

2013-301



## Oak Bay Police Department

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# Memorandum

**To:** Oak Bay Mayor and Council  
**From:** Chief Constable Fisher  
**File #**  
**Date:** 2013-11-01  
**Re:** Oak Bay Police Department Provisional 2014 Budget

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Attached is the provisional Oak Bay Police Department Budget for 2014. The following is a brief summary of some of the significant variations from the 2013 budget.

### Administration:

The Police Board account is being increased by \$5000 this year to account for increased travel costs to attend the Canadian Association of Police Boards Conference which will be held in Halifax, Nova Scotia in 2014.

The salary amounts at this point are relatively similar to those in 2013. The current Collective Agreement expired at the end of 2012 and it is anticipated that we will likely enter a bargaining process sometime later in 2014.

Conference and meeting costs are down by about \$6,200.00 as there will not be a Police Leadership Conference in 2014 and the Canadian Association of Chiefs of Police Conference is being hosted in Victoria in 2014. We have included a line item to reflect costs associated to travel to one of the committee meetings of the CACP Crime Prevention Committee. Chief Fisher is the British Columbia representative on the committee replacing Chief Chadwick of Saanich who is retiring. This committee meets at least three times a year and one of those meetings is usually in central Canada for two days. We have increased the miscellaneous meetings category by \$1000.00 to account for the fact that we are supporting having Constable Thompson attend meetings in the Lower Mainland as a representative on the Provincial Breath Test Committee and Sergeant Smith is now representing the department on a Police Services committee discussing provincial firearms training standards.

The line item for travel and accommodation costs for the BCACP meetings is being increased to reflect the fact that recently both the Chief and Deputy Chief have been attending these meetings. This practice is consistent with that of other municipal departments and is a good professional development opportunity.

We are not requesting any increases to the office supplies, administration sundry and cash recovery accounts.

### **Protective Services:**

The Protective Service salaries reflect an increase of one police officer to backfill for Constable Gibbs who is being seconded to the Mobile Youth Services Team. Her salary of \$90,349.00 will be recovered. In addition to this we have realized some savings in salary dollars over the 2013 figures because we had four senior members retire in 2014 and our new hires have less police service and thus are at a lower pay scale at this point in time. The end result of that is a saving of \$50,222.00. We have an increased cost with Sergeant Hull being our secondee into the Combined Special Enforcement Unit. We are able to recover a senior Constables salary in that position so the end result is that we have an additional \$12,901.00 in salary costs that are not recoverable.

We have decreased the amount budgeted for Front Counter Relief by \$1301.00. We have been able to keep the number of backfill hours the same but are not required to cover the 21.6% benefit load that was required if we brought someone in to backfill from the Saanich Police Department. With the part time position at the Front Counter we have been able to adjust shifting and decrease the amount of callouts for backfill administrative support when someone is ill or on annual leave. We have had Rebecca cross train Heather so that she is capable of backfilling for her. We still need to budget some funds here in the event there is an illness when one of them is on annual leave.

The Special Event overtime category has been increased slightly to reflect the increase in special event callouts for charity events on weekends.

The CREST Board has advised us that there will be a 2.5% annual increase in the CREST annual fee for 2014 which amounts to an \$820.00 increase.

The uniform, clothing and plainclothes allowance account is decreasing by \$3550.00. With fewer anticipated retirements we are forecasting lower expenditures on dress uniforms and combo jackets.

Telephone costs are projected to drop again this year by another \$5990.00 due to projections based on this year's costs.

### **Force Supplies:**

In the area of Force Supplies we now have decreased maintenance costs of \$700.00 as we have taken the Datamaster instrument out of service now that we have a sufficient number of our officers trained to operate the Intoximeter breath testing instrument.

This past year we had Sergeant Smith take the Use of Force Instructor training course. He can now provide Use of Force training locally so that we do not have to arrange and pay for training elsewhere. We require a FIST training suit for the actors to wear during this training. We will also require training batons. These items are projected to cost \$1450.00.

With the addition of another officer to backfill for Constable Gibbs we will be required to purchase an additional firearm. We have budgeted for an extra firearm to have on inventory as with the age of firearms we can expect that we may need to send one in for maintenance at some point. Currently we are using the firearms of members that are on sick leave if we need a spare. Sergeant Smith is also attending armourer's training so that he can perform inspections of our firearms locally and perform minor maintenance. There are some common spare replacement parts that we should have on hand so that these common maintenance issues can be dealt with in a timely manner. We have budgeted \$1035.00 for these spare parts and an additional \$1000.00 for spare replacement magazines. The two new pistols will cost \$1040.00.

### **Computers:**

In 2014 we will be required to purchase two factor identification tokens for our officers and civilian staff to access the Canadian Police Information Center database to conduct queries on criminal histories, stolen property, and outstanding release conditions of offenders. These tokens will cost \$6600.00.

### **Computers and Small Equipment Replacement:**

We have been advised that the provincial standardized Approved Alcohol Screening Devices will be changing in 2014 and we will be required to replace our four units with ones with the updated technology and features. Each unit is projected to cost \$1000 with a total budgetary impact of \$4000.00. The replacement monitors and server batteries are part of the regular evergreening process of computer equipment.

### **Saanich Police Department MOU Contract Costs:**

The increases in Police Dispatching costs are due to the wage increase projections of two per cent for 2014. The other MOU costs remain the same as 2013.

### **Reserve For Retirement:**

At the direction of the Municipal Treasurer we are directing \$13,000.00 to this reserve account. In 2013, one more member completed their fifteenth year of service at the department and qualified for this severance entitlement.

### **IT Services:**

There is a slight increase of \$355.00 to the new service contract for our Close Circuit Video monitoring equipment.

### **Building Expenses:**

The utility increases are based on figures provided to us by the Municipal Treasurer. Our janitorial service contractor is projecting an increase of 2.5% in his costs for 2014.

The Police Board has added a category for a funding contribution of \$25,000.00 to a formal facilities review in 2014. Significant concerns regarding the state of our current building were raised during the strategic planning process that we undertook last year. We have had some preliminary reports concerning the state of the electrical, plumbing, heating, and structural issues with the building. A proper assessment will require funding for a structural engineering firm to conduct an assessment of the state of the building. I am aware that our contribution towards this work may form part of a larger facilities review in the municipality.

### **Auto Equipment:**

The police bikes are receiving more use so we anticipate increased maintenance and tune up costs next year.

The maintenance costs for the vehicles are projected by the municipal mechanics. PC 72 will be replaced in 2014 and the conversion costs are estimated to be \$14,000.00 based on what the Delta Police Department paid for a similar conversion this year. We have lowered the projections for the amount of fuel required for PC 73 by 200 liters, PC 74, 71, 76, and 79 by 300 litres each based on less usage due to foot and bike patrols.

### **Community Program:**

This program has two items that are increases. We are proposing the purchase of quick dry t-shirts for our community sports games at the local elementary and middle schools. This item is projected to cost about \$800.00.

Police Camp is not going to proceed in 2014 so that item has been removed from the 2014 budget which is a savings of \$1600.00.

In recognition of the many hours that our complement of Reserve Constables volunteer and contribute towards our community education and crime prevention initiatives we are recommending that we budget \$2200.00 to send two of them to the BC Crime Prevention Symposium in the fall of 2014.

There are ongoing discussions regarding the funding of the Greater Victoria Crimestoppers office. At the time of this memo it is still not clear what level of involvement the RCMP detachments will have with funding the Greater Victoria office. They are considering contracting with the Nanaimo Crimestoppers office. Our best projection at this point is that our cost will rise slightly to \$6600.00, an increase of \$926.00.

#### **Integrated Units:**

In 2014 we are moving to a new funding formula for the integrated policing units. The new formula will no longer be based on the number of police officers in a jurisdiction. Instead it will be based on an average of police strength, criminal code case volume, population, and tax assessment values.

The majority of increases to our integrated unit costs are attributable to projected wage increases. The Regional Crime Unit costs were projected to increase due to the Central Saanich Police Department and the Sidney North Saanich RCMP no longer participating in the unit however a decision was made to reduce the personnel complement of the unit by one supervisor position to avoid a significant budgetary impact to the remaining partners.

### **CAPITAL EXPEDITURES**

#### **New Equipment Office:**

The only capital item in this category is a new portable speed reader board which is solar operated and pole mounted. The software program will allow us to remotely access data from the board. We have nothing but problem with trailer mounted boards and feel that this would be a better solution given the number of requests we receive for additional speed monitoring. The cost of this item would be \$5204.00.

#### **New Capital Equipment Cars:**

Car 72 is scheduled for replacement next year. The anticipated cost for the replacement sport utility vehicle is \$40,000.00. This category decreases by \$34,000.00 over 2013.

#### **New Capital Equipment – Computers:**

We will require a new server in 2014 for a cost of \$17,000.00 and a new mobile data terminal at costs of \$6000.00.

As mentioned at the September Police Board meeting the Office of the Police Complaints Commissioner is mandating all municipal police departments to install a contemporaneous electronic filing system for uploading investigative materials on all Police Act investigations. This software and licence will cost \$12,350.00.

This category will increase by \$24,850.00 over 2013.

#### **Police Department Renovations:**

A switch and video monitoring unit needs to be installed on one of our temporary holding areas for our CCTV monitoring unit. Although the area is not used often the expectation of the courts is that we will have video monitoring anywhere in the building where a detainee may be taken during the course of their interaction with the police. The cost for this item is \$4500.00. This category is decreasing by \$14,200.00 this year.

**Reserve Account Contributions:**

The reserve account contributions will remain the same as last year.

**Final Figures:**

The total capital purchases for 2014 are projected to cost \$98,354.00. The portion of this to be funded by taxes is \$28,054.00. The balance is being covered by funds held in reserve.

The final budget amount is \$4,437,860.00 which is a \$39,217.00 decrease from the 2013 budget figures. This equates to a .876% budget decrease for 2014.



Mark Fisher  
Chief Constable  
Oak Bay Police Department

**2013 PROVISIONAL BUDGET - POLICE BOARD**  
**Operating Fund**

			2013 Budget	Provisional 2014 Budget	% Change
		<b>POLICE BOARD</b>			
10221100	5900	SUNDRY	5,000	10,000	100.00%
		TOTAL POLICE BOARD	5,000	10,000	100.00%
		<b>ADMINISTRATION</b>			
10221200	1101	SALARIES FULL TIME	424,101	424,128	0.01%
10221200	1201	BENEFITS	27,782	26,996	-2.83%
10221200	2001	LEGAL FEES	10,000	10,000	0.00%
10221200	2100	CAR ALLOWANCE/TRAVEL	200	200	0.00%
10221200	2101	CONFERENCES/MEETINGS	21,620	15,440	-28.58%
10221200	3300	OFFICE SUPPLIES	10,700	10,700	0.00%
10221200	5900	SUNDRY	9,773	9,773	0.00%
10221200	9999	RECOVERIES	(20,000)	(20,000)	0.00%
		TRANSFER TO RESERVE			
		TOTAL ADMINISTRATION	484,176	477,237	-1.43%

**2013 PROVISIONAL BUDGET - POLICE BOARD**  
**Operating Fund**

			2013 Budget	Provisional 2014 Budget	% Change
		<b>PROTECTIVE SERVICES</b>			
10221300	1101	SALARIES FULL TIME	2,508,532	2,576,403	2.71%
10221300	1103	OVERTIME - MANAGEABLE	91,463	96,210	5.19%
10221300	1106	OVERTIME - STAT. HOLIDAYS	63,197	63,197	0.00%
10221300	1301	FRONT COUNTER RELIEF	4,313		-100.00%
10221300	1401	BENEFITS PART TIME	932		-100.00%
10221300	1906	E.I.	27,100	27,100	0.00%
10221300	1907	C.P.P.	60,800	60,800	0.00%
10221300	1908	SUPERANNUATION	435,000	435,000	0.00%
10221300	1909	GROUP INSURANCE	4,800	4,800	0.00%
10221300	1931	DENTAL	38,300	38,300	0.00%
10221300	1934	UNIFORM CLEAN ALL'CE	8,580	9,080	5.83%
10221300	1935	W.C.B. ASSESSMENTS	20,100	20,100	0.00%
10221300	1936	W.C.B. REIMBURSEMENTS			
10221300	1939	EHB	31,100	31,100	0.00%
10221300	3500	RADIO	34,550	35,370	2.37%
10221300	3700	CLOTHING, UNIFORMS ETC	35,730	32,180	-9.94%
10221300	3800	TELEPHONE (Incl PRIME charges)	34,890	28,900	-17.17%
10221300	4200	REPAIRS & SUPPLIES	35,661	29,508	-17.25%
10221300	4500	COMPUTER (Incl. PRIME, software, RTID)	38,762	42,411	9.41%
10221300	4602	SMALL EQUIP. REPLACE		11,000	
10221300	5901	CONTRACT - SAANICH GEN. SERVICE	190,655	190,655	0.00%
10221300	5907	CONTRACT - SAANICH DISPATCH	131,452	134,081	2.00%
10221300	6001	RESERVE FOR RETIREMENT	17,000	13,000	-23.53%
10221300	6650	IT SERVICES	6,300	4,655	-26.11%
10221300	8800	CAPITAL REPLACEMENT - COMPUTERS	20,000	20,000	0.00%
10221300	8888	RESERVE FOR OLD MAJOR CRIMES	20,000	20,000	0.00%
10221300	9999	RECOVERIES	(270,912)	(387,208)	42.93%
		<b>TOTAL PROTECTIVE SERVICES</b>	<b>3,588,305</b>	<b>3,536,642</b>	<b>-1.44%</b>
		<b>TRAINING</b>			
10221500	5904	TRAINING EXPENSES	25,400	25,400	0.00%
		<b>TOTAL TRAINING</b>	<b>25,400</b>	<b>25,400</b>	<b>0.00%</b>

**2013 PROVISIONAL BUDGET - POLICE BOARD**  
**Operating Fund**

			2013 Budget	Provisional 2014 Budget	% Change
		<b>BLDG EXPENSES</b>			
10221600	1102	WAGES HRLY FULL TIME	2,200	2,200	0.00%
10221600	1202	BENEFITS HRLY FULL TIME	1,166	1,225	5.06%
10221600	3900	ELECTRICITY	7,254	7,544	4.00%
10221600	4000	WATER	1,251	1,389	11.03%
10221600	4100	NATURAL GAS	1,578	1,578	0.00%
10221600	4200	REPAIRS & SUPPLIES	14,000	14,000	0.00%
10221600	5600	CUSTODIAL SUPPLIES	4,000	5,000	25.00%
10221600	5601	JANITOR SERVICES	16,528	15,698	-5.02%
10221600	5907	FACILITIES REVIEW		25,000	
		<b>TOTAL BLDG EXPENSES</b>	<b>47,977</b>	<b>73,634</b>	<b>53.48%</b>
		<b>POLICE AUTOMOBILES</b>			
		<b>SUNDRY AUTO EQUIPMENT (ICBC Van, Ferry reservations, bicycle program, etc)</b>			
10221730	4201	GAS & OIL FOR EQUIPM'T	150	150	0.00%
10221730	4202	EQUIP'T PARTS SUPPLIES	2,133	2,700	26.58%
		<b>TOTAL SUNDRY AUTO EQUIPMENT</b>	<b>2,283</b>	<b>2,850</b>	<b>24.84%</b>
		<b>AUTO EQUIPMENT # 71 (2013 Ford Taurus)</b>			
10221731	4201	GAS & OIL FOR EQUIPM'T	8,500	8,775	3.24%
10221731	4202	EQUIP'T PARTS SUPPLIS	13,200	3,451	-73.86%
		<b>TOTAL AUTO EQUIPMENT # 71</b>	<b>21,700</b>	<b>12,226</b>	<b>-43.66%</b>
		<b>AUTO EQUIPMENT # 72 (2009 Ford Escape hybrid, to be replaced in 2014)</b>			
10221732	4201	GAS & OIL FOR EQUIPM'T	4,375	4,725	8.00%
10221732	4202	EQUIP'T PARTS SUPPLIES	5,060	17,533	246.50%
		<b>TOTAL AUTO EQUIPMENT # 72</b>	<b>9,435</b>	<b>22,258</b>	<b>135.91%</b>



**2013 PROVISIONAL BUDGET - POLICE BOARD**  
**Operating Fund**

			2013 Budget	Provisional 2014 Budget	% Change
		<b>AUTO EQUIPMENT # 73 (2008 Toyota Camry Hybrid)</b>			
10221733	4201	GAS & OIL FOR EQUIPM'T	1,500	1,350	-10.00%
10221733	4202	EQUIP'T PARTS SUPPLIES	2,516	2,017	-19.83%
		<b>TOTAL AUTO EQUIPMENT # 73</b>	<b>4,016</b>	<b>3,367</b>	<b>-16.16%</b>
		<b>AUTO EQUIPMENT # 74 (2011 Ford Crown Victoria)</b>			
10221734	4201	GAS & OIL FOR EQUIPM'T	8,500	8,775	3.24%
10221734	4202	EQUIP'T PARTS SUPPLIES	5,778	4,840	-16.23%
		<b>TOTAL AUTO EQUIPMENT # 74</b>	<b>14,278</b>	<b>13,615</b>	<b>-4.64%</b>
		<b>AUTO EQUIPMENT # 75 (2014 Ford Taurus Interceptor)</b>			
10221735	4201	GAS & OIL FOR EQUIPM'T	8,125	8,775	8.00%
10221735	4202	EQUIP'T PARTS SUPPLIES	10,894	3,045	-72.05%
		<b>TOTAL AUTO EQUIPMENT # 75</b>	<b>19,019</b>	<b>11,820</b>	<b>-37.85%</b>
		<b>AUTO EQUIPMENT # 76 (2007 Toyota Camry)</b>			
10221736	4201	GAS & OIL FOR EQUIPM'T	1,875	1,620	-13.60%
10221736	4202	EQUIP'T PARTS SUPPLIES	4,039	2,492	-38.30%
		<b>TOTAL AUTO EQUIPMENT # 76</b>	<b>5,914</b>	<b>4,112</b>	<b>-30.47%</b>
		<b>AUTO EQUIPMENT # 79 (2011 Mazda 3)</b>			
10221739	4201	GAS & OIL FOR EQUIPM'T	1,625	1,350	-16.92%
10221739	4202	EQUIP'T PARTS SUPPLIES	3,405	2,069	-39.24%
		<b>TOTAL AUTO EQUIPMENT # 79</b>	<b>5,030</b>	<b>3,419</b>	<b>-32.03%</b>
10282191	6217	<b>TRANS RESERVE POLICE CAR</b>	<b>35,000</b>	<b>35,000</b>	<b>0.00%</b>
		<b>TOTAL POLICE AUTOMOBILES</b>	<b>116,675</b>	<b>108,667</b>	<b>-6.86%</b>

**2013 PROVISIONAL BUDGET - POLICE BOARD**  
**Operating Fund**

			2013 Budget	Provisional 2014 Budget	% Change
<b>COMMUNITY PROGRAM</b>					
10221800	5900	SUNDRY	22,274	19,800	-11.11%
		TOTAL COMMUNITY PROGRAM	22,274	19,800	-11.11%
<b>OTHER EXPENSES</b>					
10221900	5907	DOMESTIC VIOLENCE UNIT	19,028	21,408	12.51%
10221900	5900	SUNDRY	4,400	4,400	0.00%
10221900	5901	CROWD MANAGEMENT UNIT	2,920	3,015	3.25%
10221900	5903	EMERGENCY RESPONSE TEAM	31,973	29,922	-6.41%
10221900	5904	DIVE TEAM	5,713	5,333	-6.65%
10221900	5914	MOBILE CRISIS RESPONSE TEAM	12,077	13,667	13.17%
10221900	5917	REGIONAL CRIME UNIT	94,171	89,927	-4.51%
10221900	5919	UNDERCOVER POLICING UNIT	5,038	4,754	-5.64%
		TOTAL OTHER EXPENSES	175,320	172,426	-1.65%
10157070		TRANSFER FROM RESERVE FOR VEHICLE CONVERSION	<u>(6,750)</u>	<u>(14,000)</u>	
		<b>TOTAL POLICE OPERATING</b>	<u>4,458,377</u>	<u>4,409,806</u>	-1.09%

# OAK BAY POLICE DEPARTMENT

## PROVISIONAL CAPITAL BUDGET FOR 2014

Account #	Account Name	2013 Budget	2014 Budget
10-286201-7100	Police Office Equipment	2,500	5,204
10-286204-5907	Building Renovation	18,700	4,500
10-286207-7100	Police Automobiles	87,300	53,300
10-286208-7100	Police Computer Equipment	10,500	35,350
	Total Capital, gross	119,000	98,354
Internal Transfers/Other Offsetting Revenue:			
10-157065-0000	Trans. from Reserve for Vehicle Replacement	(74,000)	(40,000)
10-157070-0000	Trans. From Reserved Grant	(13,300)	(13,300)
10-157070-0000	Trans. from ICBC Counter-Attack Reserve	(2,500)	
10-157065-0000	Trans. from Computer Replacement Reserve	(10,500)	(17,000)
	Net Capital Costs	18,700	28,054

### Detail

#### Capital funded by reserves:

Vehicle camera	13,300	Provincial Grant Reserve
Vehicle #72	40,000	Vehicle Replacement Reserve
Server	17,000	Computer Replacement Reserve
TOTAL	70,300	

#### Capital funded by taxes:

Speed reader board	5,204
OPCC contemporaneous electronic filing system	12,350
1 MDT	6,000
Cell B switch for CCTV camera	4,500
TOTAL	28,054

**MEMORANDUM**

**To:** Municipal Council

**From:** Gary C. Nason, Interim Chief Administrative Officer

**Date:** November 12<sup>th</sup>, 2013

**Subject:** **Capital Regional District Deer Management Pilot Project – Terms of Reference & District of Oak Bay's Participation**

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**BACKGROUND:**

At the Regular Council Meeting held on April 22<sup>nd</sup>, 2013, representatives from the Capital Regional District (CRD) made a presentation to Council on the status of the proposed Regional Deer Management Strategy (RDMS). The CRD requested that Council provide a response to ten questions with respect to the District of Oak Bay's potential future participation in the implementation of a pilot project based on recommendations from the RDMS. It was the consensus of Council, following the CRD's April 22<sup>nd</sup>, 2013 presentation, that the CRD's request for response would be brought forward to a subsequent Committee of the Whole meeting which would provide an opportunity for further public input.

On June 12<sup>th</sup>, 2013, Council convened a Special Meeting of the Committee of the Whole for the purpose of reviewing comments and input from the public on the proposed RDMS. An extensive delegation of speakers attended the meeting and provided comments on the issue. No motions were adopted by the Committee of the Whole that evening, and further consideration of the District's responses to the CRD's ten questions was deferred to the next Regular Council Meeting.

At the Regular Council Meeting held on June 24<sup>th</sup>, 2013, Council put its mind specifically to formulating responses to the CRD's ten questions. Summarized below are Council's responses and/or motions which were adopted at that June 24<sup>th</sup>, 2013 meeting:

1. Support the region pursuing fencing subsidies from senior governments for agricultural operations?

No motion: It was noted that this item was not applicable to the District of Oak Bay.

2. Work with the region on public education regarding use of repellent?

Council Motion: That the District of Oak Bay work with the CRD on public education regarding the use of deer repellent.

3. Provide input on dealing with aggressive deer?

Council Motion: That the District of Oak Bay provide input to the CRD on dealing with aggressive deer.

4. Support the regime pursuing changes to public hunting regulations?

No Motion: It was noted that this was not a significant issue for Oak Bay, but that the CRD could pursue changes to public hunting regulations if it wished to do so. It was the consensus of Council that no comment be provided to the CRD with respect to this item.

5. Review road signage, speed limits and consider refinements?

Council Motion: That the District of Oak Bay work with the CRD to review road signage, speed limits and consider refinements.

6. Partner with the CRD to expand public education?

Council Motion: That the District of Oak Bay partner with the CRD to expand public education.

7. Track deer related complaints and circumstances where the District is contacted?

Council Motion: That the District of Oak Bay track deer related complaints and circumstances when contacted.

8. Formalize participation via membership on a Regional Deer Management Strategy oversight committee?

Council Motion: That the District of Oak Bay formalize participation via membership on a Regional Deer Management Strategy oversight committee.

9. Advise whether the District wishes to pursue a capture and euthanize approach to population reduction?

Council Motion: That the CRD be advised of the District of Oak Bay's interest in pursuing a capture and euthanize approach to deer population reduction.

10. Support the region's effort to enhance First Nation's harvest?

Council Motion: That the District of Oak Bay support the region's effort to enhance First Nation's harvest [as part of the overall approach to deer population reduction, including consideration of hunting regulations].

With respect to Question No. 9 above, Council further clarified that it was Council's expectation that the CRD would prepare a formal terms of reference for deer population reduction using a capture and euthanize approach in the Municipality, which would then be provided to Council for further consideration.

The purpose of this Memorandum is to bring forward for Council's consideration the formal terms of reference which was requested in Question No. 9 above.

### **DISCUSSION:**

In response to Council's motion the CRD has prepared draft Terms of Reference for a proposed "Deer Management Pilot Project". A copy of the full Terms of Reference for the pilot project is attached as Appendix "A" to this Memorandum. The Terms of Reference outline in detail the recommended steps for both an "urban" and a "rural" pilot project. To date the District of Oak Bay and the Town of View Royal have indicated their interest in considering formal participation in an urban pilot. Similarly, the District of Central Saanich has indicated its interest in participating in a rural pilot project.

Council's attention in particular is directed to pages 9 through 17 of the Terms of Reference, which outline in detail the recommended steps and timeline for the Oak Bay pilot project. These principal steps are:

- |                       |  |
|-----------------------|--|
| 1. Communication Plan | 6. Site Specific Action Plan Development |
| 2. Data Compilation   | 7. Design a Monitoring Plan              |
| 3. Database Design    | 8. Pilot Project Implementation          |
| 4. Analysis           | 9. Pilot Project Assessment              |
| 5. Site Selection     | 10. Determination of Next Steps          |

In terms of the overall timeline for the pilot project, and subject to Council's confirmation of participation, the project would run from November 2013 through to the first quarter of 2015. Implementation of population reduction measures is subject to obtaining all necessary permits and approvals from the Provincial Ministry of Forests, Lands and Natural Resource Operations, but anticipated for early Fall 2014 or mid-winter 2015.

Pages 15 & 16 of the Terms of Reference summarize the various population reduction approaches, including capture and euthanize – this approach being the most likely approach to be employed in Oak Bay. All activities associated with any capture and euthanize program would be undertaken by contracted wildlife capture specialists approved and overseen by the Conservation Officer Service, Provincial Wildlife Veterinarian and Ministry staff. The meat would be donated to First Nations and charitable organizations, and every attempt to engage the Songhees First Nation in the process would be made. The only involvement of Oak Bay municipal staff in the pilot project would be collecting information regarding complaints and submitting same to the CRD, approving the RFP and contract for any wildlife capture and euthanize specialists, and working with the CRD on a coordinated communications and public consultation/information strategy throughout the pilot project.

The costs associated with any educational materials or consulting for the pilot project would be borne by the CRD's operating budget. In terms of hard dollar costs to be borne by the District for this project, Oak Bay would be responsible for the costs associated with the trapping and processing of any deer. Estimated costs are based on an initial permit for the removal of up to twenty five (25) deer from the Municipality, at an approximate cost of \$500 per deer. This order of magnitude cost would be subject to possible adjustment once contractors and processing have been confirmed. Based on the timeline proposed for the pilot, this approximate \$12,500 cost would likely be incurred entirely in the 2014 calendar year.

At this juncture the CRD is seeking confirmation from the District of Oak Bay that it is prepared to participate in the pilot project, and that the District is generally satisfied with the Terms of Reference as set out. Subject to the District's confirmation of participation in the pilot project, the first steps of the pilot (as set out on page 11 of the Terms of Reference) would commence immediately.

### **OPTIONS:**

At this juncture, the most plausible options to take with respect to this matter would appear to be:

1. Receive the draft Terms of Reference for the CRD "Deer Management Pilot Project" for information only, and the District indicate that it is not prepared to participate at this time; or
2. Indicate to the CRD that the District confirms its participation in the proposed Deer Management Pilot Project in accordance with the Terms of Reference as set out; or
3. Indicate to the CRD that the District is prepared to participate in the proposed Deer Management Pilot Project, subject to any additional requests or conditions that Council may ask the CRD to consider.

Given the multi-jurisdictional approach which has been taken to date with respect to this matter, combined with the significant and complex project management and permitting requirements mandated by the Province, it is not considered to be a viable option for the District to "go it alone" on the development and implementation of a program for deer-human conflict resolution which may ultimately include population reduction.

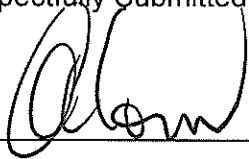
### **FINANCIAL IMPACT:**

As noted in the Discussion section of this Memorandum, the District of Oak Bay would be responsible for hard costs in the order of magnitude of \$12,500 for implementation of any deer population control measures which may ultimately be approved. In all likelihood these costs would be incurred entirely in the 2014 calendar year.

**RECOMMENDATION:**

It is recommended that Council provide direction in regards to the District of Oak Bay's participation in the CRD's proposed (urban) Deer Management Pilot Project.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read 'G. Nason', is written over a horizontal line.

Gary C. Nason  
Interim Chief Administrative Officer





## **TERMS OF REFERENCE:**

# **Capital Regional District Deer Management Pilot Project**

Prepared for:  
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August 3<sup>rd</sup>, 2013

# **Coastal Prosperity Consulting**



# TERMS OF REFERENCE:

## Capital Regional District Deer Management Pilot Project

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## **Purpose Statement:**

This document outlines a general framework for the development of pilot projects, in particular the development of basic monitoring and assessment strategies that can be applied to ensure a consistent and defensible approach that accommodates adaptive management principles. CRD staff will work with pilot partners, government biologists and wildlife experts to fully develop the details of each pilot project using this framework as guidance.

## **Background:**

### **Provincial Overview**

In many British Columbia communities, there are increasing numbers of deer-human conflicts in urban, rural and agricultural areas. This trend is common in many areas of North America and the linkage has been made between the increase in human-deer conflict and increasing deer populations. Residential and agricultural areas offer protection from predators, prohibition or severe restrictions on hunting and a ready source of rich food sources through landscaping, agricultural crops, gardens, municipal parks and supplemental feeding by some residents. Human development is also contributing to this trend as more deer habitat is converted into residential areas.

Deer-human conflicts are not just an animal nuisance issue, as increasing vehicle collisions and human conflicts with deer are impacting public safety. Deer can act aggressively to protect themselves or their fawns from humans and/or their pets. Deer aggression has been escalating in several B.C. and Alberta communities with high densities of urban deer. In response to these increasing conflicts, the Ministry of Environment (MOE) produced an Urban Ungulate Conflict Analysis (Hesse 2010). The purpose of the document was to review urban deer management options and provide mitigation recommendations.

Five communities in the Kootenay/Boundary Region (Cranbrook, Kimberley, Invermere, Elkford and Grand Forks) have followed the recommendations outlined in this report. They have passed deer feeding prohibition bylaws, created deer management committees, surveyed residents regarding urban deer and undertake annual deer inventories within city limits. Community-based urban deer committees have reviewed and/or implemented several conflict mitigation measures such as: public education, translocation, fertility control, hazing with dogs, and lethal control (controlled hunting, sharpshooting, capture/euthanize) beginning in 2011.

Public education is the most important management technique and is actively used by communities. In 2012, the Ministry of Forests Lands and Natural Resources (FLNR) Region 4 provided support towards education. The communities chose to use the support to create and install signage (Kimberley and Invermere) or develop educational programs (Cranbrook) (Irene Teske, Personal Communication). Media, websites, brochures, fact sheets, children's programs, and signage are being used and developed to inform the public on how reduce conflicts with urban deer. In addition, the provincial government has also developed a website which provides conflict reduction information:

To date, Cranbrook, Kimberley and Invermere have undertaken efforts to reduce urban deer populations. During 2011/12, Cranbrook, Kimberley, and Invermere culled 25, 99, and 19 deer, respectively. Based on deer counts before and after the culling operations, the City of Cranbrook received a permit to conduct a cull in late 2012 or early 2013 and removed an additional 24 deer.

## Capital Regional District Overview

The Capital Regional District (CRD) has recognized that conflicts between the Columbia Black-tailed deer (*Odocoileus hemionus columbianus*) and private land owners of the region are an ongoing and increasingly problematic issue. Within the regional district, a large proportion of the lands provide excellent natural deer habitat within a matrix of human land use ranging from dense urban development through suburban neighbourhoods, large rural properties and agricultural areas. In some cases these “human habitats” provide a source of high quality deer habitat where animals are provided with concentrated rich food sources and protection from predation and hunting. In many cases, this results in increased and concentrated deer density in some areas. The close proximity of deer with human residents has also resulted in an increased number of deer-human conflicts including crop losses for commercial agricultural producers, deer-vehicle collisions, damage to gardens and landscaping, increasing reports of aggressive deer behavior toward humans and pets and increased risk of disease transmission. Within this same landscape, there is a considerable value placed on natural features and biodiversity, including the presence of deer and other wildlife. The challenge in such a complex landscape is identifying the range of values and seeking a balance of interests and outcomes that reflects this.

The increasing concern over deer-human conflicts was identified as a regional issue in January 2011. Since then the CRD has worked with the provincial government in their traditional role of wildlife management. The province has recommended the development of a deer management strategy prior to the implementation of conflict mitigation actions. Based on the Ministry of Environment’s BC Urban Ungulate Conflict Analysis (Hesse 2010) and region-specific research and analyses, the CRD produced the province’s first Regional Deer Management Strategy. This was accomplished through the creation of a Citizen’s Advisory Group (CAG) that worked between May and August, 2012 to produce the Strategy. After much deliberation, the CAG reached consensus on a number of key points and developed a long-term strategy for managing deer in the CRD. Below is a brief summary of their findings.

Within the CRD, deer-human interactions are occurring and have considerable public interest across rural, agricultural and urban landscapes. Deer populations in many areas within the CRD appear to be increasing and as a result, damage to crops, deer-vehicle collisions, ornamental plant and food garden damage, public health and safety risks and other deer-human conflicts have also increased.

Management options considered by the CAG for application in the CRD were organized into four categories Conflict Reduction, Deer-Vehicle Collision Mitigation, Population Reduction and Fertility Control (Immunocontraception). Each management option was evaluated based on set criteria including effectiveness, feasibility, capability, cost, time required to implement, and public support

This evaluation resulted in the creation of outcomes and recommendations for the region and more specifically for unique aspects of agricultural, rural and urban settings within the region (see Appendix 2). The desirable outcomes include:

- Establish an overall monitoring and reporting program to measure the effectiveness of the regional deer management strategy and apply adaptive management techniques
- Establish a region-wide public education program to support the management of deer-human conflicts in the CRD.
- Reduce the economic loss in agricultural areas by reducing the deer population to acceptable levels by improving programs and tools for farmers to minimize crop losses.
- Reduce the deer population to more “natural” levels in rural areas
- Reduce the number of deer vehicle collisions
- Increase public awareness of public health and safety concerns
- Provide residents with the means to reduce deer-human conflicts within the range of individual (and community) tolerance levels.
- Monitor the state of emerging technologies.

Although convincing anecdotal evidence has been received by the CAG, clearly documented and consistent data is not readily available. Such defensible “evidence” is desirable to support management actions that may be contentious and will require statistical analysis to determine if proposed management actions are successful. Conversely, if management actions are not meeting expected outcomes, these analyses will be useful in adjusting management actions toward more successful outcomes (adaptive management).

Saanich Peninsula municipalities have all experienced direct impacts from deer resulting in agricultural crop loss, property damage, and deer-vehicle collisions. Currently, several agricultural producers are managing deer on their lands through the nuisance wildlife permit process. Individuals can make application under the Wildlife Act of British Columbia for permits to manage nuisance wildlife for purposes of both crop protection and wildlife population control. These permits provide authorization for a resident to hunt, trap or kill wildlife on his or her own property or on other property during the open or closed season given, clear documentation of the number of individual animals to be removed, the methods to be used, what preventative measures are currently in place to deter wildlife and compelling reasons as to why the control is required. Additional permit conditions or requirements may be assigned for reporting requirements, specific locations and detailed control measures, wildlife disposition (disposal) and professional qualifications of practitioners involved.

The Districts of Central Saanich and North Saanich have both agreed to advocate additional government support for farmers suffering crop loss. Both districts support regional public education efforts and increased First Nations involvement, particularly in relation to increased deer harvest in affected farming areas. Current fencing bylaws allow for fences to be constructed at an effective height for deer exclusion and Central Saanich has begun implementing an anti-feeding bylaw and will explore the feasibility of allowing a hunting season in future years. A number of individual property owners have also shown interest in participating in further efforts that may mitigate these conflicts.

Similarly, Oak Bay and View Royal have experienced a high level of complaints from residents relating to deer-human conflict. There are increasing occurrences of aggressive deer behaviour to humans and

pets, high numbers of vehicle conflicts (both cyclists and motor vehicles) and increasing damage to landscaping and gardens. The municipalities are interested in implementing further mitigation strategies to reduce conflict.

As a result, two pilot projects will be developed to implement recommendations from the Regional Deer Management Strategy for both an agricultural and urban context. The purpose of this document is to outline a standard framework for the development of pilot projects that respects unique differences across the CRD but also ensures a consistent and defensible approach that accommodates adaptive management principles. CRD staff will work with municipal pilot partners, ministry biologists, former members of the expert resource working group and wildlife researchers in the academic community to flesh out the details of each pilot project using this framework as guidance.

## **Study Area and Site Selection:**

The Capital Regional District (CRD) is a local government administrative district encompassing the southern tip of Vancouver Island and the southern Gulf Islands. The CRD had an official population of 359,991 (2011 Census). The region encompasses the thirteen municipalities of Greater Victoria and the electoral area of Juan de Fuca, Salt Spring and the Southern Gulf Islands. The total land area is 2,341.11 km<sup>2</sup>. Each municipality or electoral area has a varying mix of rural, urban and/or agricultural land use and each has both common and unique issues with respect to deer-human interactions.

For the purposes of establishing pilot projects aimed at reducing deer-human conflict, four municipalities (Oak Bay and View Royal-urban, Central Saanich and North Saanich-agricultural) have indicated interest in participation. By maintaining a coordinated approach in the region other municipalities will benefit from these projects as they prepare to move forward with future conflict reduction programs.

Oak Bay is an urban municipality located on the southeastern quadrant of greater Victoria bounded by Victoria and Sannich. The district has expanses of Gary Oak habitat scattered throughout the urban area. The total area of the municipality is 10.5 km<sup>2</sup> with a population of 18,015 residents (population density of 1,710/ km<sup>2</sup>).

View Royal is an urban municipality located at the base of the Esquimalt Peninsula in the central part of greater Victoria and spreading northwest to the Highlands. The district has expanses of parkland including portions of Mill Hill and Thetis Lake Parks. The more developed areas are found along Esquimalt Harbour and Portage Inlet. The total area of the municipality is 14.4 km<sup>2</sup> with a population of 9381 residents (population density of 653/ km<sup>2</sup>).

Central Saanich is a mix of rural, suburban and agricultural lands situated on the Saanich Peninsula between North Saanich and Saanich. Although the district is known for its farm land the area has considerable residential, commercial, and industrial development, especially around the neighbourhoods of Brentwood Bay and Saanichton. The total area of the municipality is 41.3 km<sup>2</sup> with a population of 15,936 residents (population density of 386/ km<sup>2</sup>).

North Saanich is located at the northern end of the Saanich Peninsula adjacent to Central Saanich and the town of Sidney. The district is rural and residential with a large agricultural land base. Commercial/industrial activity is restricted mainly to the Victoria Airport and the Swartz Bay Ferry Terminal. The total area of the municipality is 37.2 km<sup>2</sup> with a 2011 population of 11,086 residents (population density of 298/ km<sup>2</sup>).

## **Creation of Management Zones and Selection of Pilot Areas**

While municipal boundaries divide the CRD into logical management zones that may be adequate for initial pilot projects, optimal locations for these projects should be derived through spatial analysis of available deer-human conflict and vehicle accident data. This analysis may be used to identify properties and target landowner who may be interested in participating as well as identifying those properties with the greatest potential for successful implementation of management actions (treatments) and in achieving management objectives. Treatment areas for pilot projects must be of sufficient size to limit the effect of in-migration of deer from adjacent areas.

The development of geographic information system (GIS) based database is seen as a key initial step in the development of pilot projects and will be instructive in better understanding and developing actions to address regional deer management and in managing/analysing information at both the small scale (pilot project) and larger scale (regional initiatives) with consistency.

## **Objectives:**

The reduction of deer-human conflicts is the penultimate objective of deer management in the region. Based on the outcomes of the Regional Deer Management Strategy and through further consultation with interested municipalities within the region, the CRD has established a series of objectives for the development of deer-human conflict mitigation pilot projects. Objectives are categorized by land use type but while there are some unique aspects to these, many of the objectives are common throughout:

### **Overall Pilot Project Objectives:**

- Determination of suitable pilot area(s)
- Establish baseline population and density estimates
- Set stable population targets
- Agree on a suite of management measures
- Develop communications and engagement materials and programs.
- Gain provincial permits, where necessary
- Carry out management measures
- Monitor and report back

### **Rural**

- Raise awareness and education of conflict reduction measures
- Engage in outreach with farmers on conflict reduction and population control measures
- Increase use of available tools for population control



- Increase opportunities for First Nations harvest of deer
- Reduce crop damage due to deer foraging pressure
- Establish appropriate benchmarks and evaluation measures to measure pilot project outcomes
- Support decision-makers on future management program, based on pilot project outcomes

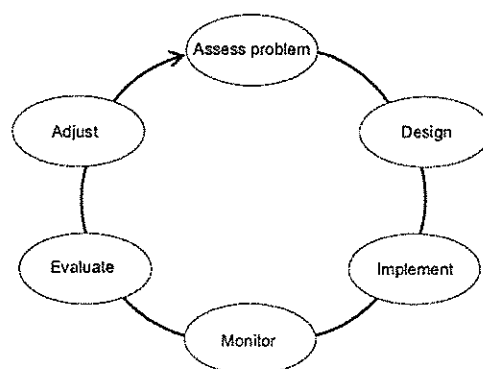
#### Urban:

- Raise awareness and education of conflict reduction measures
- Increase use of available tools for population control
- Increase opportunities for First Nations harvest of deer
- Reduce complaints due to all types of deer/human conflicts
- Establish appropriate benchmarks and evaluation measures to measure pilot project outcomes
- Support decision-makers on future management program, based on pilot project outcomes

## **Adaptive Management Framework:**

Due to the unpredictability of natural systems, achieving desired outcomes and objectives is more likely when undertaking an adaptive management approach. Adaptive management is “a formal process of ‘learning by doing’ for continually improving management policies and practices by learning from their outcomes” (Woodley 2009 p.113). Employing such an approach ensures the plan is flexible and remains open to changes throughout the planning and implementation of the project, which can serve to improve the project.

Active management by land stewards; government agencies, private landowners or other interested parties seek to change approaches or procedures to achieve established goals. Natural system responses cannot be predicted with certainty and adaptive management, through deliberate action, monitoring, documentation and feedback provides a defensible and rigorous process that allows for an objective evaluation of their effectiveness. Comparison of sites before, during and after treatment increases the confidence of results. Adaptive management requires the setting of measurable targets for interim and long term outcomes. Monitoring can be used to measure progress, and identify the need to modify actions or approaches where desired targets are not being achieved or adjust targets as more realistic objectives are developed in an iterative process.



## **Recommended Steps for Pilot Projects:**

The following outline relies on the detailed information review contained in this report. Some or all of these elements may remain relevant and others elements may come to light depending on the next steps in developing pilot projects. The framework can be expanded to provide more detail on specific Urban and Rural pilot projects in an iterative process as they develop. The current level of detail in each case is variable. In some instances, more information gathering or analysis work may be required prior to further development or implementation of specific steps. Although a timeline is not associated with each task, the tasks are presented in a logical sequence respecting that these are not discrete actions but will play out on parallel but interconnected timelines. It is recognized that this process, although linear is somewhat iterative and responsive to opportunity and adaptation as knowledge is gained. Some general temporal context is relevant. It is recommended that pilot projects proceed first in an urban environment and then in an agricultural setting. This will accommodate action planning for the urban project areas in preparation for the fall rut and winter season and will allow for the scheduling needed to collect agricultural baseline data (crop depredation surveys) prior to treatments being implemented, A rapid assessment technique should be utilized to assess existing information and identify candidate sites for pilot projects. The urban pilot rapid assessment would be based on existing traffic accident and public complaints data. Similarly, the agricultural pilot project would be based on these data as well as any existing data on deer culls to date (based on current or past nuisance wildlife permits) or other input from the farming community. These data need to be modified and input to a GIS format for analysis. Selection of pilot sites will also rely on support of specific land owners. This is explained further below.

### **Framework:**

1. Communications Plan
2. Data Compilation
3. Database Design
4. Analysis
5. Site Selection
6. Site Specific Action Plan development
7. Design a Monitoring Plan
8. Pilot Project Implementation
9. Pilot Project Assessment
10. Determination of Next Steps

### **Detailed Outline:**

The following more detailed framework has elements that are common to both urban and agricultural pilot projects and those that may be unique. These differences are specified where necessary. In both instances, it is assumed that there are linkages to other region-wide programs that may be contemplated within the life of these projects and transitioning to the next steps in deer-human conflict management. This outline is not complete but represents the information available at this point. Some

elements are already in progress through the development of the RDMS. Further project specific data collection and analysis will be required in most sections as the concepts are developed.

## 1. Communications Plan

- a. Develop a communications strategy specific to the pilot project. Both planning and implementation should be initiated at the outset of the project (See Appendix 3 for more detail and examples).
  - Issue Description
  - Communication and Outreach Goals
  - Gather Background Information
  - Key Messages and Targets
    - Primary; Secondary
  - Strategic Consideration
  - Challenges and Opportunities
  - Strategic Approach
  - Delivery Vehicles and Timing
- b. Develop or adapt deer-human conflict related material relevant to the CRD in general and the pilot projects specifically (iterative process).
- c. General information releases will evolve into specific communications elements as the project details develop.
- d. Specific information items to be identified (iterative process through project development).

## 2. Data Compilation

- a. Urban Pilot
  - i. Compile existing readily available traffic accident data (ICBC etc.)
  - ii. Compile existing complaints data
  - iii. Verify content and screen data for geospatial attributes
- b. Agricultural Project
  - i. Compile existing readily available traffic accident data (ICBC etc.)
  - ii. Compile existing complaints data
  - iii. Compile existing nuisance wildlife permit harvest data
  - iv. Verify content and screen data for geospatial attributes

<b>Oak Bay Timeline</b>		
<b>Oct-13</b>	Information on conflict mitigation distributed, Terms of Reference completed	<b>Oct-13</b>
<b>Nov-13</b>	Communications Plan completed for the General Permit	<b>Nov-13</b>
<b>Dec-13</b>	Compiling conflict data, Continuation of the General Permit application	<b>Dec-13</b>
<b>Apr-14 Jun-14</b>	Conduct population counts in Oak Bay, Approval of the General Permit	<b>Apr-14 Jun-14</b>
<b>Jul-14</b>	Compilation of data for probable pilot project locations, Sourcing of equipment for the Pilot Project, Search and review of contractors	<b>Jul-14</b>
<b>Aug-14</b>	Completion of the General Permit, Selecting of contractors	<b>Aug-14</b>
<b>Sep-14</b>	Start of the Oak Bay Pilot Project (Success could be prolonged due to the presence of large amounts of feed)	<b>Sep-14</b>
<b>Jan-15</b>	End and review of the Pilot Project	<b>Jan-15</b>
<b>Note: If the General Permit Application is completed and approved by December 2013 then the Pilot Project may start as soon as the end of January 2014</b>		

### 3. Database Design

- a. Design a geospatial database for
  - i. all new occurrence records (complaints, nuisance wildlife removals)
  - ii. official traffic accidents reports
  - iii. database design needs to be open-ended to be compatible with future initiatives
- b. Establish protocols and agreements for generating and transmitting new reports, records and related data from all relevant agencies.

### 4. Analysis

- a. Utilizing internal resources (CRD staff) undertake a rapid GIS-based assessment based on available data (step 2 above):
  - i. Urban: compliant data for traffic accidents and public complaints to identify areas of high concern for deer-human conflict in urban areas.
  - ii. Agricultural: compliant data for traffic accidents, public complaints and nuisance wildlife permit culling data to identify areas of high concern for deer-human conflict in agricultural areas.
    - Acquire and analyse
      - all existing nuisance wildlife permit harvest data (permits issued, deer removed, demographics, geo-spatial relationships)
      - all existing regional wildlife-traffic accident data (ICBC) (Time of day, Date, Location)
- b. Contact large and small property owners at or near conflict hot spots to determine who may be interested in assisting with deer-human conflict reduction through provision of access to their properties or direct participation in management initiatives (some property owners have already come forward). If resources permit, this may be accomplished in conjunction with a more detailed survey of landowners (as suggested in this document)
  - Determine locations and property statistics for interested landowners (potential pilot areas)
  - Incorporate a participation question into a general survey of land owners
- c. Feed results back into database development (step 3 above)

### 5. Site Selection

- a. Combine the analyses in step 4(a) and 4(b) to identify properties or sites of interest in urban and agricultural areas. Assess each for feasibility and likelihood of success.
  - i. Pilot areas must be large enough to have a significant effect ie. Removing a few deer from a small property will likely lead to in-migration from adjacent areas with no discernible reduction in conflict reports or other measures.
- b. Select pilot project sites.

### 6. Site Specific Action Plan development

- a. Recommended Actions for Pilot Projects:
  - i. Refine site-specific actions for implementation
  - ii. Establish timelines and milestones

### 7. Design a monitoring plan for establishment of baseline and follow up measures

- a. Refer to Appendix 5 (urban) and Appendix 6 (Agricultural) for recommended monitoring approach.
- 8. Pilot Project Implementation
  - a. Implement pilot project actions
  - b. Revise communications and outreach messages
- 9. Pilot Project Assessment
  - a. Evaluate monitoring elements to determine project success (timelines, targets etc.)
- 10. Determination of Next Steps
  - a. Reporting
  - b. Determine the feasibility of conclusion, continuance or expansion
  - c. Closing the Adaptive Management Framework Loop

## **Suite of Management Actions:**

Based on the RDMS and Council resolutions to date, the suite of management actions likely to form the basis of a pilot project are listed below. Some or all of these may be given consideration for implementation and some aspects are already being developed (based on existing work) to feed into pilot project development and overall implementation of the Regional Deer Management Strategy. Although the scope of any pilot project is limited by design, the underlying principles, objectives and management actions will have direct implications for future initiatives in the region. These actions are categorized in a logical order or sequence but it is recognized that a well-designed program will move forward in a multi-faceted, coordinated and integrated fashion toward meeting program objectives. Supplemental information has been added to provide contextual or technical detail where appropriate.

When considering deer-human impacts, the path to effective and sustainable outcomes requires consideration of all the “tools in our toolbox”. It is often easier and more effective to influence human behaviour than to manage wildlife or natural systems. In addition to direct management action linked to deer population management there are a number of other actions focused on influencing the human side of this conflict situation. Often, it is necessary to take drastic action like deer population reduction to “reset the clock” and achieve a more balanced system. Subsequent conflict reduction measures may be sufficient to maintain that balance going forward or periodic pulses of active management may be required from time to time.

All management actions will have a higher likelihood of success if implemented in an adaptive management framework with identifiable targets and thresholds for management. The following points outline actions that can be implemented toward: 1) conflict reduction or resolution, 2) education outreach and communication, and 3) deer population management.

## **Conflict Reduction or Resolution**

The reduction of deer-human conflicts is the penultimate objective of the Regional Deer Management Strategy. Management actions implemented in this section will be important in further defining required

actions under either the education/outreach/communication or the deer population management components.

1. Reporting and Data Management:
  - Develop a standardized and verifiable reporting system to document and categorize public complaints, traffic accidents and other wildlife related conflicts. The system should capture spatial and temporal attributes to support incident tracking and analysis locally and across the region.
2. Legislation/Regulation:
  - Prepare refine and enforce bylaws prohibiting deer feeding
3. Public Safety
  - Expand public education regarding general awareness of deer-human interactions and desirable behaviour changes to minimize the occurrence of deer-human interactions or deer-pet interactions.
4. Gardens and landscaping
  - Expand public education regarding use of deer repellents, deer resistant plantings and other conflict reduction measures noted in the RDMS
5. Crop depredation
  - Determine the current level of deer related crop depredation and determine acceptable levels of depredation in the agricultural landscape.

## **Public Education Outreach and Communications**

For the purpose of implementing pilot projects, one of the first considerations is a communications plan. All communications efforts should fall within a comprehensive plan and thereby be directly related to project specific communications outcomes. Project level communications will contribute to larger regional initiatives (scaling up to region-wide projects). Communications materials should be issue and audience specific to ensure messaging is effective in achieving program goals of conflict reduction. If a comprehensive communications strategy is not established in the early stages of the program there is a high risk of the program running into delays and diversions. Communications need to be both proactive and reactive but, timely and well-designed proactive communications should reduce the demand for reactive communications. Appendix 3 provides an example template for a communications strategy.

1. Develop a comprehensive integrated regional communications plan with specific elements for each pilot project within the regional context.
2. Develop a standardized reporting system to document complaints or other public feedback
  - Include spatial and temporal attributes
  - Can be utilized for pre and post treatment comparisons locally and across the region to measure conflict reduction
3. Ensure consistency of messaging through coordinated communications programs. Efficiencies will be gained by providing summarized materials to all jurisdictions for their use “as is” or with minor modifications for their specific circumstances; the public will be getting a consistent quality message throughout the region.
  - Targeted Media Briefing kits

- Informational advertisements in area newspapers on a weekly/monthly basis
- Corporate website updates (must be current and relevant)
- 4. Develop public education products or messages regarding specific issues such as:
  - Use of deer repellents, deer resistant plantings and other landscape alternatives
  - Deer feeding prohibition bylaws
  - Public safety messaging (focus on fawning and rutting seasons)
  - Yard and garden landscaping options available to minimize deer damage
  - Information on how to report urban deer conflicts
  - Other conflict reduction measures noted in the RDMS
  - Ecological values and conservation impacts from over-abundant deer
- 5. Formalize participation via membership on an RDMS oversight committee

## Population Reduction

When deer-human conflicts arise and management strategies are drafted, deer population reduction is often mistakenly cited as a program objective. Placing the focus on population reduction in this instance misdirects focus and energy. The more appropriate program objective is that of conflict reduction. Nonetheless, population reduction can be (and often is) an important management action toward reducing conflict. There are several population reduction approaches that should be considered in combination. In their work on deer reduction techniques, Simard et al. (2013) confirmed the findings of many other researchers suggesting that to improve the success of deer control programs: 1) harvest mortality should achieve a 30-50% reduction and focus on antlerless deer to exceed compensatory mechanisms such as increased recruitment; 2) programs should be conducted over multiple years and 3) public hunting programs are more effective when combined with other programs such as use of sharpshooters or organized culling operations.

The following points summarize a number of actions that may be useful in managing toward pilot project goals and objectives.

1. Public Hunting
  - a. Investigate administrative tools (permits, bylaw amendments, regulatory changes etc.) to allow increased public hunting in suitable areas of the regional district and/or the pilot project jurisdiction
  - b. Pursue amendments to provincial public hunting regulations (eg. increased seasons, increased bag limits) to better reflect deer conflict reduction objectives within the regional district and/or the pilot project jurisdiction.
2. Increase opportunities and engagement of First Nation's hunting
  - a. Facilitate collaborative approaches between local First Nations communities and landowners to participate in deer management operations
  - b. Investigate opportunities for the distribution of meat and other animal parts (hides, hooves, antlers etc.) for cultural purposes
3. Undertake hunting or culling operations with permitted animal control specialists
  - a. Promote greater uptake Nuisance Wildlife Permits by land owners for crop protection
    - i. Work with permit authorities to streamline the permitting process



- ii. Provide support to landowners (facilitate permit acquisition)
  - b. Investigate the regulatory requirements for the use of contracted animal control specialists (eg. Sharpshooters) for the purposes of deer population reduction
  - c. Ensure adequate training or certification is in place for high levels of competency in respect to humane animal treatment (marksmanship) and public safety (firearm and/or archery safety)
  - d. Investigate modifications to hunting and shooting restrictions to allow the controlled use of single projectile firearms by permitted individuals in the District for the purpose of dispatching deer
  - e. Work with provincial authorities to develop a standardized quantified reporting system to document all deer population reduction efforts (hunting, First Nations, permitted culls) with spatial and temporal attributes. These data can be used for pre and post treatment comparisons locally and across the region
  - f. Capture and euthanize programs:
    - i. In the short term, a capture and euthanize program should be designed for immediate implementation in the event that a public safety incident (human injury) or significant property damage has occurred or is highly likely to occur. In particular, work with the Conservation Officer Service and contracted wildlife capture specialists to establish a clear protocol for removing individual habituated or aggressive deer. This could be based on similar removal programs for other problem wildlife species
    - ii. In the longer term, a capture and euthanize program should be designed for future implementation to achieve broad population reduction targets if other measures are deemed insufficient for meeting program objectives
4. Animal Disposal:
- a. Public hunting regulations require hunters to follow standards of practice for animal carcass disposal. However due to the intensive land use in many parts of the region, adjustments may be required to reduce conflicts with other land users or residents.
  - b. Culling operations:
    - i. Deer population reduction operations must include specific steps for carcass disposal
    - ii. Meat may be processed and distributed but must follow the established provincial guidelines
    - iii. Other deer parts (hides, hooves, antlers etc.) may be distributed to First Nations for cultural purposes where there is interest and capacity. This has been done successfully in other jurisdictions
    - iv. Offal and other waste products must be disposed of by landfilling, composting or other acceptable means
    - v. Ensure adequate training or certification to ensure a high level of competency in respect to food safe practices and hygiene
    - vi. Request a provincial review to define local requirements for the utilization of harvested deer under the nuisance wildlife permits
5. Costs:

The costs associated with any educational materials or consulting will be included in the CRD operating budget. The traps, bolt gun and the necessary training will be provided by the Ministry of Forests, Land and Natural Resource Operations. The Ministry also requires that the contractor is trained in the field inspections of wild game meat and that training will be provided by Ministry staff. Oak Bay will be responsible for costs related to the trapping and butchering of the deer. Costs are based on an initial permit for removing 25 deer from Oak Bay. The cost estimate is approximately \$500 per deer which includes the cost of the contractor to oversee the animals and traps and assumes approximately \$100 per deer to the butcher. The costing is subject to adjustment once contractors and butchers are confirmed.

## **Monitoring:**

To measure the success of pilot programs, it will be important to design a suite of indicators or metrics that can measure direct response to management actions. Monitoring requires the establishment of a baseline condition followed by a treatment or action and a measured response. Thresholds or benchmarks are established for each indicator to provide feedback with respect to meeting project objectives. The reliability of a monitoring program requires consideration of several factors including decision and outcome risk, resources available (time and money) and the natural variation in the parameters being measured. The KISS (Keep it simple strategy) is often the best approach for monitoring as long as it is matched with anticipated outcomes. Defensible data facilitates moving away from anecdotes and innuendo toward building confidence in the data and a more objective assessment of the situation. In addition to a positive influence on project design and implementation, clearly articulated objective data can affect opinions and outcomes in a public forum.

Although “counting deer” or tallying up conflict statistics are important metrics, it is also important to monitor societal aspects to determine if management actions are increasing the awareness of important issues and mitigation strategies and/or meeting resident’s expectations. Efforts in communication and education can be powerful if they reach the intended audiences. This can be measured when feedback mechanisms are linked to measurable objectives.

The following is a brief summary of recommended monitoring techniques to be considered. It is based on a rapid literature review in order to meet project timelines. Further literature review and/or expansion of the list of potential techniques may be considered if time and resources permit. The techniques are listed according to the three over-arching program elements: 1) deer-human conflict reduction or resolution; 2) education outreach and communication; and, 3) population reduction. A more detailed discussion of these and other techniques are provided in Appendix 4 and a recommended implementation strategy (outline) is presented in Appendix 5 (urban) and Appendix 6 (agricultural).

## **Conflict Reduction or Resolution**

### ***Deer-human Conflict Tracking***

Complaints from residents involving conflicts with deer need to be documented in a standardized format to facilitate compilation and analysis of data across the region and from various sources.

Municipal and Regional Staff, Conservation Officers, BC Parks, MLR, Police and Fire Services and members of the public may have vital information to report. These data can be invaluable in designing either site-specific or issue-specific program elements to address those areas of highest priority. Tracking conflict statistics over time will provide a metric for assessing if the number and/or type of deer-human conflicts are being reduced.

Each agency will have information needs and a “user needs” consultation may be useful in refining what information can be collected and what information may have associated privacy or other data integrity issues. Effective deer-human conflict incident reporting must collect a minimum standard set of data. If the data is not used and shared, data collection will not be sustained.

All existing deer-human complaints should be collated and standardized in one database. This will provide a better understanding of the current state of knowledge and the level of detail available. This information can be used to inform the design of a data collection strategy that respects historic data but ensures data collection moving forward is adequate to meet current and future needs.

### ***Traffic Conflicts and Accident Statistics***

Deer-vehicle collisions and the costs incurred from the resulting damage to vehicles, driver injury or fatality, and animal injury or death are a significant concern on CRD roads. Various mitigation measures can be implemented but without knowledge of accident patterns and causal relationships, they may be ineffective. Wildlife-related traffic accident statistics are most often documented when insurance claims are processed. Insurance claims for traffic accidents generate location and time specific conflict data. This data is managed by ICBC and has been provided to the CRD for further analysis. Annual updates should be imported into a geospatial database for analysis by the CRD for project planning and monitoring purposes. Data analysis to identify roadway sections with high vehicle-ungulate collision rates can be used to identify focal areas for conflict mitigation in roads management. A reduction in accident reports in pilot project areas would provide some indication of successful mitigation from readily available data.

When accidents do not result in insurance claims or a police report, or when a near-miss wildlife-vehicle conflict occurs, there are no statistics available. For the purposes of detecting an overall decline in wildlife related traffic conflicts these additional data collected in a standardized format to facilitate compiling of data across the region would be valuable although they may be more difficult to obtain. This aspect of reporting could be included in the general conflict reporting program (above).

### ***Crop Damage Assessment***

Current detailed crop depredation information is not collected at the regional level, nor can it be attributed specifically to black tailed deer or other species. Similarly, loss data does not cover all agricultural producers in the region. Crop damage assessment were undertaken in 2001 by the Ministry of Agriculture, Food and Fisheries, in conjunction with the Island Farmers’ Alliance and in 2011 by the CRD. Although self-reporting of crop damage is valued information, it is difficult to standardize these reports and compare either across time or geographic space. These existing reports are informational but they are not likely to provide a useful indicator of crop depredation levels over time. Therefore, it would be beneficial to implement a standardized reporting method with some means of independent

verification or calibration to establish a defensible baseline and track future conditions (pre and post treatment monitoring). This would be a useful metric for determining if management actions lead to achieving a direct reduction in crop damage attributed to deer.

Haney (2011) undertook a study to evaluate deer-related crop depredation assessment methods. Although his work was in a different location and dealing with different crops, it is instructive and illustrates some simple field crop assessment methods. Haney found that the most accurate assessment method was crop plant surveys where crop plants are counted along transects and categorized as healthy, injured or killed by deer. This sample was then used to extrapolate the decrease over the larger field.

A baseline survey would need to be deferred until the 2014 since surveys should be undertaken during the growing season. In the short term, it would be advisable to work with farmers in refining protocols for local conditions and determining the best time for surveys. Farmers who are already engaged in the planning process may be amenable to undertaking surveys this summer or early fall to test protocols. By repeating year to year surveys consistently, the increase or decrease of crop damage will be an indicator of conflict mitigation efforts. In addition to measuring standardized crop depredation before and after mitigation strategies are applied, it would be useful to implement pre and post treatment surveys (see example questions in Appendix 1).

If resources are available, it would be beneficial to provide a rapid response during the growing season to agricultural producers who have indicated significant deer impacts to their crops. By investigating the crop damage first hand, a CRD staff member or contractor could provide a standardized assessment process by interviewing the farmer (standard reporting protocol) and doing an assessment of one or more crop fields (standardized measures). This could be a two stage process with a detailed assessment as a follow up when warranted. In the initial stages of the program, this would provide the CRD with a consistent or standardized assessment of the problem to direct further action planning and would also build the relationships with individual farmers.

## **Education Outreach and Communication**

Deer-human conflict in the CRD is about managing deer but is equally about understanding human values in a complex landscape. Having a thorough understanding of the cultural context or social dynamics of deer-human conflict in the regional landscape will identify where the needs are in terms of basic education, further communications and engagement of residents etc. Effective communications can help connect the dots for residents in terms of the complex relationship we as humans have with our landscape and with our respective communities.

Well-structured repeat surveys can provide a measure of how this may be changing through time as a direct or indirect result of deer-human conflict management. Hesse (2010) presents a comprehensive list of relevant literature and Cranbrook (City of Cranbrook 2010) undertook a survey of its residents in relation to their deer cull operations. While there are a considerable number of survey examples, each project will require a survey design specific to the stated objectives and the relevant community context.

It is important to determine the current level of understanding with respect to conflict issues to target communications efforts where they are needed most. A focussed survey should be implemented to establish pre and post treatment benchmarks to assess the success of pilot project communications and to determine if public support is sustained, building or waning in response to deer-human conflict management. This pilot scale survey can be used to inform designs for larger regional initiatives in future.

All communications products need to be identified and linked to a communications strategy that is focussed on specific key messages, target audiences and specified outcomes through a range of communication vehicles (Appendix 3). In the short term, this can be based on survey results and issue analysis already undertaken by the regional district). Where technical topics are being presented in communications products, all materials should be reviewed by a competent authority to ensure accuracy, consistent messaging and linkages to other programs in the region and in the province.

## **Population Reduction**

While it is recognized that reducing the deer population will be a required action and likely a major focus of any conflict reduction program, the setting of targets should continue to focus on outcomes of conflict reduction and not necessarily the establishment of a fixed deer density. The determination of what a “natural level” of deer density might be is fraught with challenges. In natural areas, deer densities fluctuate through time and space depending on availability and quality of habitat for food and cover as well as factors like predator dynamics. In human settled areas, deer density is as much a function of societal goals as it is a function of ecological principles. There is a need to seek balance between human needs like public safety, urban aesthetic and agricultural prosperity with our desire for living in a rich natural environment that includes deer and other native wildlife species.

For any population control program wildlife managers should strive for the best possible baseline information regarding deer abundance, age, and sex ratios. Often there is existing information (current or historic) that can be used for a rapid assessment of the current situation and to provide guidance toward what information gathering or survey techniques are best suited to collecting new data. In conducting deer population reductions, Simard et al. (2013) suggests that estimates of herbivore (deer) density should be validated or assessed with more than one index and followed for several years post-treatment. They also suggest that deer populations should be monitored to assess seasonal movement and colonization from surrounding areas.

There is limited data available for deer population demographics in the region. Both direct survey of deer populations and indirect sampling of other related indicators can serve to create an index of relative or absolute abundance. Utilizing indirect methods does not require that deer be counted directly and therefore can be easier and more efficient to implement.

The nature of the CRD landscape suggests that deer management may range from regional or district level initiatives to highly localized programs where accurate abundance estimates specific to individual properties may be required. This is especially important where lethal means to reduce overpopulated suburban deer herds are subject to political pressure and public accountability (Weckel et al. 2011).

Operational and social-political implications may vary considerably in long-term continuous or incremental deer removal programs versus pulsed large scale removals (Rondeau and Conrad 2003).

The following sections outline some recommended pilot project monitoring methods for consideration in establishing a relative population index for deer. Several other monitoring methods have been reviewed and excluded such as spotlight surveys, drive counts, browse surveys and mark-recapture telemetry surveys. These excluded methods are discussed further in Appendix 4. Population monitoring should be completed prior to population reduction is initiated. Then monitored concurrently with a reduction program, with the ability to continue running after the reduction phase is complete. Once that is complete the population reduction phase can begin. Locations of high human-deer conflict need to be determined so that sites can be selected appropriately.

### ***Volunteer Surveys***

Deer surveys can be conducted annually within urban or rural areas. The survey area is typically divided into zones and each zone has dedicated volunteers to survey it. All volunteers must be able to identify and classify deer by species, sex and age. The volunteers walk through each zone counting and classifying deer observed within the zone. Counts are conducted either in the early morning or early evening and counts within adjacent zones are conducted simultaneously to minimize double counting of deer. Volunteer surveys are generally inexpensive and easy to implement given a large pool of volunteers. This is a technique that is very successful in engaging the public directly in deer management initiatives. However, the challenge with this approach is observer bias due to inconsistency across large numbers of observers through time in addition to highly variable detection rates under different conditions resulting in counts that may be meaningless as a population index.

It may be beneficial to consider structured volunteer surveys on a localized basis, as those being carried out in several other BC communities to count deer. However, this should not be relied on independently as a relative population index nor should it be applied at bigger (regional) scales.

### ***Remote Infrared Cameras***

Remote infrared cameras can be used to conduct population estimates using a mark-recapture survey model. Various researches have tested remote camera survey techniques (Jacobson et al. 1997; Roberts et al. 2006; Curtis et al. 2009; Weckel et al. 2011) to determine their utility for creating population estimates of free-ranging deer. Methods and technology have evolved and become much more feasible in terms of cost and field utility. This technique is gaining considerable support in wildlife management. Traditional population survey techniques are not always feasible in urban or suburban environments. Remote cameras have advantages as they are quiet, unobtrusive, and can obtain data 24 hours a day, seven days a week, 365 days a year. The remote camera method may be the most suitable technique for studies of urban wildlife where it is difficult to otherwise measure animal abundance (Curtis et al. 2009).

Jacobson et al. (1997) suggested that remote camera surveys have the potential to provide reliable population estimates. At a minimum, the survey method can provide a minimum estimate of adult bucks present in a population. This alone may have utility as a relative population index. The primary advantage of remote camera surveys is that individual deer do not have to be captured and marked,

saving considerable time, expense and avoiding issues of animal care and handling. A disadvantage is that this technique can be used only when bucks have antlers (i.e., fall to mid-winter), and the quality of photographs must be sufficient to distinguish branch-antlered males from each other. Curtis et al. (2009) tested similar protocols concluding that remote cameras could provide reliable estimates of deer abundance in suburban areas. Two disadvantages identified by Curtis (2009) were the cost of equipment and its vulnerability to theft or human interference. Their research, conducted in 1999/2000 was estimated to cost \$14 per hectare over a 5 year period including equipment and staff costs.

Remote camera surveys are likely one of the most effective and efficient survey techniques reviewed here. This method is promising as a technique well suited to the CRD landscape although there are challenges with implementing this method in an urban or suburban area.

### ***Pellet Transect Surveys:***

The pellet transect survey is an established method for the indirect survey of deer. The British Columbia Resource Inventory Standards Committee (RISC) (1998) recommends the approach outlined in detail by Smith et al. (1969). This approach uses linear transects with circular plots spaced at regular intervals. Within the plots, pellet groups are counted and cleared seasonally or each year. The technique has been used locally as an index of relative deer abundance to monitor year to year changes. Plots of this nature have been established since 2006 to track relative deer numbers on Sidney Island (Parks Canada 2008) and to assess deer impacts on several Gulf Islands (Martin et al. 2010). In conjunction with the extraction of genetic material it may be possible to construct demographic profiles and estimates of absolute abundance although these techniques are experimental in nature and quite costly.

Pellet transect surveys are well suited in terms of cost and ease of implementation to monitoring relative deer abundance at a localized scale in a pilot project. This method is best used in conjunction with other methods.

## **Reporting Results:**

The deer-human conflict reduction program, including specific pilot projects should be reported on formally on an annual basis. Timely updates should be produced to share pertinent information with participating land owners, advisory committee members, politicians and the general public. As with other outreach materials, the message and the audience need to be linked to maximize the likelihood of effective communication taking place. In addition to traditional reports and briefing materials, digital media platforms should be used to outreach broadly to the public.

Any further work with respect to deer-human conflict reduction strategies should be designed such that data collection and reporting is tracked and analysed on a geographic information system (GIS). These data can be overlaid with deer habitat data, cadastral data and safety related data to determine the locations that maximize successful outcomes toward project objectives. Sub-regional goals will need to be tied to more specific geographic areas for development of specific treatment prescriptions.

Where results are communicated, the materials need to be tied back to project objectives and measureable outcomes. This also facilitates a clear message of how the project is proceeding within the adaptive management framework.

## **Post Pilot Considerations:**

The focus of this document is for the development of pilot projects within a 1 year timeframe. By necessity, there will be linkage to regional program development and implementation. It is imperative that these elements proceed in a coordinated fashion. The following ideas are presented for consideration in the development of new pilot programs or larger regional initiatives over the longer term.

- Based on successful outcomes of the pilot projects, prepare a motion for consideration by UBCM to seek provincial funding in support of regional deer management
- Prepare materials in support of a request to the provincial government to renew agricultural subsidies for deer fencing and explore the potential for wildlife related crop depredation subsidies or compensation
- Fencing projects, traffic accident reduction strategies or other landscape level conflict reduction strategies should be documented geo-spatially so that their efficacy can be assessed in relation to other data. Pilot project reporting and data management should be designed to allow for expanded reporting of this nature as data becomes available.
  - In agricultural areas where fences are being used, linkage to crop depredation monitoring may provide an opportunity for additional comparisons to assess mitigation linked to fencing.
  - In urban areas, where measures have been taken to reduce supplemental feeding or access to gardens, there should be a reduction in deer observations, conflicts, accidents etc. If these mitigation initiatives are “mappable” they can be analysed in a geospatial context.
- The development of a public complaints database is an important step in the pilot projects. Technology today allows a robust database to receive data from multiple sources ranging from paper forms to internet-based or smart phone based applications. These mobile applications can be particularly useful for inclusion of data from interested members of the public. Establishing an opportunistic wildlife sighting program through the adaptation of existing smart phone applications (such as “record wildlife” or “moose survey”) may also be a means of enhancing public engagement although these data, in the short term will not be sufficient to measure achievement of management objectives. Over time, it may prove useful for tracking the number of deer sightings in a given neighbourhood or district. In order to sustain interest, it may be worth considering a repeated short term public survey period (deer counting day or



week) that volunteers can work in neighbourhoods or areas to count deer on a repeated basis. This could be linked with a deer-human conflict awareness campaign.

- There is value in looking at the regional geography within and across boundaries. There is considerable data already available for the region and new data will be collected in relation to pilot projects and other initiatives. Utilizing GIS tools, the regional area should be assessed for a range of geospatial relationships including deer habitat, land use categories, road densities and traffic patterns and accident rates, resident compliance data, crop depredation and landscape impacts. By looking at these attributes across the region and in relation to one another spatial patterns may emerge to better discern the best location for risk assessment and mitigation on an objective priority basis.
- The development of a long term urban strategy that incorporates new urban development and land use planning may be needed in addition to the conflict mitigation techniques already discussed. The animals that are moving from bedding to feeding areas or between feeding areas are much more visible in this landscape which can lead to human deer conflict. Planning for these movements within the urban landscape may contribute to the ability to cohabitate with a reduced population of urban deer. Some of these feeding/bedding areas are sensitive habitats and home to some rare species of native plants/wildlife that are negatively affected by the browsing deer.

There are opportunities for regional colleges and universities to engage in meaningful research and teaching opportunities for students. Although the timeframe for academic studies does not necessarily mesh with the short term timelines of the proposed pilot projects, there are a number of longer term research questions that could be undertaken by academia to better inform decision makers in future. Much of the literature explored to date is based on research results from distant places. It would be beneficial to test some of these assumptions in a local landscape. Although research is always instructive, it does not replace operational program implementation. That responsibility lies directly with the municipal, regional and provincial governments and academic research should be seen as complimentary and not alternative to it. Often by engaging the right mix of academic expertise a higher level of third party objective knowledge is brought to the discussion and in many instances this can support, redefine or repudiate information in respect to the issue at hand. This following list reflects a number of issues that have arisen through the drafting of this document.

- Community values and cultural landscape dynamics
- Telemetry studies, demographics, habitat use and deer population estimates
- Design and implement a pilot DNA study in conjunction with pellet transect surveys to determine the feasibility of using pellet-extracted DNA material for mark-recapture population estimates.
- Deer impact assessments in natural areas (ecological research)
- Deer habitat mapping
- Wildlife related traffic accident analysis
- Communications science
- Local knowledge acquisition and integration

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# Appendix 1

## Agricultural Depredation Survey (based on Haney 2011)

Dear Respondent, In order to better understand the degree of damage occurring in our agricultural lands and to better design effective mitigation strategies, we are conducting an assessment of damage through surveys of landowners and “on the ground measurements of crop depredation”. The objective of this research project is to understand current levels of damage caused by deer to a variety of crop fields as well as current landowner perceptions of that damage. Enclosed with this letter is a brief questionnaire. We are asking you to complete the questionnaire and send it back to us in the enclosed postage-paid envelope. We hope you will take a few minutes to complete this questionnaire. With the help of people like you, the district will be better able to implement effective mitigation measures to meet our common objectives. Your participation is voluntary and there is no penalty if you do not participate. Your responses will be associated with postal code, street address or geographic coordinates to allow the mapping of conditions and trends in relation to the regional landscape. Property-specific information will not be shared with the public. Nothing you say on the questionnaire will in any way influence any compensation you may receive. Results from this survey and the proposed crop monitoring will help managers obtain information about damage levels, evaluate the effectiveness of various damage reducing methods and assess the social acceptability of various management strategies. If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact. CRD staff should connect with the Business Risk Management Program (BRM) staff for wildlife damage assessment methodologies. 1 888 221-7141 604 556-3001

<http://www.agf.gov.bc.ca/awp/>

[http://www.agf.gov.bc.ca/awp/general\\_info\\_brochures.htm](http://www.agf.gov.bc.ca/awp/general_info_brochures.htm)

<http://www.agf.gov.bc.ca/awp/forms.htm>

[http://www.agf.gov.bc.ca/production\\_insurance/](http://www.agf.gov.bc.ca/production_insurance/) \_\_\_\_\_

**\*\*Note: This survey has been modified to include questions for both deer and goose damage to crops. It would be important to consider some combined effort toward the better understanding and effective management of wildlife caused crop depredation by limiting the number of queries and monitoring programs for efficiencies.**

### **Survey Questionnaire:**

Name:

Street address:

Postal code:

Geographic coordinates:

How many years have you been growing crops?  
What crops are you currently growing?

What percent of your crop do you feel was lost due to damage by deer, geese or other wildlife species?

	Deer	Geese	Other wildlife	Location of field	Crop
Field 1	____%	____%	____%	_____	_____
Field 2	____%	____%	____%	_____	_____
Field 3	____%	____%	____%	_____	_____
Field 4	____%	____%	____%	_____	_____
Field 5	____%	____%	____%	_____	_____
Overall	____%	____%	____%	_____	_____

Over the last 10 years do you feel that damage by deer to your crop is:

increasing, decreasing, or staying the same (circle the correct answer)?

Over the last 10 years do you feel that damage by geese to your crop is:

increasing, decreasing, or staying the same (circle the correct answer)?

During which month last year did you feel damage by deer was the highest?

(May June July August September October)

During which month last year did you feel damage by geese was the highest?

(May June July August September October)

What level of damage (% loss) would you be willing to tolerate for damage caused by:

Deer \_\_\_\_%; Geese \_\_\_\_%; All wildlife combined \_\_\_\_%

What changes would you like to see for managing deer in Central Saanich? (Circle either more, less, or same based on what changes you would like.)

Nuisance wildlife permits for landowners.	(More, less, or same number).
Deer killed by government employees.	(More, less, or same number).
Deer permits for hunters.	(More, less, or same number).
Effort at harassing deer.	(More, less, or same amount).

Circle correct answer:

Do you or members of your immediate family hunt?

Yes No.

Do you allow others to hunt on your land?

Yes No.

Do adjacent landowners allow hunting? Yes, No.

Yes No.

Have you made changes to farming practices as a consequence of deer damage?

Yes No.

If so what changes have you made? \_\_\_\_\_

Would you allow the public to hunt deer on your private land to minimize damage caused by deer?

Yes No.

Would you allow the public to hunt geese on your private land to minimize damage caused by geese?

Yes No.

## **Appendix 2.**

### **Regional Deer Management Strategy Outcomes and Recommendations (Ecerpt from RDMS):**

#### ***Agricultural Geography***

##### Outcome

Address the economic loss in agricultural areas by reducing the deer population to acceptable levels. Maintain the population at that level by improving programs and tools for farmers to minimize crop losses.

##### Recommendations

###### Immediate/Short Term

1. Increase effectiveness of hunting
2. Explore opportunities to support and expand First Nations harvest
3. Improve crop protection program
4. Population reduction measures
5. Remove regulatory barriers to effective fencing (e.g., height, placement)
6. Reinstate and expand government incentives for fencing including greater subsidies
7. Explore new technology for the use of electrical fencing where it was previously thought to not be technically feasible
8. Pursue compensation program for crop loss with provincial and federal government
9. Initiate data collection for crop loss information documentation to be used as baseline data to measure the effectiveness of options
10. Develop partnerships between local, regional, provincial governments and nongovernment organizations (NGOs) for implementing options (e.g., animal control bylaw officers, anglers and hunter associations)

###### Medium Term

1. Preliminary evaluation of short term actions/outcomes
2. Adjust short term measures based on outcome of preliminary evaluation and continue implementation

#### ***Rural Geography***

##### Outcome

Reduce the deer population to natural levels outside of settled areas and provide rural residents with measures to reduce deer human conflicts to within the range of individual tolerance levels.

##### Recommendations

###### Immediate/Short Term

1. Develop partnerships between local, regional, provincial governments and NGOs for implementing options (e.g., animal control bylaw officers, anglers and hunter associations)
1. Remove regulatory barriers to fencing (i.e., height, placement)
2. Population reduction measures

3. Increase effectiveness of hunting
4. Explore opportunities to support and expand First Nations harvest
5. Local governments consider impacts on deer habitat (wildlife corridors) with new
6. developments in planning document (official community plan, zoning bylaws, etc.)

#### Medium Term

1. Preliminary evaluation of short term actions/outcomes
2. Adjust short term measures based on outcome of preliminary evaluation and continue implementation

### ***Urban Geography***

#### Outcome

Reduce the deer population to natural levels inside settled areas and provide urban residents with measures to reduce deer human conflicts to within the range of individual tolerance levels.

#### Recommendations

##### Immediate/Short Term

1. Promote range of mitigating options for property owners (public and private)
2. Encourage provincial government to delegate authority to local government to deal with aggressive deer
3. Encourage local governments to develop bylaws prohibiting deer feeding and take appropriate enforcement action
4. Encourage local government to provide incentives for fencing that protects food and considers cost
5. Encourage local government to undertake bulk purchase and distribution of repellents
6. Population Reduction Measures
7. Local governments consider impacts on deer habitat (wildlife corridors) with new developments in planning document (official community plan, Zoning bylaws)

#### Medium Term

1. Preliminary evaluation of short term actions/outcomes.
2. Adjust short term measures based on outcome of preliminary evaluation and continue implementation.

### ***Deer Vehicle Collision Mitigation (Entire Region)***

#### Outcome

Reduce the number of deer vehicle collisions (auto and cyclist)

#### Recommendations

1. Encourage provincial government and municipalities to increase effectiveness of deer warning signage.
2. Encourage provincial government and municipalities to partner with ICBC to increase driver education on deer vehicle collision mitigation.
3. Encourage provincial government and municipalities to explore partnerships with school districts to produce unique mobile signage to increase awareness.



4. Encourage provincial government and municipalities to increase and extend right of way brushing in high collision areas as identified in ICBC collision map.
5. Encourage provincial government and municipalities to consider designs to minimize deer vehicle collisions in capital infrastructure planning.
6. Encourage provincial government and municipalities to revise speed limits in high collision areas identified in the ICBC collision map.
7. Encourage the CRD to integrate deer vehicle collision mitigation measures into the Regional Transportation Plan.

### ***Over-arching Recommendations (Entire Region)***

#### Immediate-Short Term (Entire Region)

1. That the CRD establish an overall monitoring and reporting program to measure the effectiveness of the regional deer management strategy, to be overseen by a permanent body (with expert and citizen representation) for deer issues and make recommendations for changes to the strategy over time.
2. Wherever population reduction measures are used, encourage techniques be adopted and regulations be changed to allow for meat to be used.
3. CRD should engage with First Nations on recommendations for deer management.
4. Encourage the CRD to establish a region-wide public education program to support the management options in addressing deer-human conflicts in the CRD.
5. Increase public awareness of health concerns e.g., Lyme disease, through existing health services (Nurseline) and public health providers (clinics).

#### Long Term (Entire Region)

1. Monitor state of emerging technologies.
2. Ongoing monitoring and adjustment of short and medium term management measures.

## **Appendix 3.**

### **Communications Planning Template:**

#### **ISSUE:**

- Brief Description of the deer-human conflict and regional deer management program.
- May be related to general communications or most commonly detailing a specific element requiring communications

#### **COMMUNICATION GOALS:**

The goals of this communications approach and associated products are to:

- Foster public awareness of...
- Effective use of media outlets
- Educate the public, staff, stakeholders (general to specific audience) about...
- Address key concerns and misunderstandings that may arise regarding...(specific issues)
- Encourage balanced media reporting by providing timely content to media

#### **BACKGROUND:**

Provide an overview of key issues with a focus on potential stakeholder interests (target communications audiences) and potential communications challenges or contentious elements.

#### **KEY MESSAGES and TARGET AUDIENCES:**

Outreach materials need to be targeted to specific audiences with anticipated outcomes (based on survey results and issue analysis already undertaken by the regional district). All materials should be reviewed by a competent authority to ensure accuracy.

#### **SECONDARY MESSAGES AND TARGET AUDIENCES:**

#### **STRATEGIC CONSIDERATIONS:**

#### **CHALLENGES:**

#### **OPPORTUNITIES:**

#### **STRATEGIC APPROACH:**

- Be proactive in all media relations. A proactive approach to media outreach well in advance of operational actions. Actively engage media contacts and build relationships toward understanding the issues under consideration (facilitate field orientations, contacts with concerned or informed residents etc.)
- Build on media awareness with broader urban deer and hyper-abundant deer challenges across North America

## VEHICLES AND TIMING (examples provided)

VEHICLE	DETAILS	TIMING
<b>MEDIA</b>		
Media lines	Rapid response to emerging issues	Timing of media and communications products is critical in terms of  timely release of information (proactive and linked to program actions)  sequencing of information release to build from general to specific information products.
Key Messages	Establishing an approved set of top-line messages and secondary or follow-up messages for use in all media interviews	
Target Audience	Establish an open list of key target audiences for each anticipated issue or key message	
Media Kits	Tools to include  Fact sheets  Images and/or video of specific issues or challenges  Contact information for third party spokespeople who can support CRD or municipal messages with authority	
Targeted media pitching  (Times-Colonist, A-Channel, Victoria News)	Contact key media to suggest a feature about deer management in the CRD to demonstrate the extent of the deer-human conflict challenges and strategies for conflict reduction  By providing a balanced and proactive information package, this effort would create a more informed audience and build support for the approaches under consideration	
(If pitching successfully generates positive media) Release joint information bulletin or press release from CRD and municipal governments or other engaged groups	Update would allow the media to gauge how well the program is being managed and implemented cohesively.	
Opinion Editorial (Times-Colonist; Victoria	Opinion Editorial by senior staff outlining positive aspects of program or program	

VEHICLE	DETAILS	TIMING
News)	elements (meat distribution, improved public safety, biodiversity improvement etc.)	
<b>PRINTED PUBLICATIONS</b>		
Printed publications such as pamphlets and information sheets are useful communications products for a limited audience. Costs of production and distribution as well as limitations on keeping information current can be problematic	Fact sheets, pamphlets or newsletters can be produced but typically have a “stale date” as information becomes outdated.	
<b>WEBSITE</b>		
Webpage with homepage notice outlining deer management challenge and link to deer-human conflict page	<p>Page will link to media kit materials such as factsheet and photos.</p> <p>Development of web-based interactive media and conflict reporting, public feedback or wildlife sighting applications</p>	
<b>SOCIAL MEDIA</b>		
Facebook and Twitter; Mobile phone apps	<p>Link to media kit materials such as factsheet and photos.</p> <p>Development of interactive media and conflict reporting, public feedback or wildlife sighting applications</p>	

## **Appendix 4.**

### **Monitoring Review:**

Pilot project planning and implementation must include monitoring requirements to measure success and inform management decisions. Monitoring requires the establishment of a baseline condition followed by a treatment or action and a measured response. Thresholds or targets are established for each indicator to provide feedback with respect to meeting project objectives. Defensible data facilitates moving away from anecdotes and innuendo toward building confidence in the data and a more objective view of the situation. In addition to a positive influence on project design and implementation, clearly articulated objective data can affect opinion in a public forum.

Although efforts to design and implement solid monitoring programs can seem daunting, the ability to measure project results with confidence is often directly tied to the quality of project design. Focussed monitoring to address specific project outcomes is most useful and cost effective. The KISS (Keep it simple strategy) is often the best approach for monitoring as long as it is matched with anticipated outcomes and does not take on a life of its own (monitoring for the sake of monitoring).

When designing and implementing a monitoring or measuring program, accuracy and precision are important aspects to be considered. Accuracy refers to how close an estimate is to the true value and precision – also known as the reciprocal of variance, refers to how close repeated measurements are to a mean or average value. Accuracy can be improved by accounting for biases inherent in a monitoring design while precision can be improved by increasing the sampling effort. Without accuracy and precision it is difficult to compare measurements over time or between areas with confidence and results may be difficult to interpret or defend. Although increases in sampling effort (more samples) can reduce sampling bias, sample-based analyses are based on statistics that require one or more assumptions to be met. If all of the assumptions are not met, a bias will result. The reliability of a monitoring program (accuracy and precision) requires consideration of several factors (BCRISC 1998):

- the decision risk (cost and likelihood) of being wrong in the outcome
- the natural variation in the parameter(s) being measured
- the resources (people, time and money) available to undertake the work

Monitoring should not just be considered “counting deer” or tallying up deer-human interaction statistics. Although these can be important metrics, it is also important to monitor societal aspects to determine if management actions are being effectively communicated, meeting resident’s expectations or increasing the awareness of important issues and mitigation strategies for interested stakeholders. Communication of project results as well as education and outreach efforts can be extremely powerful but only if they reach the intended audiences. This can also be measured when feedback mechanisms are linked to measurable objectives.

To measure the success of urban deer management pilot programs, it will be important to design a suite of indicators or metrics that can measure direct response to management actions. For each selected

indicator that will be used to report on status and trends, it is imperative that benchmark values and thresholds or targets be identified and linked to program objectives. The following is a brief discussion or summary of potential monitoring techniques that may be considered. It is based on a rapid literature review in order to meet project timelines. Further literature review and/or expansion of the list of potential techniques may be considered if time and resources permit. These techniques are listed according to the three over-arching program elements: 1) deer-human conflict reduction or resolution; 2) education outreach and communication (prevention and extension); and, 3) population reduction. It is important to consider the minimum amount of information that is required for decision making. A variable amount of time is required to acquire population estimates and densities and a maximum population density of deer in urban, rural and agricultural areas will be determined. Gathering this information can be difficult due to the landscape. Newer technologies such as remote trail cameras, DNA identification through pellet collection which can be counted by volunteers to give a rough estimate of population and or density in certain areas.

## **Conflict Reduction or Resolution**

### ***Deer-human Conflict Tracking***

Complaints from residents involving safety related conflicts with urban deer need to be documented in a standardized format to facilitate compilation and analysis of data across the region and from various sources. Municipal and Regional Staff, Conservation Officers, BC Parks, MLR, Police and Fire Services and members of the public may have vital information to report. These data can be invaluable in designing either site-specific or issue-specific program elements to address those areas of highest priority. Tracking conflict statistics over time will provide a metric for assessing if the number and/or type of deer-human conflicts are being reduced.

All existing deer-human complaints should be collated and standardized in one database. This first step will provide a better understanding of the current state of knowledge and the level of detail available. This information can be used to inform the design of a data collection strategy that respects historic data but ensures data collection moving forward is adequate to meet current and future needs.

Secondly, there is a need to promote and facilitate adequate information gathering and data sharing by the various agencies working in the region. Each agency will have information needs and a “user needs” consultation may be useful in refining what information can be collected and what information may have associated privacy concerns or other data integrity issues. Basic deer-human conflict incident reporting must collect (at a minimum) the following information:

- Location (geographic data; GPS waypoint)
- Time and Date (standardized)
- Weather Conditions
- Species involved (confirm that it is a deer interaction)
- Category of Conflict (predetermined categories)
  - aggressive deer-pet interaction
  - aggressive deer-human interaction
  - destruction of property

- traffic conflict (near miss)
- traffic accident
- other categories
- Details of the Conflict (textual description)

Collection of adequate data is important but if the data is not accessible in a format that supports analysis to inform program actions and measure objectives then it is a lost opportunity. Geographic positions are readily obtainable and are critical to linking occurrence data with other landscape features in geographic information systems (GIS). If the data is not used and shared, data collection will not be sustained. Robust database design will provide the ability for focussed analysis on priority complaint categories. For example, in urban areas, aggressive deer complaints may be deemed the most important measure based on risk to public safety while in agricultural areas, complaints related to crop depredation may be deemed the priority. These subsets of data can be used for more focussed analysis.

The development of a public complaints database is an important step in this process. Technology today allows a robust database to receive data from multiple sources ranging from paper forms to internet-based or smart phone based applications. These mobile applications can be particularly useful for inclusion of data from interested members of the public.

### ***Traffic Conflicts and Accident Statistics***

Wildlife-related traffic accident statistics are most often documented when insurance claims are processed. However, when accidents do not result in insurance claims or a police report, or when a near-miss wildlife-vehicle conflict occurs, there are no statistics available. For the purposes of detecting an overall decline in wildlife related traffic conflicts these additional data collected in a standardized format to facilitate compiling of data across the region would be valuable although they may be more difficult to obtain. This aspect of reporting could be included in the general conflict reporting program (above) or, if independent, the database design should provide for import/export functions to facilitate combined meta-analysis. All insurance claims for traffic accidents generate location specific conflict data. This data is managed by ICBC and has been imported into a geospatial database for analysis by the CRD for project planning and monitoring purposes.

Deer-vehicle collisions and the costs incurred from the resulting damage to vehicles, driver injury or fatality, and animal injury or death are a significant concern on CRD roads. Various mitigation measures can be implemented but without knowledge of accident patterns and causal relationships, they may be ineffective. This suggests that, in addition to consistent reporting statistics, there is a need for analysis of accident site conditions, as related to roadways and their surrounding landscape, to determine what makes these sites susceptible to ungulate-vehicle collisions and to inform better decision making and mitigation strategies. Similarly, follow up studies may be able to determine effectiveness of mitigation strategies at specific locations and facilitate adaptive management approaches to improve outcomes. Christie and Nason (2003) undertook a study to identify highway sections with high vehicle-ungulate collision rates and determine causal factors using a GIS analysis of roadways, and their surrounding landscape. The outcomes were used to identify focal areas for conflict mitigation in highway planning and design. Hindelang et al. (1998) have undertaken similar work to investigate patterns of deer and human movement, human population density and road use. Their analysis identified specific areas of

high deer-vehicle collisions and found that driver age, time of day and season were important predictors useful in designing mitigation strategies. Similar studies could be undertaken in the CRD but would rely on standardized data collection of relevant information as described herein. The CRD is a data-rich environment and a number of data sets are already in place (CRD Atlas) or are readily available for input. These data can be overlain with deer conflict data for a rapid analysis of trouble areas or times. This can then be utilized to improve mitigation strategies in high risk areas. Equally important, these analyses can be used to inform the development of communications programs by identifying important target audiences, and linking them with the most important issues for messaging. In addition to general information for the public, issue and location specific communications products are often far more effective and can be tied more closely to management objectives.

### ***Crop Damage Assessment***

The Ministry of Agriculture reported to the CAG that detailed crop depredation information is not collected at the regional level, nor can it be attributed specifically to black tailed deer or other species. Similarly, loss data does not always cover all agricultural producers in the region. In 2001, the Ministry of Agriculture, Food and Fisheries, in conjunction with the Island Farmers' Alliance surveyed Vancouver Island agricultural producers on the subject of problem wildlife on farmland. Sample size for this region and response rates were low. This low response rate may be related to survey design or implementation challenges or it may reflect the low priority that this issue was presenting to farmers at that time. There are more recent reports of crop damage across the region and a survey implemented today would likely provide different results in terms of the response rate as well as the outcomes of those responses. This may be a useful indicator of crop depredation levels and interest in this issue by the farming community at large.

Although self-reporting of crop damage is valued information, it is difficult to standardize these reports and compare either across time or geographic space. Therefore, it would be beneficial to implement a standardized reporting method with some means of independent verification or calibration to establish a defensible baseline and track future conditions (pre and post treatment monitoring). This would be a useful metric for determining if management actions lead to achieving a direct reduction in crop damage attributed to deer.

Haney (2011) undertook a study to evaluate deer-related crop depredation assessment methods. Although his work was in a different location and dealing with different crops, it is instructive and illustrates some simple crop assessment methods (for field crops). Approaches for assessment of orchard crops could be easily developed following the same principles. Although exclosure plots (fenced areas within crop fields) are commonly used for comparison with unprotected or control areas, the approach is labour and resource intensive (building and maintaining fenced areas) and may be in conflict with farming activities by impairing equipment movement, spraying and irrigation etc.). In his review, Haney found that the most accurate assessment method was to conduct crop plant surveys. Crop plant counts along linear transects were done categorizing plants as healthy, injured or killed by deer. This sample value was then used to extrapolate the decrease in yield overall from the losses of complete plants or the degree of loss observed on an average damaged plant.



In the Haney study, crop fields were surveyed in the spring and compared to losses self-reported by farmers. On average, perceptions of damage were over five times higher than the levels measured in surveys. The bias was attributed to the farmer's practice of surveying their fields from the field edge where ungulate damage is often concentrated while the plant survey points were stratified by distance from edge to ensure adequate sampling throughout the field extent. Although this metric may have utility in standardizing crop depredation impacts, the measurement of yield loss will likely be overestimated by not considering the ability of plants adjacent to injured or killed plants increasing yields in response to greater availability of nutrients, moisture, and sunlight (Belsky 1986). The ability to identifying ungulate damage from damage caused by natural factors or normal farming operations is another important consideration. Photographic guides are available for various crops to assist in classifying typical types of damage. A guide could be created for local use by landowners.

Rather than simple line transects, a standard circular plot (centred at a randomly selected point or a belt transect (line transect with a set width) can be used to facilitate areal calculations and extrapolation to larger field areas. In the short term, farmers who are already engaged in the planning process may be amenable to surveys being undertaken this summer or early fall. Although surveys should normally be undertaken earlier in the growing season this late season survey may provide an opportunity to work with farmers in refining the methodology for local conditions. A full baseline survey would need to be deferred until the 2014 growing season. In addition to plant classification and enumeration, the amount of deer sign present (tracks, bedding, pellets or other sign) may be a useful measure to incorporate. These surveys should be randomized by location but standardized by time of the year (work with farmers to determine the best time for surveys). If resources permit, surveys should be keyed to critical times for plant damage (eg. emergence, early growth, pre-harvest). By repeating year to year surveys consistently, the increase or decrease of crops will be an indicator of conflict mitigation efforts. It would also be instructive to survey within fenced crop fields as well to provide a control but also to determine if damage is still occurring within fenced areas (test the efficacy of fence designs).

Not all fields are created equal with regard to their potential for wildlife damage, as crop depredation can be influenced by local and landscape level characteristics including the surrounding habitat features (i.e., landscape composition) and the arrangement of those features (i.e., landscape configuration). For example, the amount of wooded area in the vicinity of a crop field can be a contributing factor to the intensity of damage caused by deer. The distribution and density of deer often varies with the abundance of cover or other habitat needs. Areas with more fragmentation (variety of open and closed habitat) are potentially more susceptible to crop depredation. For example, deer, by habit, are more likely to focus on the edges of fields preferentially resulting in larger fields often tending to have lower rates of crop damage due to edge effect. This has not been tested locally but refinements to sampling design could be done using GIS to stratify plot locations by criteria such as distance to edge, field size, crop type or other factors resulting in a better understanding of these spatial patterns. Similarly, if population reduction is used as a treatment, the treatment area must be sufficient to minimize the immigration rate by adjacent deer populations.

In addition to measuring standardized crop depredation before and after mitigation strategies are applied, it would be useful to implement pre and post treatment surveys (see example questions in

Appendix 1): In addition to a better understanding of the current situation from the perspective of the farming community, the first survey would also be useful to identify landowners or farmers who are interested in participating in “on the ground” monitoring as well the follow up surveys.

## **Education Outreach and Communication**

Deer-human conflict in the CRD is about managing deer but is equally about understanding human values in a complex landscape. People’s relationships to the landscape are diverse and continually changing. There is an ongoing need for discussion around trade-offs and compromises needed within this eco-cultural context. The regional district boasts a pleasant mix of urban/suburban/agricultural /rural human dimensions in a landscape matrix of: a network of vibrant urban, and rural communities; a prosperous farming community with access to quality local foods (organic foods, hundred mile diet); a rich biodiversity (Douglas fir forests, coastal wetlands, Garry oak woodlands); commonly observed wildlife – like deer but also bird fauna, small mammals etc. The regional deer population connects all of these elements as an adaptable species but at the same time highlights some of the conflicts in values that challenge management: what is a reasonable or acceptable degree of restriction individual choices or actions? What is a reasonable level of crop depredation; would you be willing to compensate farmers through taxation or other means for their loss in order to keep deer at high numbers? What are you willing to accept?

Having a thorough understanding of the cultural context or social dynamics in the regional landscape will identify where the needs are in terms of basic education, further communications and engagement of residents etc. Effective communications can help connect the dots for residents in terms of the complex relationship we as humans have with our landscape and our respective communities. Well-structured surveys can provide a measure of how this may be changing through time as a direct or indirect result of deer-human conflict management.

In many (most) instances, when dealing with wildlife-human conflict, it is easier and more effective to modify human behaviour than it is to modify the behaviour of wildlife. Give the appropriate information toward understanding a complex issue like deer-human conflict, most people, given the appropriate tools, will change their behaviour voluntarily to reduce the conflict. To facilitate this objective and determine if, in fact, the objective is being met, there are two critical components for monitoring. Firstly, it is important to determine the current level of understanding with respect to conflict issues. This information can then be used to identify: 1) important gaps in that understanding; 2) critical audience groups; and, 3) appropriate communication tools to target those groups with timely and focussed messaging. Repeat surveys can be useful in helping to determine if communications objectives are being met. Surveys can also be designed to query on specific issues or projects to determine if the challenges and outcomes are understood by the audience and if the management actions taken are supported or if local residents are changing their views on the balance of values and interests around complex resource management issues.

A focussed survey should be implemented to establish pre and post treatment metrics for assessing the success of pilot project communications and to determine if public support is sustained, building or waning in response to deer-human conflict management. This pilot scale survey can be used to inform designs for larger regional initiatives.

## **Population Reduction**

For any population control program wildlife managers should strive for the best possible quality baseline information regarding deer abundance, age, and sex ratios. Often there is existing information (current or historic) that can be used for a rapid assessment of the current situation and to provide guidance toward what information gathering or survey techniques are best suited to collecting new data. There is limited data available for deer population demographics in the region although historic hunting data or more recent nuisance wildlife permit harvests are important data sources to acquire and analyse prior to the design of new population reduction programs.

Both direct survey of deer populations and indirect sampling of other related indicators can serve to create an index of relative or absolute abundance. By utilizing indirect methods an index of relative deer abundance does not require that deer be counted directly and therefore can be easier and more efficient to implement.

Each deer population assessment method has its benefits and limitations. Aerial counts and thermal infrared photography are expensive, drive counts are labor intensive and spotlight counts are restricted to open habitat. Population estimates from mark-recapture studies require capture and marking of sample deer with uniquely colour-coded collars and/or ear tags that can be used to facilitate visual observation by tracking parties, members of the public and remote camera stations (see below). Due to the high cost of capture programs and their invasive nature (animals have to be trapped, drugged and marked) they are often disregarded. However, traditional mark-recapture also provide the opportunity to install telemetry equipment (radio or gps collars). Telemetry programs can provide a wealth of data to better understand wildlife populations in terms of demographics, habitat use, home range and travel data throughout the region.

While these techniques provide useful metrics for monitoring deer abundance they may not be appropriate for small scale management matrix of suburban, urban agricultural and rural environments characteristic of the CRD. The nature of this landscape suggests that deer management may range from regional or district level initiatives to highly localized programs where accurate abundance estimates specific to individual properties may be required. This is especially important where lethal means to reduce overpopulated suburban deer herds are subject to political pressure and public accountability (Weckel et al. 2011). Similarly, the design and implementation of deer population reduction programs and related monitoring will vary considerably in terms of timelines and thresholds depending on the selected operational strategy. Operational and social-political implications will vary considerably in long-term continuous or incremental deer removal programs versus pulsed large scale removals (Rondeau and Conrad 2003).

The following sections outline some important considerations for a range of direct and indirect deer survey methods.

## **Direct**

### ***Volunteer Surveys***

Deer surveys can be conducted annually within urban or rural areas. The survey area is typically divided into zones and each zone has dedicated volunteers to survey it. All volunteers must be able to identify and classify deer by species, sex and age. The volunteers walk through each zone counting and classifying deer observed within the zone. Counts are conducted either in the early morning or early evening and counts within adjacent zones are conducted simultaneously to minimize double counting of deer.

Volunteer surveys are generally inexpensive and easy to implement given a large pool of volunteers. This is a technique that is very successful in engaging the public directly in deer management initiatives. However, the challenge with this approach is observer bias due to inconsistency across large numbers of observers through time in addition to highly variable detection rates under different conditions resulting in counts that may be meaningless as a population index.

It may be beneficial to consider either structured volunteer surveys, as those being carried out in several other BC communities to count deer. However, this should not be relied on independently as a population index of abundance. Establishing an opportunistic wildlife sighting program through the adaptation of existing smart phone applications (such as “record wildlife” or “moose survey”) may also be a means of seeking public engagement although these data, in the short term will not be sufficient to measure achievement of management objectives. Over time, it may prove useful for tracking the number of deer sightings in a given neighbourhood or district. In order to sustain interest, it may be worth considering a repeated short term survey period (deer counting day or week) that volunteers can work in neighbourhoods or areas to count deer on a repeated basis annually. This could be linked with a deer-human conflict awareness campaign.

### ***Spotlight Surveys:***

Monitoring programs for deer population size and trends often rely on road-based spotlight surveys. The BC Resource Inventory Committee includes this method as a recommended survey technique for ungulate counts (Resource Inventory Committee 1998). The following paragraph is a summary from that document. Refer to the original documentation for further information and associated references:

Ungulates are generally difficult to observe during daylight hours. At night, however, many ungulates move into open areas to feed and tend to be less easily alarmed. Spotlight counts are night time encounter counts which use roads as transects. Therefore, the assumptions and requirements for spotlight counts are similar to those for other transect survey designs. Spotlight surveys have been used to estimate population density (absolute abundance) and indices of abundance (relative abundance) from year to year. They may be used to estimate animal density when sighting distances is known or when the effective area of the survey can be estimated but more research on this technique is required.

Spotlight counts survey open habitats only so extrapolation to larger areas may not be valid. Spotlight counts can be influenced by time of night, forage conditions, seasonal behaviour and weather conditions. The principal advantage of spotlight counts is that a large area can be sampled with little effort but relies on the availability of open areas adjacent to roads, and their use by ungulates. Two studies examining the accuracy of this technique to estimate density found deer density estimates from spotlight counts varied between 80 and 98 percent (Fafarman and DeYoung 1986) and 12 to 45 percent (McCullough 1982) of the assumed population density.

Although this method is recognized and used in common practice across North America, recent research suggests spotlight surveys are ineffective primarily because of highly variable detection rates. Recently, Collier et al. (2013) evaluated variability in detection rates and their results suggest that density estimates are likely not reflective of the standing deer population. Furthermore, there was considerable variability across surveys, observers, transects, and years, which, the authors suggested, precludes the generation of a correction factor to evaluate long-term trends at any scale.

At a very local scale, for example, on farm lands, spotlight surveys may provide some utility but, given the high variability of detection rates and other biases, this is not likely the best option for monitoring either absolute or relative deer numbers.

### ***Remote Infrared Cameras***

Remote infrared cameras can be used to conduct population estimates using a mark-recapture survey model. Various researches have tested remote camera survey techniques (Jacobson et al. 1997; Roberts et al. 2006; Curtis et al. 2009; Weckel et al. 2011) to determine their utility for creating population estimates of free-ranging deer. These cameras have been used for wildlife observation over the past twenty or more years. Over this time frame, methods have evolved and technology has both evolved and become much more feasible in terms of cost and field utility. This technique is gaining considerable support in wildlife management.

RIC surveys offer advantages over conventional mark-recapture methods, including cost, time and human resource reductions. Traditional population survey techniques are not always feasible in urban or suburban environments. remote cameras have advantages over aerial surveys and ground drives in populous areas as the camera surveys are quiet, unobtrusive, and can obtain data 24 hours a day, seven days a week, 365 days a year. The remote camera method may be the most suitable technique for studies of urban wildlife where it is difficult to otherwise measure animal abundance (Curtis et al. 2009).

Remote infrared cameras are used to photograph deer at sampling locations. In order to mimic a traditional mark-recapture survey, a selection of the sampled deer must be identifiable in the photographs. This can be accomplished by trapping and marking a sample of deer with ear tags and/or uniquely marked radio collars. Alternatively, Jacobson et al. (1997) determined that surveys conducted in the autumn after full antler development can rely on a selection of male deer being identifiable by their antler pattern or other distinguishing physical features. The camera population estimate was calculated by determining the total numbers of branch-antlered males (BAM), spike bucks, does, and fawns in photographs and then determining the number of individually identifiable BAMs. From the

ratio of identifiable BAMs (marked population) to the total number of BAMs, recapture statistics are generated. The number of spike bucks, does, and fawns is then calculated providing a population estimate as well as age and sex ratio for the population. There were some biases identified in the sampling program. The percent of females captured increased as camera density increased, indicating higher recapture estimates for males at low camera densities. To reduce this bias, a sampling density of 1 camera/65 ha. was established. Similarly, a 14 day sampling period was deemed to be optimum for recapturing the maximum number of deer. With the high camera density (1/65 ha), 100% of marked deer were recaptured in year 1 and 88.2% were recaptured in year 2.

Jacobson et al. (1997) suggested that remote camera surveys have the potential to provide reliable estimates of white-tailed deer populations in dense woodland habitats with potential for much broader application. At a minimum, the survey method can provide a minimum estimate of adult bucks present in a population. This alone may have utility as a relative population index. The remote camera method also provides data on sex and age composition although the relationship between trap density and sex-related vulnerability to trapping and biases in adult:fawn ratio estimates requires further examination.

Since this early work, was completed, a number of other researchers have made improvements in field methods and data analysis techniques. Curtis et al. (2009) tested similar protocols in a woodland/grassland habitat and a suburban area with a shorter survey period (10 and 11 days) and higher camera density (33 and 38 ha per camera). The researchers concluded that remote cameras, in conjunction with appropriate analysis provided reliable estimates of deer abundance in suburban areas. Two disadvantages identified by Curtis (2009) were the cost of equipment and its vulnerability to theft or human interference. Their research, conducted in 1999/2000 was estimated to cost \$26 per hectare including equipment and staff costs. Costs amortized over a 5 year life expectancy was calculated at \$14 per ha. Costs and equipment durability (life expectancy) may be different today.

The primary advantage of Jacobson's method (remote camera surveys) is that individual deer do not have to be captured and marked, saving considerable time, expense and avoiding issues of animal care and handling. A disadvantage is that this technique can be used only when bucks have antlers (i.e., fall to mid-winter), and the quality of photographs must be sufficient to distinguish branch-antlered males from each other. Although both baited and non-baited camera stations have been used, the baited stations provide an incentive for the deer to stay in the frame longer and results in better photographs. There is some question as to the utility of this method in a "food abundant" habitat like agricultural area where it may be difficult to attract deer to a baited camera station. If this method was implemented on a smaller scale within private property, these limitations may be less of an issue. Similarly, camera settings can be adjusted to delay between photo cycles reducing the number of duplicative photos (multiple photos of the same deer) and subsequent photo analysis time. In his study of sika deer, Dougherty (2010) found that a photo cycle delay of 10 minutes reduced the number of photos requiring analysis by 81% with a minimal change to the population estimates.

Weckel et al. (2011) reviewed the Jacobson method for remote camera surveys and found that the use of camera data may be limited in meeting the survey assumption that all deer have an equal chance of detection and that this potential bias may lead to inaccurate estimates. However, land managers need

to consider the level of precision necessary for the magnitude of population change one needs to detect. In many cases, the benefits of remote camera surveys may outweigh this shortfall.

### ***Drive Counts***

This survey method involves people pushing or driving deer through an area toward human observers or digital recording monitors at fixed counting stations. Drivers are evenly placed in a line and must remain within sight of each other as they move through an area and push the deer towards the designated counting station. This method relies heavily on landscape. All potential escape routes must be monitored. Landscapes with well-defined natural boundaries are best suited to this approach.

A drive count census captures the number of animals moving out of a given area ahead of the observers. This method assumes that all deer are counted as they leave the area and are not counted twice. This can be affected by deer doubling back through the line or being missed. A drive count tends to underestimate the total number for low populations and overestimate the total number for a large population. It can be considered a minimum count of the population. This method, while not costly does require large numbers of people and inexperienced counters or drivers may reduce the success. Coordination and timing/scheduling is also critical to the success. Depending on the size and complexity of the area, results can provide a reasonable minimum population estimate.

### **Indirect**

#### ***Pellet Transect Surveys:***

Pellet transect surveys are well established methods for the indirect survey of deer. The British Columbia Resource Inventory Standards Committee (RISC) (1998) recommends the approach outlined in detail by Smith et al. (1969). This approach uses linear transects with circular plots spaced at regular intervals. Within the plots, pellets are counted and cleared seasonally or each year. This technique has been used locally as an index of relative deer abundance to monitor year to year changes. Plots of this nature have been established in the Gulf Islands National Park Reserve to track relative deer numbers on Sidney Island (Parks Canada 2008) and to assess deer impacts on several Gulf Islands (Martin et al. 2010).

Plot size is affected by the density and distribution of pellet groups in the study area. More plots are required when pellet group densities are low or have non-uniform distribution. At lower deer densities, the number of zero-count plots can be problematic in statistical analysis. Both temporary and permanent plots have been used for pellet group sampling. Both methods provide similar estimates of pellet group density and, in this instance, temporary plots cost only half as much as permanent plots to establish and 16% less to monitor annually (Freddy and Bowden 1983). For repeated measures to establish trends, the fixed permanent plot technique is useful since permanent plots can be established and cleared of pellet groups to ensure that all pellets enumerated in subsequent surveys are new pellets (since the previous survey).

The technique has been used to estimate absolute abundance, by assuming a defecation rate and total days of occupancy, but it is more suitable as a method for estimating relative abundance. In conjunction

with the extraction of genetic material it may be possible to construct demographic profiles and estimates of absolute abundance although these techniques are experimental in nature and quite costly.

### ***Browse Surveys***

Browse surveys involve an inventory or measure of browse impact to preferred browse species. By counting the number and/or degree of browsed twig tips per plant or by unit area to assess the relative browse intensity. This method assumes that all the browse damage on a tree is caused by deer and that observers can detect new browse vs. old browse. This indirect measure can suggest changes in population, food selection or behaviour modifications. This method is best suited to trees and shrubs and can be combined with seedling surveys to measure plant recruitment.



## **Appendix 5:**

### **Urban Pilot Project Monitoring Metrics: Actions and Targets**

The following points are derived from the detailed reviews provided in this report. Some or all of these monitoring approaches may be implemented to measure results and provide feedback in a pilot project. Monitoring will benefit from the selection of complimentary metrics to corroborate results. The intent with these monitoring elements is to identify baseline conditions (pre-treatment) and then measure the degree of change from baseline conditions (post-treatment) toward pre-established targets. In many cases, thresholds can change as more information is gathered and understanding is increased. However, the comparison to some pre-treatment condition is essential to effective monitoring. Nominal targets have been provided for illustrative purposes only. Specific objectives, outcomes, targets, thresholds and timelines will need to be refined for the pilot project. Development of detailed methodologies and action plans will be required for specific sites and elements. Wherever possible, common elements should be retained across multiple projects to provide a platform for rolling up data at a larger spatial scale (municipal or regional levels). There are both common and unique elements in the agricultural and urban pilot projects.

#### **1. Conflict Reduction or Resolution**

- a. Deer-human Conflict Tracking
  - i. Develop a public conflict reporting geo-spatial database
    - 1. achieve 80% compliance from agency reporting (municipal governments, provincial agencies, police services)
    - 2. Where public complaints are received achieve a verification rate of 20% (two in ten public complaints will be followed up and verified)
  - ii. Track deer-human conflict reports
    - 1. achieve a 30% reduction in deer-human public safety (aggressive deer) conflict reports
- b. Traffic Conflicts and Accident Statistics
  - i. Development of an accident and traffic conflicts database
    - 1. achieve a 10% reduction in traffic conflict reports
      - 1. achieve a 20% reduction in deer related auto insurance claims (reported accidents)

#### **2. Education Outreach and Communication**

- a. Design and conduct a targeted survey within the pilot project area municipality for immediate implementation to establish a baseline and follow up survey after pilot programs are implemented. Measure the success of reaching education and outreach target audiences with key messages and measure the success of pilot projects determining if public support is building or waning in response to outcomes of pilot programs (is there support to continue or expand the program).

- i. achieve a 15% increase in overall awareness of deer-human conflict issues\*
- ii. achieve a 15% increase in support for the deer management program \*

\*specific measureable outcomes could be established during survey design.

### **3. Population Reduction**

- a. Design and implement a public reporting program for deer observations
  - i. achieve a 25% increase in regional deer sighting reports following the introduction of an observer program (this is indicative of increased public engagement)
  - ii. achieve a 25% decrease in deer sightings within treatment areas following population reduction
- b. Design and implement a deer population index using multiple metrics:
  - i. remote infrared camera surveys
    - 1. establish a population estimate
    - 2. achieve a 30-50% reduction in localized deer population estimate
  - ii. Design and implement pellet transect surveys
    - 1. achieve a 30-50% reduction in pellet group density
  - iii. Design and implement a citizen-based deer survey (road based evening deer count) to cover each neighbourhood in the municipality. Volunteers should be “invited” to participate based on their knowledge of deer and motivation to continue in an objective survey.
    - 1. achieve a 30-50% reduction in deer observations

## **Appendix 6.**

### **Agricultural Pilot Project Monitoring Metrics: Actions and Targets**

The following points are derived from the detailed reviews provided in this report. Some or all of these monitoring approaches may be implemented to measure results and provide feedback in a pilot project. Monitoring will benefit from the selection of complimentary metrics to corroborate results. The intent with these monitoring elements is to identify baseline conditions (pre-treatment) and then measure the degree of change from baseline conditions (post-treatment) toward pre-established targets. In many cases, thresholds can change as more information is gathered and understanding is increased. However, the comparison to some pre-treatment condition is essential to effective monitoring. Nominal targets have been provided for illustrative purposes only. Specific objectives, outcomes, targets, thresholds and timelines will need to be refined for the pilot project. Development of detailed methodologies and action plans will be required for specific sites and elements. Wherever possible, common elements should be retained across multiple projects to provide a platform for rolling up data at a larger spatial scale (municipal or regional levels). There are both common and unique elements in the agricultural and urban pilot projects.

#### **1. Conflict Reduction or Resolution**

- a. Deer-human Conflict Tracking
  - i. develop a public conflict reporting geo-spatial database
    - 1. achieve 80% compliance from agency reporting (municipal governments, provincial agencies, police services)
    - 2. Where public complaints are received achieve a verification rate of 20% (two in ten public complaints will be followed up and verified)
  - ii. track deer-human conflict reports
    - 1. achieve a 15% reduction in deer-human agricultural conflict reports
  - iii. implement a rapid response to agricultural conflict reports (standardized assessment and interview process)
    - 1. achieve a verification rate of 30% (three in ten agricultural complaints will be followed up and verified)
- b. Traffic Conflicts and Accident Statistics
  - i. Development of an accident and traffic conflicts Database
    - 1. achieve a 10% reduction in traffic conflict reports
    - 2. achieve a 20% reduction in deer related auto insurance claims (reported accidents)
- c. Crop Depredation Assessment
  - i. Refine and implement a field crop depredation monitoring program
    - 1. achieve a 25% reduction in crop depredation following localized deer population reduction

## **2. Education Outreach and Communication**

- a. Design and conduct a targeted survey within the pilot project area municipality for immediate implementation to establish a baseline and follow up survey after pilot programs are implemented. Measure the success of reaching education and outreach target audiences with key messages and measure the success of pilot projects determining if public support is building or waning in response to outcomes of pilot programs (is there support to continue or expand the program).
  - i. achieve a 15% increase in overall awareness of deer-human conflict issues\*
  - ii. achieve a 15% increase in support for the deer management program \*

\*specific measureable outcomes could be established during survey design.

## **3. Population Reduction**

- a. Design and implement a public reporting program for deer observations
  - i. Achieve a 25% increase in regional deer sighting reports following the introduction of an observer program (this is indicative of increased public engagement)
  - ii. achieve a 25% decrease in deer sightings within treatment areas following population reduction
- b. Design and implement a deer population index using multiple metrics:
  - i. remote infrared camera surveys
    - 1. establish a population estimate
    - 2. achieve a 30-50% reduction in localized deer population estimate
  - ii. Design and implement pellet transect surveys
    - 1. achieve a 30-50% reduction in pellet group density