landowners, this detailed, research-based proposal is meant to support landowners in their decision-making process.

Summary

The spectacular Coastal Douglas-fir forests of the southern Gulf Islands region are rich in biodiversity and increasingly at risk.

A compelling body of research has shown that deer have significant impacts on forest ecosystems in BC's southern Gulf Islands. The most extreme example of this is on Sidney Island, where a large population of invasive fallow deer have severely deteriorated the island's forests.

Various management efforts to mitigate the impact of deer and improve forest health have occurred on Sidney Island since 1981, largely through the efforts of private landowners. While conditions have improved, fallow deer continue to thrive and ecosystems continue to suffer.

Consequently, Parks Canada is proposing to work with local landowners and local First Nations to restore the island's forest ecosystems. An initial key step of the proposal is to eradicate fallow deer from the island. This would be followed by extensive efforts to restore forest ecosystems on the island, including future management of black-tailed deer.

Parks Canada would fund the eradication operation on both private and public lands, and also provide funding and support for ecosystem restoration afterwards. This would include the management of both black-tailed deer and invasive plants.

This collaborative effort presents an opportunity for landowners and the federal government to work together to restore and maintain a globally unique ecosystem on Sidney Island.

Research-Based Rationale:

There are four key reasons why Parks Canada has identified Sidney Island as a critical place to restore forest ecosystems, beginning with the removal of invasive fallow deer:

- I. Sidney Island is home to a large area of at-risk Coastal Douglas-fir forest;
- II. Invasive fallow deer continue to have a devastating impact on at-risk ecosystems on Sidney Island;
- III. Efforts to control fallow deer have not been sufficient to allow for a functioning, healthy ecosystem;
- IV. Eradication is a feasible option.

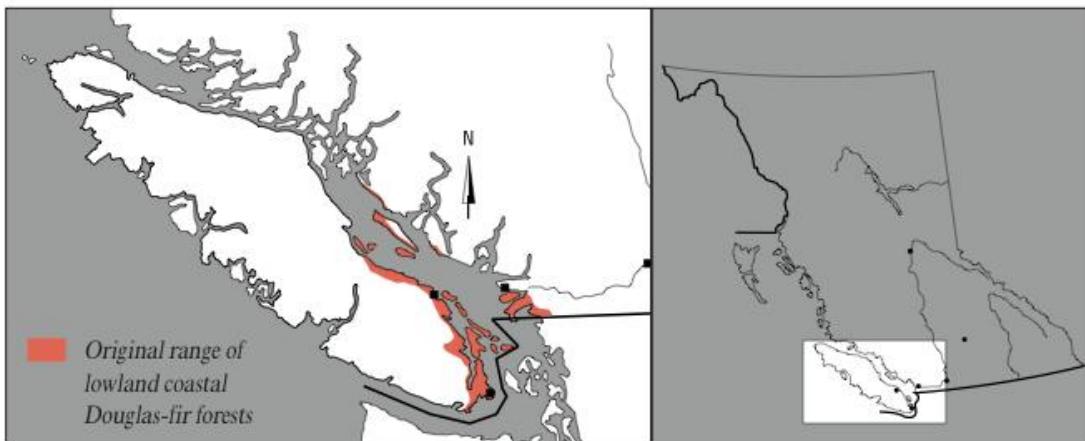
I. Sidney Island is home to a large area of at-risk Coastal Douglas-fir forest

The Coastal Douglas-fir forests found in the southern Gulf Islands are a part of a globally unique biogeoclimatic zone found only in a narrow area encompassing south-east Vancouver Island, the Gulf Islands, and the Sunshine Coast. The zone's Mediterranean-like climate gives rise to a rich biodiversity, encompassing a wide variety of species and ecosystems, including Garry oak. It has the highest diversity of plant species in BC and the highest diversity of over-wintering birds in Canada (Ward et al. 1998; Floberg et al. 2004).

Numerous Indigenous Nations have occupied the Coastal Douglas-fir forest zone since time immemorial, and continue to play a key role in the management of its cultural and ecological landscapes. However, this ecologically and culturally rich zone is increasingly under threat from a variety of pressures and is at risk of losing many of the rich ecological communities which define its very health and beauty. In fact,

data from Parks Canada's ecological integrity monitoring program for Gulf Islands National Park Reserve indicate the forest ecosystems are in poor condition and declining.

This biogeoclimatic zone - the smallest in BC - is also the most vulnerable in the province with the highest number of at-risk species and ecosystems, many of which are ranked as imperilled. More than 250 species in the zone and nearly all of its ecological communities are considered at-risk. Part of this problem is the high incidence of invasive species with more than 150 invasive species found in the region, such as scotch broom (MacDougall et al. 2004). These invaders outcompete native species for space and nutrients.



The South Coast of BC is a very popular part of Canada, with over three-quarters of BC residents living in the region. However, remaining natural spaces in the Coastal Douglas-fir forest zone face significant pressures from development and industrial use. Many of the zone's characteristic ecosystem types, including Garry oak, have lost more than 75% of their original area (CDFCP 2018). Less than 1% of old growth forests remain and almost half have been permanently altered by human activities (Madrone, 2008). It is also the least protected zone in BC with less than 10% of the region designated as a conserved or protected area.

To add to these pressures, cougars and wolves have nearly disappeared from the southern Gulf Islands. The near extirpation of apex predators in this area combined with the suppression of traditional management regimes of Indigenous peoples have contributed to the further degradation of Coastal Douglas-fir forest ecosystems.

The creation of Gulf Islands National Park Reserve occurred in part to conserve this highly vulnerable and highly valuable eco-zone. Likewise, Sidney Island landowners, through thoughtful community design, have preserved a large forested area of the island from development.

On Sidney Island, an exceptional opportunity exists to protect, restore, and maintain at-risk Coastal Douglas-fir forests. A key barrier is the large population of invasive fallow deer.

II. Invasive fallow deer are devastating at-risk ecosystems on Sidney Island

Throughout the world, significant scientific research shows that invasive and hyperabundant deer are a critical impediment to healthy forest ecosystems, impacting ecosystem function, plant richness, diversity, and cover (Wiegmann and Waller 2006; Perrin et al. 2011; Martin et al. 2011; Arcese et al. 2014). Deer also have a dramatic impact on other species dependent on forest ecosystems including invertebrates, small mammals, and songbirds (Moser and Witmer 2000; Stewart 2001; Miyashita et al. 2004; Holt et al. 2011; Martin et al. 2011; Chollet and Martin 2013). Results from Parks Canada's ecological integrity monitoring program in Gulf Islands National Park Reserve show significant impact from hyperabundant

deer to forest understory vegetation (Gonzales et al. 2014; Paleczny 2018) and forest-understory dependent songbirds.

On Sidney Island, invasive non-native fallow deer have been found to be particularly destructive, dramatically impacting forest ecosystem health in Gulf Islands National Park Reserve (Martin et al. 2011). Fallow deer have been present on Sidney Island since the early 20th century (Moody et al 1994; Pearse 2014) and their population has risen dramatically. These animals have now reached an unhealthy population size and their rampant feeding is reducing plant richness, diversity, and cover (Martin et al. 2011; Arcese et al. 2014; Paleczny 2018).

Research conducted in the region by Dr. Peter Arcese indicates that the cover, richness, and diversity of native shrubs was significantly lower in areas with abundant deer compared to areas with little or no deer (Arcese et al. 2014). Recent monitoring data indicates that shrub species richness and cover was lower for Sidney Island when compared to D'Arcy Island where black-tailed deer are hyperabundant, and Portland Island, which has no deer (Paleczny 2018). As a result of its fallow deer population, Sidney Island has the unfortunate distinction of being the least diverse island in the region (Martin et al. 2011).

Songbird communities are a common indicator to clearly show the levels of impact created by hyperabundant deer. This was demonstrated in a study examining the impact of introduced black-tailed deer on forest birds in Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site. On islands with a long history of deer browse (>50 years), forest songbird abundance was 55 – 70% lower than on deer-free islands, and for birds dependent on forest understory, songbird abundance dropped by 93% (Allombert et al. 2005a).

Similar results are observed on Sidney Island. In a survey of 18 islands in the southern Gulf Islands and San Juan Islands, Sidney Island had both the highest density of deer as well as the least diverse songbird community out of all islands studied (Martin et al. 2011).

Songbird monitoring studies conducted by Parks Canada indicate that Sidney Island has the lowest abundance of songbirds of island studies in the region (Lawn 2015).

Parks Canada's monitoring program found that the current population of invasive fallow deer on Sidney Island is at least 400% greater than a healthy ecosystem can support. Removing invasive fallow deer is critical to improving forest health on Sidney Island.

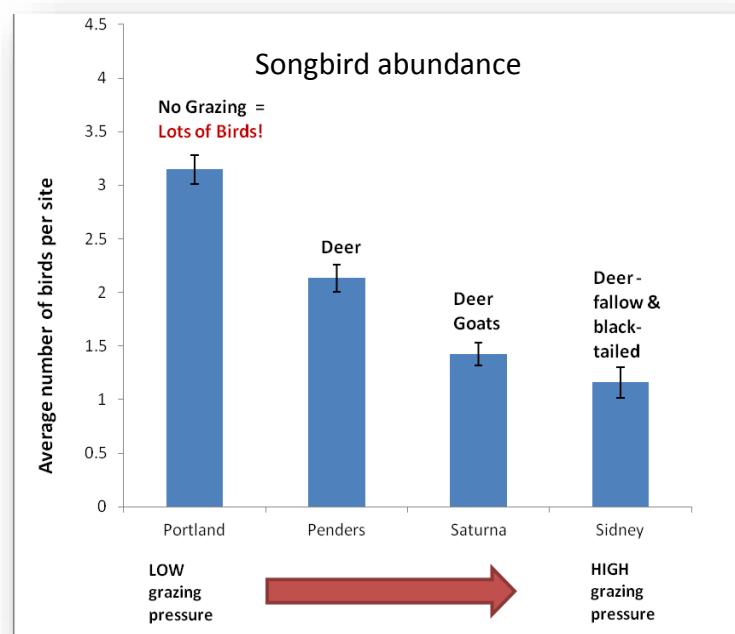


Figure 1: Songbird abundance in Gulf Islands National Park Reserve based on 2014 songbird monitoring research (Parks Canada)

III. Efforts to control fallow deer have not been sufficient to allow for a functioning, healthy ecosystem

Management efforts to reduce fallow deer populations on Sidney Island have occurred for more than 35 years. Since 1981, more than 14,000 deer were removed from the island through efforts such as semi-professional, recreational, and First Nations hunts, as well as commercial culls and trapping.

While abundant fallow deer provide a unique hunting experience for some landowners, their presence comes at a steep cost. Invasive fallow deer numbers have never been effectively brought down to a healthy level, causing the island's forests to steadily decline. Despite intensive efforts, largely on the part of private landowners and with some assistance from the Province of BC and Parks Canada, deer populations on Sidney Island continue to deteriorate local ecosystems.

The challenges posed by fallow deer are not unique to Sidney Island. Fallow deer were introduced to Tasmania as a game species in 1836. The population and range of deer has expanded dramatically: an estimated 8,000 fallow deer ranged across 400,000 hectares in 1970. Current estimates place the population at more than 40,000 across 2.1 million hectares. Fallow deer numbers are predicted to exceed one million by 2050. Efforts to control the population through current recreational hunting and crop protection measures are not sufficient to curb the growing population.

Similarly, fallow deer were released into the state of Victoria in Australia in the 1860s. In the 1970s, there were only two small populations of fallow deer in the state, but now this has increased to more than 50 populations spread over 2.1 million hectares, with numbers estimated in the tens of thousands. Despite an active legal hunt which resulted in over 9,000 fallow deer being harvested in 2012-13, populations are only expected to increase (Moloney and Turnbull 2014).

Ongoing hunting is not sufficient to tackle Sidney Island's large and resilient fallow deer population. Eradication is needed to end this ongoing battle to protect the island's forest health.

IV. Eradication is a feasible option

Before embarking on this restoration project, Parks Canada examined other options and worked with experienced eradication practitioners to investigate whether eradication of fallow deer is a feasible and achievable option for Sidney Island.

The *Eradication of Fallow Deer Feasibility Study* identified that, while there are various logistical and technical challenges, eradication is a viable option. The study is available for Sidney Island landowners to consider.

A detailed and draft operational plan for eradication clearly outlining proposed methods, timing, and potential impacts will be developed throughout the spring, following discussions with landowners. The plan will be shared this summer to aid landowners in their decision making process.

Parks Canada examined other options for managing fallow deer and other mechanisms for eradication but these were ultimately ruled out. Some of these methods include:

- *Non-lethal deer control:* Fertility control methods such as immunocontraceptive vaccines or injections of hormones have been used, but are often invasive and can require repeated applications. Relocation is another non-lethal method but is very expensive and time consuming. It also requires sufficient alternative habitat with a welcoming jurisdiction for the animals. Physical and chemical deterrents are not proven to be effective over the long term.
- *Reintroducing predators:* can often have a dramatic and long-lasting effect but is rarely a preferred option due to public safety concerns. Reintroducing fear-based impacts can be effective to some extent. For example, hazing by dogs has been effective in influencing use of space by elk, and predator playbacks have shown some success with deer in the southern Gulf Islands.



- *Recreational hunting* is often considered an effective and socially acceptable tool to control populations over a broad area. However, recreational hunting tends to be impractical for effective animal control, as often more than 50% of a population needs to be culled to maintain status quo. Deer quickly compensate for reduced population levels through breeding. Recreational hunters may also choose to target particular sexes or age categories, minimizing their impact on population size. Recreational hunting is often limited to more easily accessible areas, and animals can learn to avoid such areas over time and disperse to less targeted areas that may in fact be more environmentally sensitive.

The targeted eradication operation Parks Canada is proposing for Sidney Island would employ a broad range of methods such as aerial hunting, trapping, and bait station hunting. Such methods are known to be extremely quick and effective at reducing deer populations. For example, as part of a 2002 study on methods to control deer in the 9000 hectare Gum Lagoon Conservation Park in Australia, 65 recreational hunters shot 44 deer over four days. In contrast, a four-hour helicopter hunt in 2007 resulted in 182 deer shot.

Plans and Commitments

Parks Canada is proposing a multi-year project to restore the Coastal Douglas-fir ecosystems on Sidney Island, centred on three key initiatives. Below is a summary of those initiatives along with Parks Canada's commitments.

i. Removal of invasive fallow deer

Removing invasive fallow deer from Sidney Island would be an important first step in forest restoration. An eradication expert has been contracted to develop an eradication plan with input by landowners and First Nations. A team of professionals would lead any operation, likely over a period of four months during the fall or winter of 2019. A monitoring program would continue to track deer abundance, and a biosecurity plan would be put in place to detect any reinvasion of fallow deer from nearby islands such as James Island.

Parks Canada commits to:

- Produce a safe and effective eradication operation plan that reflects the values of landowners. Contractors will meet with landowners to produce a plan that would outline how eradication would take place. The plan would be presented to landowners in advance of any vote to further aid in decision-making.
- Pay for the eradication operation on both private and public lands, if eradication is supported. Parks Canada has secured approximately \$1 million for the project. No funds will be sought from landowners. Successful removal of fallow deer would require a variety of techniques and could consider both the semi-urban environment of Sidney Island and the perspectives and rights of residents and First Nations (please see *Eradication of Fallow Deer Feasibility Study* for further detail).
- Ensure Sidney Island landowners have opportunities (through workshops, one-on-one conversations, and a dedicated website) to help shape an eradication operation so methods align with community values and interests.
- Conduct trials of all proposed eradication methods to determine best practices in advance of an eradication operation.
- Ensure eradication operation protects public safety at all times, minimizes inconvenience to landowners, and respects the rights of landowners.
- Ensure eradication techniques respect animal welfare.



- Coordinate processing of deer meat and cover costs. Sidney Island landowners can opt to keep a portion of the meat from the deer killed. The remainder will be provided to local Indigenous communities and potentially donated to local schools or community groups in need.
- Communicate regularly with Sidney Island landowners through the planning, implementation, and restoration phases of the eradication project. Sidney Island landowners would be updated on a daily basis while the eradication operation was underway.
- Implement a biosecurity plan to prevent reinvasion of fallow deer from neighbouring islands.

ii. Management of black-tailed deer

Parks Canada will work with Sidney Island landowners and the Province of BC to develop a management plan for black-tailed deer on Sidney Island. Populations of black-tailed deer will increase in the absence of fallow deer, so hunting opportunities will continue to exist for Sidney Island landowners. First Nations will continue to play a role in supporting Sidney Island's forest ecosystems through traditional deer harvesting on Parks Canada lands.

Parks Canada commits to:

- Continue to monitor black-tailed deer populations on park reserve lands and contribute funds, materials, and expertise to landowners to undertake deer monitoring on private lands over the life of the project.
- Develop a hyperabundant black-tailed deer management plan with Sidney Island landowners, Province of BC, and First Nations, with specific strategies to prevent black-tailed deer from becoming hyper-abundant on Sidney Island.
- Continue to support deer hunting on private and public lands, as appropriate, contributing funds, materials, and expertise to landowners.

iii. Forest restoration

Parks Canada will work with Sidney Island landowners and First Nations to develop a forest restoration management plan to support the recovery of Sidney Island's forest ecosystems after the eradication of fallow deer. Effective forest vegetation restoration will require control of key invasive plant species, such as English Hawthorn and scotch broom, in ecologically important areas.

The reintroduction of native plants in some areas may occur in order to boost natural regeneration. Culturally important native plants such as camas, chocolate lily, fawn lily, shooting star, and native grasses including California oatgrass, blue wildrye, and red fescue have all been successfully propagated and used in restoration projects throughout the Gulf and San Juan Islands.

If community members supported this approach, some areas could be fenced off to support restoration.

Parks Canada commits to:

- Develop a forest restoration plan with Sidney Island landowners, outlining plans and strategies to support restoration objectives of priority to landowners.
- Contribute funds, materials, and expertise to forest restoration on both private and public lands in a way that respects the needs, interests, and desires of landowners over the life of the project.

Conclusion:

Restoration of forest ecosystems on Sidney Island, beginning with the removal of invasive fallow deer, presents a unique opportunity to contribute to the conservation of a globally important and at-risk eco-zone. These efforts would act as a model for collaborative private-public restoration projects and would leave a lasting legacy for future generations of Canadians and landowners.

The proposal will only proceed with clear support from Sidney Island landowners. This will be determined through a community vote arranged by Sidney Island's Stata Council later this year.

Information documents available:

A Proposal for the Eradication of Fallow Deer Newsletter (2018)
Available now

Frequently Asked Questions (2018)
Available now

A Proposal for Restoring Healthy Forests on Sidney Island (2018)
Available now

An Eradication Operation Plan for Fallow Deer on Sidney Island
Summer 2018

A Black-tailed Deer Management Strategy for Sidney Island
Summer 2018

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