



A Plan for the Management of European Fallow Deer At Sidney Spit, Gulf Islands National Park Reserve



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Executive Summary

European fallow deer (*Dama dama*) were introduced to Sidney Island approximately 70 years ago. Since that time, their numbers have escalated and they are now recognized as an impediment to the ecological integrity of the island due to their grazing and browsing pressure on local vegetation. This document presents a review of fallow deer on Sidney Island with respect to their history and management.

Sidney Island is managed as national park lands (Parks Canada) and private residential and conservation lands (Sallas Forest Strata Corporation VIS5122 (hereinafter “Sallas Forest”). Both parties, have common interest in the management of introduced fallow deer. Sallas Forest has been undertaking deer management since 1981 and they continue to do so under a recently updated management program (Sallas Forest Strata Corp. 2009). Although Parks Canada has assisted Sallas Forest in the development and implementation of their program, additional coordinated effort is required on park lands to achieve conservation goals.

Introduction

Background

Sidney Island is located in the Southern Gulf Islands just east of the Saanich Peninsula (Vancouver Island) (Figure 1). The island is made up primarily of marine sands and clays and is an artifact of glacial outwash materials deposited in the area approximately 12,000 years ago. The vegetation is made up of second growth coastal Douglas fir forests fringed by Garry oak and arbutus woodlands and coastal bluffs. With the exception of several small dugout ponds, there is no significant source of surface water on the island. Considerable clearing and pasture seeding has occurred in the past resulting in large open meadow areas interspersed throughout the island. The coastline is dominated by sand beach with a rocky shoreline south of Miner's Bay on the eastern and southern shores. There is a large lagoon and spit complex to the Northwest known locally as Sidney Spit.

Sidney Island has a long history of use by the Coast Salish People and exhibits several archaeological sites. Following European contact, the island was operated by the Hudson Bay Company as a farm and in 1910 it was established as a private hunting club. There was a brick works established on the north end of the island that operated into the 1930's while the south part of the island was managed as a sheep farm until the late 1960's.

In 1907, fifty (50) fallow deer European fallow deer (*Dama dama dama*) were brought to British Columbia from England and released on James Island where they quickly acclimatized and thrived. In the Mid 1930's there was an attempt to transplant deer from the James Island herd to other areas within British Columbia. The areas chosen were the Alberni Valley, Salt Spring Island and Sidney Island. The fallow deer population on Sidney Island has expanded to the extent that impacts to local vegetation are noticeable. Although the historical presence and abundance of black tailed deer is unclear, they are currently present on Sidney Island in low numbers. Black tail deer were intentionally introduced from Victoria (Beacon Hill Park) in the 1960s.

Fallow deer are an introduced and invasive species. Their ecological effect is illustrated by the noticeable reduction of understory vegetation and the loss or reduction of associated native species. Browsing and grazing pressure by introduced deer can also have cascading effects on the ecosystem by reducing habitat and food availability for forest birds and terrestrial arthropods thereby reducing these groups in terms of species diversity and abundance (Gaston et al. 2008; Martin 2009). These circumstances provide the context and rationale for a more effective deer management program. Efforts to control the deer population over the past 29 years have resulted in removal of over 11,000 deer from Sidney Island. The level of removal effort from year to year has been insufficient to reduce the population; indeed the abundance of fallow deer appears to have increased substantially over recent years. Thus we conclude that the level of

effort will have to be considerably greater than past programs to prevent reduce deer density to the point where serious impairment of ecological integrity is reversed and abated.

Management Context

Sidney Island is managed under two jurisdictions. Gulf Islands National Park Reserve (formerly Sidney Spit Provincial Marine Park) was established as a protected area in the 1960's and expanded in 1981. Transfer to National Park Reserve status occurred in 2003. The park is located on the northern end of the island and makes up about 15% or 120 ha of the area. The remaining 715 ha is owned by Sallas Forest Strata Corporation VIS5122 (henceforth "Sallas Forest"). Both Parks Canada and Sallas Forest share a common interest to protect the ecological integrity of Sidney Island and recognize that effective deer management is required to mitigate continued deterioration of the island's natural environment. Sallas Forest has managed the fallow deer since 1981 and has developed considerable expertise in the technical aspects of deer management. This document reviews past management actions and sets out deer management protocols for the National Park lands on Sidney Island. Although the focus of this document is deer management, this species-level management is intended to achieve more broad conservation and restoration goals toward improved ecological integrity on Sidney Island and Sidney Spit in particular.

Parks Canada derives its mandate from the Canada National Parks Act which states that the management priority is maintenance or restoration of ecological integrity through the protection of natural resources and natural processes. Specific policy direction (Appendix II) exists with respect to the management of introduced species and surplus wildlife. In these documents, Parks Canada states that all practical efforts will be made to prevent the introduction of exotic plants and animals into national parks and to eliminate or contain them where they already exist. In instances where wildlife (native or exotic species) reach proportions where their numbers negatively impact the ecological integrity of the ecosystem, they may be declared surplus and removed to prevent further damage to the park ecosystem and promote recovery of impacted ecosystems. Action will be taken only when research and monitoring confirms that intervention is required to counteract stresses which compromise a park's ecological integrity or other park objectives. Humane treatment of animals will be the paramount consideration in all operations related to the capture, husbandry, relocation, sale or destruction of surplus wildlife. Recipients of surplus wildlife will be responsible for adherence to the appropriate provincial, territorial, federal and international regulations concerning the transportation and health of animals.

Species at Risk

The degraded habitat of Sidney Island is under sustained pressure and particular threats to a number of rare species (see below). The direct impact of deer browsing and/or the alteration of habitat related to deer browsing is critical to the recovery of these species. Two of these plant species (bold font) have been assessed by COSEWIC as endangered while others are considered rare and are candidates for assessment. The common nighthawk (*Chordeiles minor*), a bird known to nest on the hook spit is recognized as threatened. Additional species at risk are not known on Sidney but are present regionally and restoration efforts should result in expanded habitat and potential new populations for these species. The *Camissonia contorta* Recovery Strategy indicates that the current population on Sidney Spit is marginally viable.

Enhancement of adjacent potential habitat will increase population viability and restoration of new habitat patches will provide opportunities for new or expanded populations. There are also a number of provincially significant species that will benefit from increased ecological integrity. As the ecosystem grows back into its full potential, visitors will be able to enjoy the diversity and abundance provided by an intact ecosystem.

- ***Camissonia contorta*** (contorted-pod evening primrose)(S1, G5; endangered) on sandy backshores near beaches
- ***Chordeiles minor*** (Common nighthawk)(S4, G5; threatened) on sandy backshores near beaches
- ***Carex tumulicola*** (S2, G4; endangered) (foothill sedge) on upland coastal meadows.
- *Abronia latifolia* (S3,G5) (yellow sand verbena), *Leymus triticoides* (S1, G4-5) (creeping wildrye) and *Glehnia littoralis* (S1, G4-5) (American glehnia) found on sandy backshores near beaches. *Abronia latifolia* is a host plant for *Copablepharon fuscum* (Sand-verbena Moth) (S1, G1-2; endangered). This moth species is also absent from Sidney spit but known to be habitat limited and found on adjacent islands.
- *Jaumea carnosa* (S2-3, G4-5) (fleshy jaumea) and *Triglochin concinnal* (S2, G5) (graceful arrowgrass) on shallow tidal flats
- *Lathyrus littoralis* (S2, G5) (Grey Beach Peavine), *Convolvulus soldanella* (S3, G5) (Beach Bindweed) and *Polygonum paronychia* (S3, G5) (Black Knotweed) not found on Sidney but known from adjacent islands.

Deer Management: Experience to Date

Population Estimates

There are many possible approaches to quantifying the absolute or relative number of deer in a population, such as counting each animal, counting fecal pellets, aerial surveys, and analysis of historical data on removals. All of these have challenges. In past years, a variety of techniques have been used on Sidney Island, but, consistent with the warning of leading experts on fallow deer, counting deer in woodland is difficult (Chapman and Chapman 1982). Experts recommend two or more techniques be used simultaneously. Others suggest the number of deer is not a concern but managers should be more concerned with describing or measuring the ecosystem response they are managing the deer for.

Using aerial surveys, the total population of fallow deer on Sidney Island has been estimated at a low of 700-900 animals (Simmons 1989 in Maurer 1989) and a higher estimate at the same time of over 1200 animals (Gary Bowden 1989). An aerial survey by Park Staff indicated that there were 900-1100 deer in 2005. Recent data from live capture operations suggests a 2003 population of approximately 1,100 animals (Graham Hickling, pers comm.). Research suggests that this is unlikely given the territoriality of fallow deer. Use of DNA markers can also provide mark-recapture data. However, preliminary exploration indicates that the genetic homogeneity on Sidney Island precludes use of this approach. Pellet counts establishing plots, and periodically clearing and counting the number of deer fecal pellets found on them. This is a well-established method of estimating changes in the density of the population. Plots have been established in representative areas across the island. Mark-recapture is a reliable method of establishing the absolute

number of deer in some circumstances, but only if the deer marked and released distribute themselves evenly throughout the whole island population. Pellet count surveys by Mercer (2009) indicate that the 2008 population of deer is 1064 (+/- 208 = 1SE). This is supported by Martin's independent assessment of 1164 (+/-90) deer (Martin 2009). Detailed records of deer removed from the island are available over nearly three decades. With population modeling software it is possible to estimate the minimum population size to support those removals. Through such an analysis, a first estimate of the population is 2,700 deer; more than double that of any other previous estimates.

Capture and hunting statistics suggest that black tailed deer are far less abundant on the island. Although hunting or capture related biases have not been considered, it would appear that black tail deer represent less than 2% of the total harvest.

Management Actions

Several deer management actions were undertaken by BC Parks (at Sidney Spit) and by Sallas Forest Limited (on the remainder of the island). A Total of 11,287 deer have been removed from Sidney Island through a series of management actions between 1981 and 2010 (Table 1). These data on deer removals are conservative, because they include only the numbers reported to have been removed, excluding natural mortality, those taken but not reported, poaching and other unreported mortality, which undoubtedly amount to a significant additional number of deer removed.

Sidney Spit

Under the jurisdiction of BC Parks the Sidney Spit area was closed entirely to deer hunting in 1975 in response to increasing user conflicts and concerns for public safety. Increasing impacts of deer on local vegetation became much more obvious in the 1980s as deer numbers increased. A deer fence between Sallas property and Parks property was established by BC Parks in the late 1980's. The fence has proven ineffective in preventing deer movement but is effective in delineating the property boundary and preventing unintentional trespass by park visitors. Moody (1987) examined the fallow deer of the island and their effects on vegetation. The work focused on population estimates and deer condition analysis (food habits and diet) along with a general description of deer effects on native vegetation. In conjunction with this work, browsing exclosures were established although the results over two years were inconclusive. Based on this preliminary work, Palmer (1988) established four permanent exclosures to facilitate long term monitoring of vegetation response to browsing. Follow-up studies were produced by Thompson and Hignett (1989 and 1991). Vegetation plots and exclosures were re-visited by Parks Canada in 2004. Results indicate large differences in both composition and structure of forest vegetation (Figure 2).

With increasing concerns over high deer numbers and related impacts, a limited entry hunt was initiated in 1996 and continued until 2001. To address public safety concerns, the park was officially closed to the public from October to March during which time hunters were permitted. Throughout this time, a first nations harvest has also occurred. First Nations hunting activity was coordinated with provincial officials to focus on seasonal closure periods and minimize public safety hazards. Since 2001, sport hunting has been prohibited under the National Parks Act. Parks Canada has implemented a park closure from November to February to facilitate First Nations hunting. Hunting statistics on park lands dating back to 1996 are recorded

for limited entry and First Nations hunts (Table 1). Hunting under these management approaches has had limited success in controlling deer numbers.

Sallas Forest Lands

Sallas Forests has been managing their fallow deer populations since 1981 in order to reduce browsing stress on regenerating forest species in both their working forests and conservation areas. Management has included hunting by owners, commercial guided hunting, and live capture and relocation of deer off-island. Removals under each category are shown in Table 1. Sallas Forest is committed to the management and sustainable use of the island's forest, which has included intensive silviculture and reforestation programs. The deer have presented a major challenge in this endeavor, insofar as reforestation and protection of young trees from deer has proven to be costly. Sallas Forest thus has an economic, as well as an environmental, interest in controlling the deer population. Management of the forest has increased its deer carrying capacity over time as a result of harvesting in the 1980s although this habitat is now diminishing as the new forest canopy has closed in.

Sallas Forest's experience with various methods of controlling deer numbers is extensive. Management of the deer population has occurred mainly through hunting and capturing. Sallas Forest provides high quality hunting opportunities to its owners and guests. Under a longstanding arrangement, the Ministry issues a special permit which extends the hunting season, and waives the usual bag limits. The harvest of fallow deer over the last decade averaged 190 per year, but increased effort in the last three years (2006-2009) increased the average to 360 animals per year. Because of increasing residential development on the island, commercial hunting was terminated in 2002, and for the same reason the scope for increasing recreational hunting appears limited.

During the 1980s, when deer farming was introduced in British Columbia, large numbers of fallow deer were captured on Sidney Island and shipped by livestock trucks to deer farmers. However, over the last decade that industry has largely collapsed, and with it, the opportunity to dispose of live deer. In 2009 capture facilities (Figure 3, Figure 4) were redesigned to improve operations by reducing injury to captured deer, improving husbandry (feed and watering) and to accommodate a mobile abattoir recently licensed to process red meat in British Columbia. Although this new facility can process live deer for shipment, the new arrangements allow for on-site processing of deer to provide federally inspected venison for commercial sale.

Wildlife biologists and other personnel from Parks Canada, British Columbia's Ministry of Environment, Canadian Food Inspection Agency as well as veterinarians from the schools of veterinary medicine in both Saskatoon and Calgary have participated in the design and operation of this new facility. In addition to commercial meat, antlers, hooves and hides have been recovered for local First Nations communities, to be used for cultural and artistic purposes. Revenues from the venison offset the substantial costs of the abattoir operation. Two operations have been undertaken in 2009 with the processing of 890 deer. This project succeeded in demonstrating the feasibility of capturing large numbers of deer and processing them on the island. The Strata Corporation has a long-term plan for reducing and managing the deer population at a sustainable level that will enable the island's natural vegetation to recover. This plan

includes the opportunity for Parks Canada to capture deer in the park and process them through these facilities.

Table 1. Deer harvest from Sidney Island 1981-2003.

Deer Harvested						
Year	Deer removed from Parks			Deer removed from Sallas Lands		Total
	LEH (Park)	1st Nation (Park)	Total Park Harvest	Hunting (Sallas)	Live Capture (Sallas)	
1981-1982				281		281
1982-1983				292		292
1983-1984				283		283
1984-1985				266		266
1985-1986				258		258
1986-1987				318		318
1987-1988				200	223	423
1988-1989				116	500	616
1989-1990				386	85	471
1990-1991				83	100	183
1991-1992				82		82
1992-1993				127		127
1993-1994				163		163
1994-1995		0	0	283	0	283
1995-1996		0	0	403	0	403
1996-1997	88	0	88	289	0	377
1997-1998	71	28	99	409	0	508
1998-1999	72	30	102	432	0	534
1999-2000	106	30	136	424	225	785
2000-2001	103	40	143	371	375	889
2001-2002	40	30	70	235	0	305
2002-2003		3	3	279	223	505
2003-2004		11	11	70	327	408
2004-2005		20	20	120	0	140
2005-2006		22	22	186	0	208
2006-2007		14	14	327	0	341
2007-2008		12	12	386	0	398
2008-2009		6	6	374	348	728
2009-2010		0	0	170	542	712
Total	480	246	726	7613	2948	11287

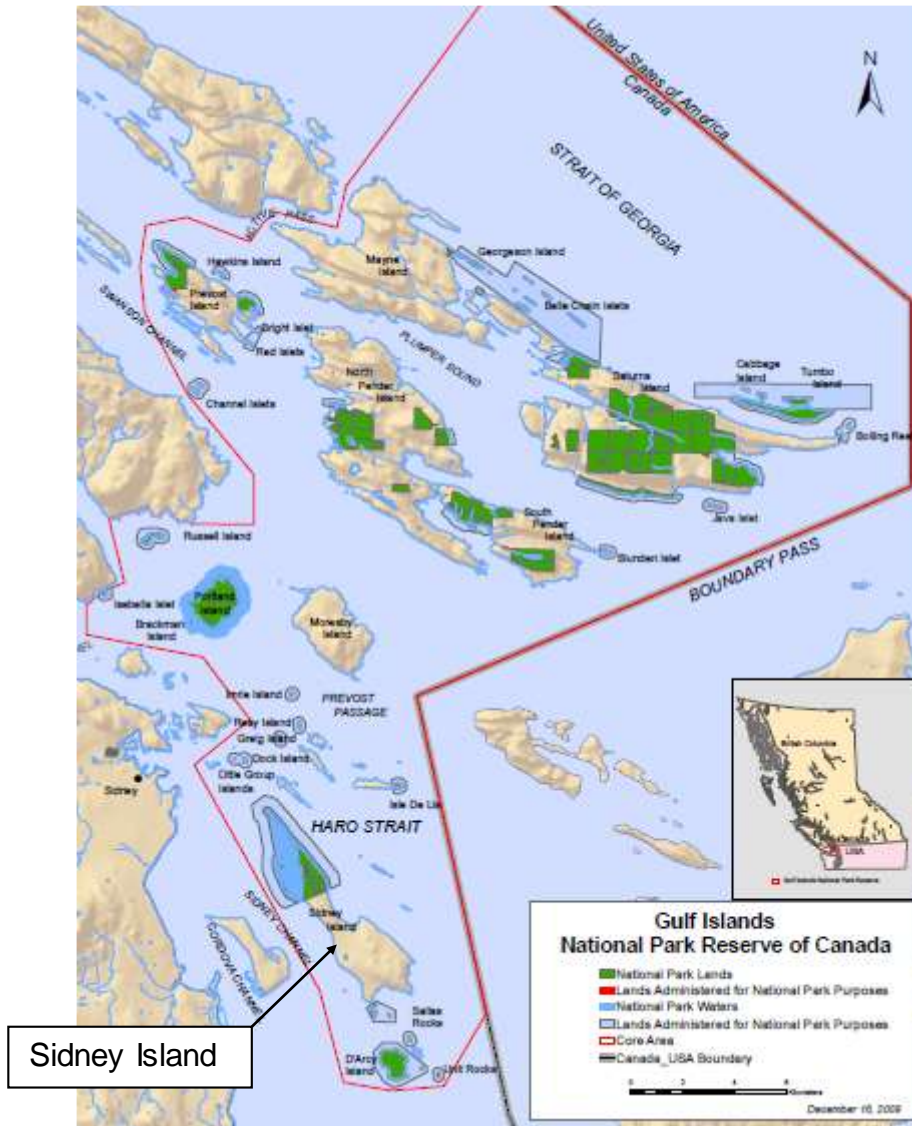


Figure 1. Sidney Island Location with National Park Lands demarcated.

DEER BROWSING AFFECT ON THE UNDERSTORY

(OPTICAL ESTIMATE: MEAN % COVER)

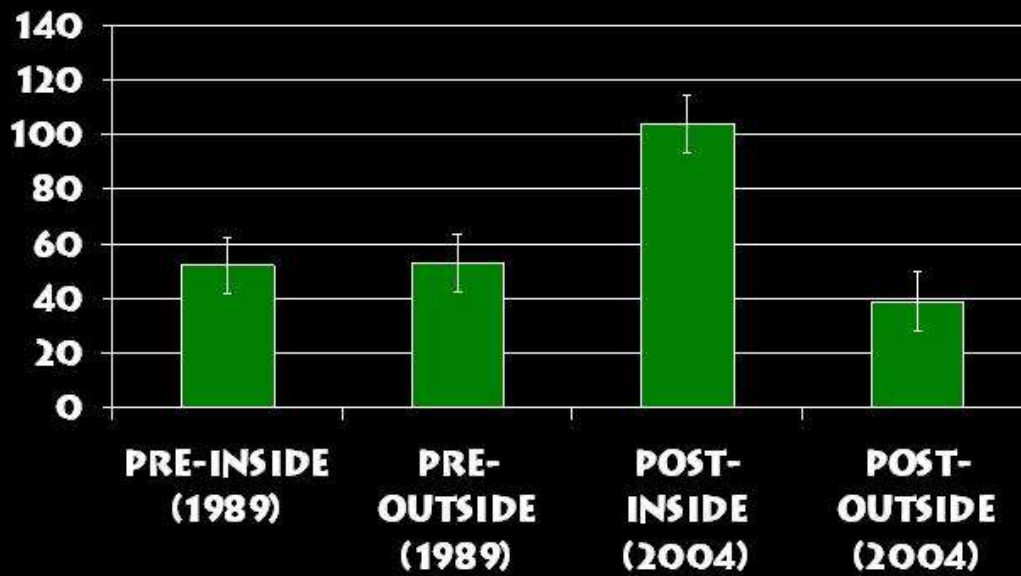


Figure 2. Percent change in vegetation cover inside and outside of deer exclosures between 1989 and 2004.

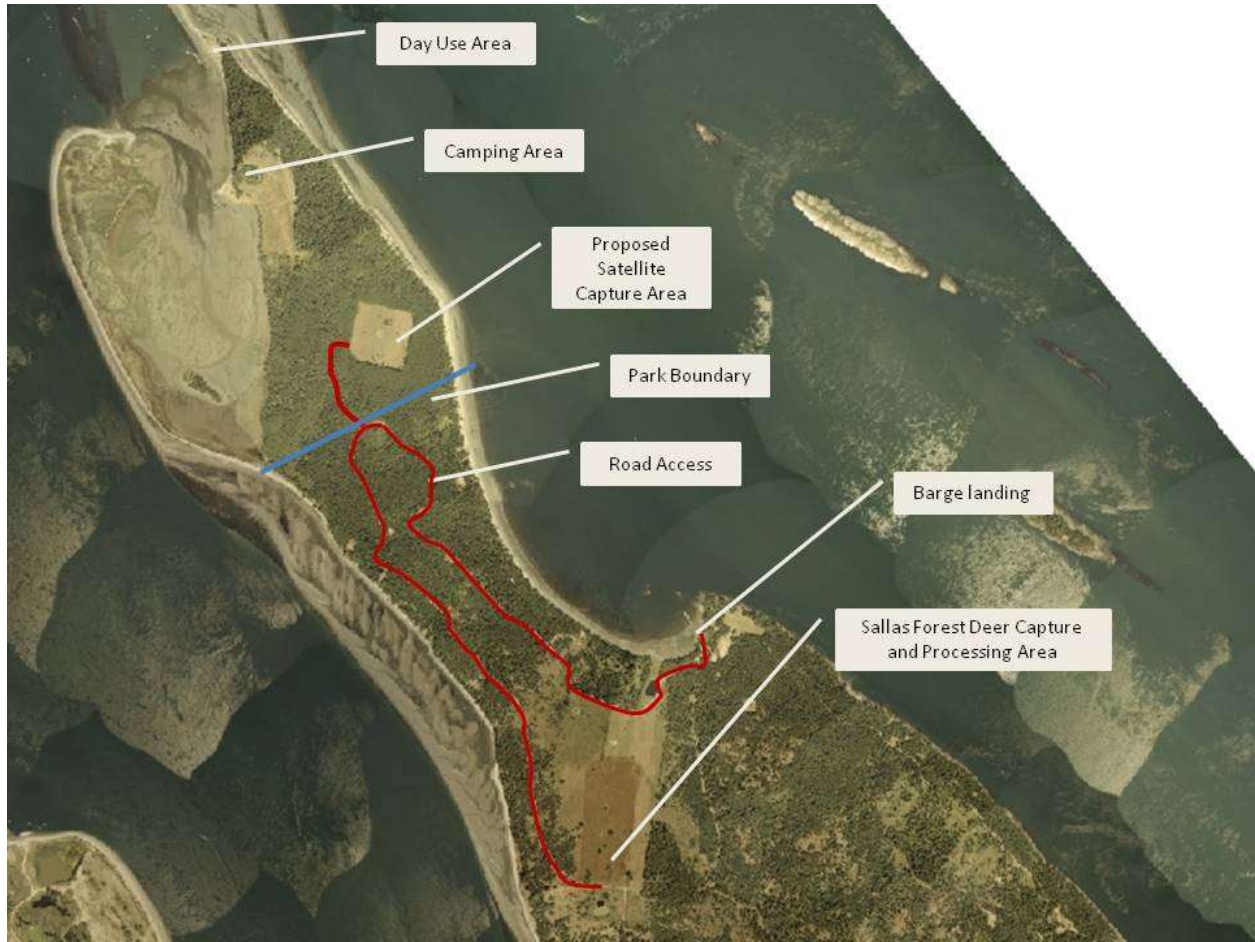


Figure 3. Sidney Spit (Park Lands) and Sallas Forest lands with identification of satellite deer capture facilities and road networks.