Annual Report to the Alaska Board of Game on Intensive Management for *Sitka Black-tailed deer* with wolf Predation Control in Portion of *Unit 1A*

Prepared by the Division of Wildlife Conservation
February 2017

1. Description of IM Program[1] and Department recommendation for reporting period

A) **This report is an annual evaluation for a predation control program authorized by the Alaska Board of Game (Board) under 5 AAC 92.1002.**

B) **Month this report was submitted by the Department to the Board:**

February _15_ (annual report) Year_2017_____

C) **Program name:** Intensive Management of Sitka Black-tailed deer in a portion of Game Management Unit 1A.

D) **Existing program *has* an associated Operational Plan:** Version 1.February 2013

E) **Game Management Unit fully or partly included in IM program area:** Portion of Unit 1A including Gravina Island and Cleveland Peninsula.

F) **IM objectives for Unit 1A deer: population size** 15,000, **harvest** 700

G) **Month and year the current predation control program was originally authorized by the Board:** March 2013.

H) **Predation control is** *temporarily inactive*. While the intensive management plan for a portion of Unit 1A was authorized by the BOG in March 2013, the predator control program has remained inactive pending refinement of techniques for measuring changes in deer and wolf abundance.

I) **If active, month and year the current predation control program**: The predation control program for a portion of Unit 1A has never been active.

J) **A habitat management program funded by the Department or from other sources is currently active in this IM area:** No

K) **Size and geographic description of the IM program area:** The experimental wolf reduction or treatment area is limited to Gravina Island (248 km^2 or 96 mi^2), approximately 2% of the land area in Unit 1A (77,700 km^2 or 5,300 mi^2). The IM Plan also identifies a comparison area on the Cleveland Peninsula (834 km^2 or 322 mi^2) (Figure 1).

[1] For purpose and context of this report format, see *Intensive Management Protocol, section on Tools for Program Implementation and Assessment*

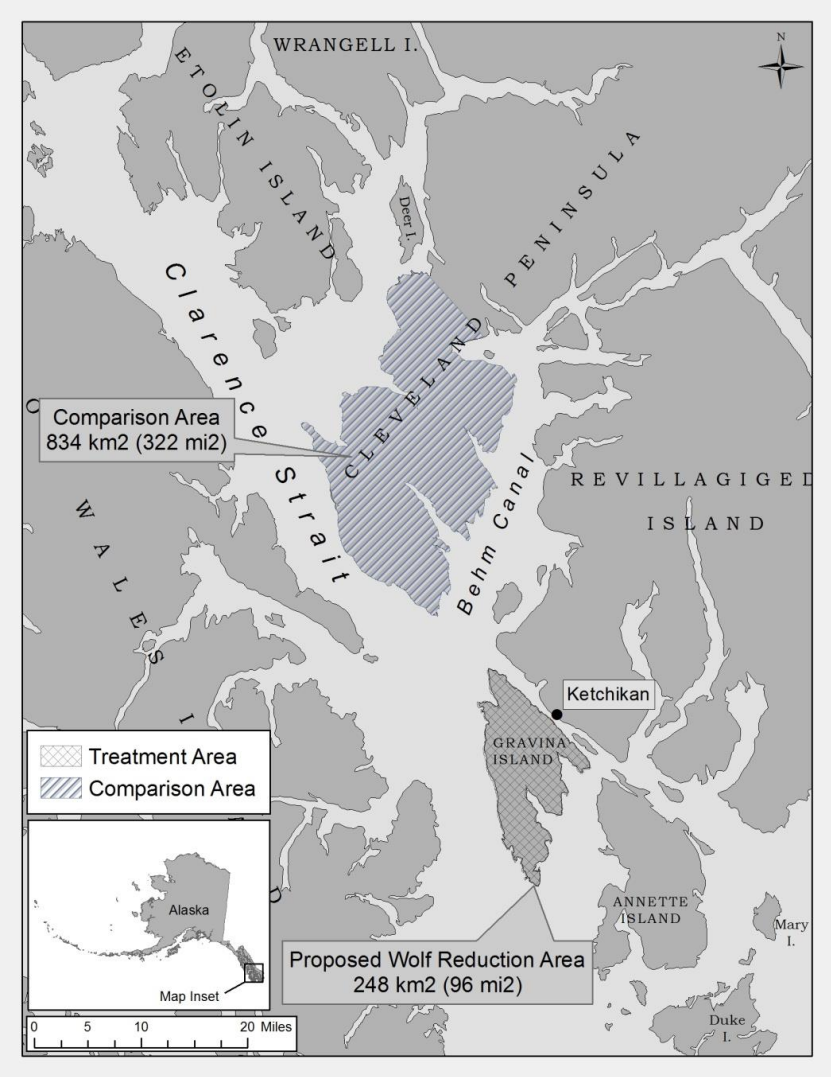


Figure 1. IM treatment and comparison areas located in Unit 1A.

L) **Size and geographic description of area for assessing ungulate abundance:** Deer abundance will be monitored in both the wolf treatment (96 mi^2) and comparison (322 mi^2) areas as described above (Figure 1).

M) **Size and geographic description of area for ungulate harvest reporting:** Hunters are required to report deer hunting effort and harvest throughout Unit 1A.

N) **Size and geographic description of area for assessing predator abundance:** Wolf abundance will be monitored in the experimental wolf reduction area on Gravina Island.

O) **Size and geographic description of predation control area:** The experimental wolf reduction area is limited to Gravina Island (248 km^2, 96 mi^2).

P) **Criteria for evaluating progress toward IM objectives:** Changes in deer abundance as

determined by trends in traditional pellet group transects, DNA-based mark-recapture density estimates, and estimated total deer harvest based on deer harvest ticket reports.

Q) **Criteria for success with this program:**

Thresholds for continuing and suspending wolf control in the treatment area.

Deer Abundance:

1) If 2 of the 3 indices of abundance indicate that deer abundance has doubled in the treatment area within 5 years, control will be suspended and normal hunting and trapping of wolves in the treatment area will be allowed to continue.

2) If a combination of 2 of the 3 indices of abundance indicate that deer abundance has not changed in the treatment area versus the comparison area after 5 years we will reevaluate the program and make changes.

Wolf Abundance:

1) if indices of wolf abundance indicate that wolf control has been effective (i.e. most wolves have consistently been removed from the predator control area each year), but indices of deer abundance have not measurably changed in the predator control area, the program will be reevaluated;

2) The portion of Unit 1A proposed for experimental wolf reduction represents a semi "closed system". Wolves from adjacent non-treatment areas of Revilla and Annette Islands may swim between islands. Therefore, in order to achieve and maintain the desired reduction in wolf numbers, it will be necessary to continue wolf removal efforts for a number of years to address immigration from adjacent areas and counteract annual increases in wolf numbers that result from reproduction.

3) if the wolf population estimate for the control area reliably falls below the minimum management objective of 2 wolves, predator control activities will be suspended (see: Section 2.);

Prey Harvest Catch Per Unit Effort.

1) Catch per unit effort will be important indices of both wolf numbers and deer numbers.

R) **Department recommendation for IM program in this reporting period**: **(details provided in sections 6 or 7)** Suspend wolf control activities and continue to monitor deer and wolf abundance and harvest through 2018.

Refer to one or more scaled maps in the Operational Plan for areas described in this section See Figure 1, in the "Operational Plan For Intensive Management Of Sitka

Black-tailed Deer In A Portion Of Game Management Unit 1A."

2. Prey data

Date(s) and method of most recent abundance assessment for Deer include:

- May 2014 – Deer pellet DNA-based mark-recapture density estimate
- April 2016 - Traditional Pellet-group transects

Compared to IM area, was a similar trend and magnitude of difference in abundance observed in nearby non-treatment area(s) since program inception - __No____ and in the last year __No____? Describe comparison if necessary: Although a DNA-based deer density estimate has only been conducted in the Treatment area, deer abundance in both the Treatment and Control areas has been monitored using traditional pellet group transects (Table 1). Pellet group density appears to be increasing in the treatment area and flat in the non-treatment area.

Date(s) of most recent age and sex composition survey (if statistical variation available, describe method here and show result in Table 1): No age or sex composition surveys have been conducted for deer in the Unit. However, the 2014 DNA-based density estimate also provided information on sex ratio.

Compared to IM area, was a similar composition trend and magnitude of difference in composition observed in nearby non-treatment area(s) since program inception ___and in the last year ? N/A___ Describe comparison if necessary: With the exception of sex composition data from 2014 in the Treatment area, no age or sex composition surveys have been conducted for deer in the Unit.

Table 1. Sitka Black-tailed deer pellet trend assessment Unit 1A.

		Unit 1A Pellet Trends	
Period	RY	Transect location (VCU)	Pellet Groups/Plot (95% CI)
Year 1	2013	VCU 765 Dall Head[a]	0.44 (0.34-0.55)
	2013	VCU 716 Helm Bay[b]	0.18 (0.12-0.23)
	2013	VCU 719 Port Stewart[b]	0.10 (0.06-0.15)
Year 2	2014	VCU 765 Dall Head[a]	0.62 (0.45-0.80)
Year 3	2015	VCU 765 Dall Head[a]	0.53 (0.41-0.65)
	2015	VCU 763 Bostwick Inlet[a]	0.53 (0.45-0.64)
		VCU 716 Helm Bay[b]	0.16 (0.09-0.24)
Year 4	2016	VCU 763 Bostwick Inlet[a]	0.60 (0.48-0.72)

[a] Treatment Area
[b] Non-treatment Area

Describe trend in abundance or composition:
Although differences are not statistically significant, pellet trend counts may indicate slight improvements on Gravina Island including VCUs 763 and 765, while deer pellet counts in the comparison area on Cleveland Peninsula, VCUs 716 and 719, remain low and stable (Table 1). In general, pellet count transect data are not very sensitive to smaller changes in abundance and may be confounded by variation in winter severity. Since 2013 winters have been relatively mild with the winter of 2015-16 being exceptionally mild. During winters with little snow deer likely remain spread out across the landscape, rather than concentrating in favorable wintering habitat. Although we believe overwinter survival has been high for 3 consecutive years and the population has grown, pellet group densities probably do not reflect that trend because deer did not concentrate in wintering habitat.

In spring 2014 we initiated a DNA-based deer fecal pellet mark-recapture project on Gravina Island. The goal was to estimate the density of deer during spring 2014. Deer density estimation work is ongoing in an IM project area in Unit 3, and final results for this effort have not been fully summarized. However, an estimate of deer density based on individual deer identification, recapture events, and Sex-Effect Models, suggest approximately 5 deer per square mile on Gravina Island. Extrapolating this estimate to all deer habitat on the entire 96 square mile island would equate to an island-wide population of about 500 deer ($\hat{N}$ = 527 ± 72 deer [95% CI: 412, 699]).

Estimated deer harvest in assessment area (M). Methods for estimating unreported harvest are described in Survey and Inventory reports.

Table 2. Deer harvest in assessment area, Gravina Island.

Period	RY	Reported[d]		Estimated		Total harvest
		Male	Female[a]	Unreported[b]	Illegal[c]	
Year 1	2011	15	0	-	-	15
Year 2	2012	15	0	-	-	15
Year 3	2013	13	0	-	-	13
Year 4	2014	46	0	-	-	46
Year 5	2015	88	0	-	-	88
Year 6	2016	NA	0	-	-	NA

[a] Deer harvest in the assessment area is limited to bucks only.
[b] Some deer mortality occurs as a result of vehicle collisions or other causes unrelated to hunting, however, such instances are not well reported to the department.
[c] Illegal harvest of deer undoubtedly occurs in the Unit, but the extent is unknown.
[d] Reported harvest numbers are estimates of actual harvest derived using an expansion factor to account for caused by hunters that do not report their harvest.

Describe trend in deer harvest
Deer harvest in all of Unit 1A has improved during the past few years (Figure 2) and harvest on Gravina Island also continues to improve (Figure 3). Several consecutive mild winters, increased

deer abundance, low wolf abundance, and increased road access to the interior of the island have all contributed to higher harvest on Gravina Island (Table 2).

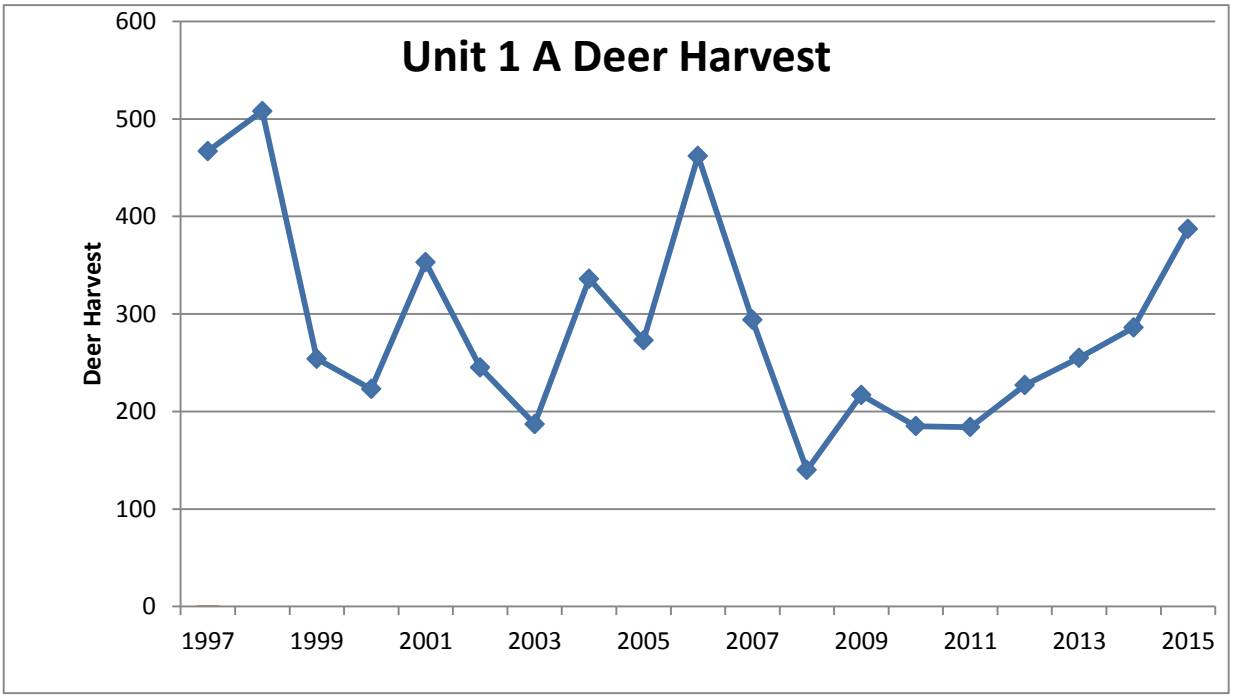


Figure 2. Unit 1A deer harvest trend (1997-2015).

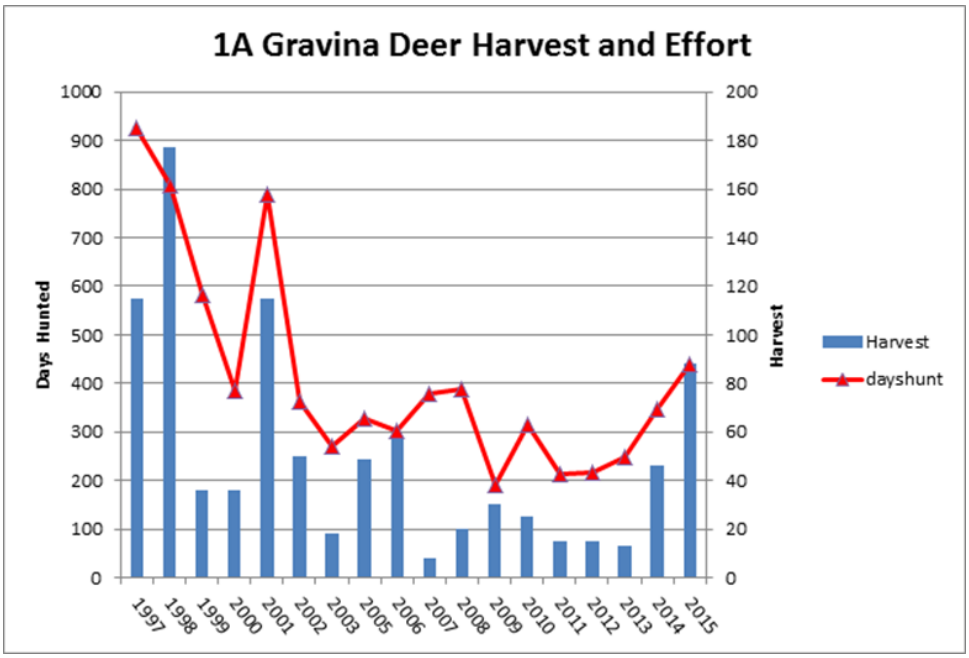


Figure 3. Deer harvest and hunter effort trends on Gravina Island (1997-2015).

Describe any other harvest related trends if appropriate: Deer harvest and deer hunting effort have been slowly increasing on Gravina Island and are currently the highest reported since 2000 (Figure 3). With improved access and higher deer numbers on Gravina Island we expect

this upward trend to continue.

Deer Hunter Catch Per Unit Effort (CPUE): We collect data on CPUE as the number of days hunting required to harvest one deer. Since 2013 the average number of days afield required for a hunter to harvest one deer has declined from 9 days to 6 days or about 30% (Figure 4).

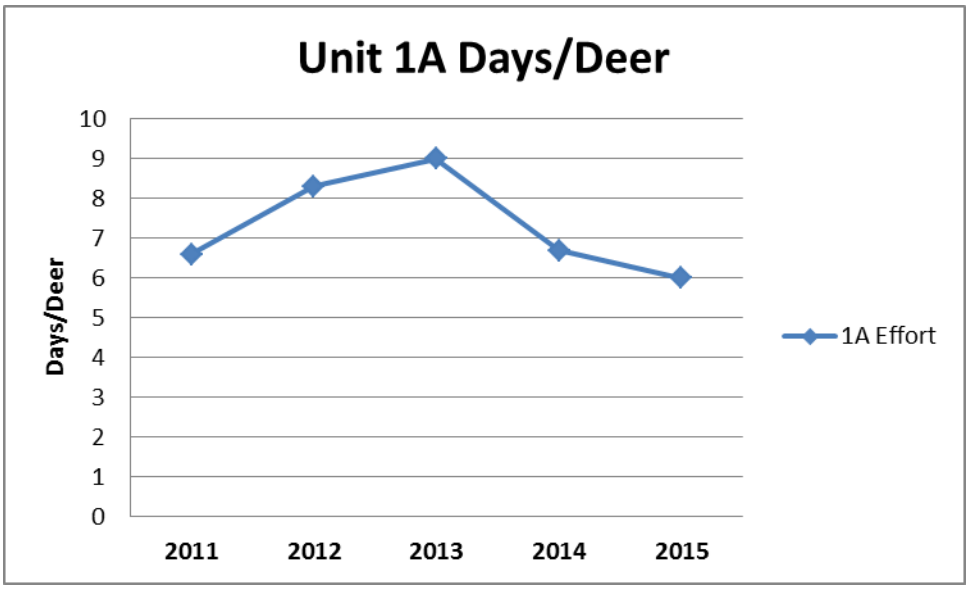
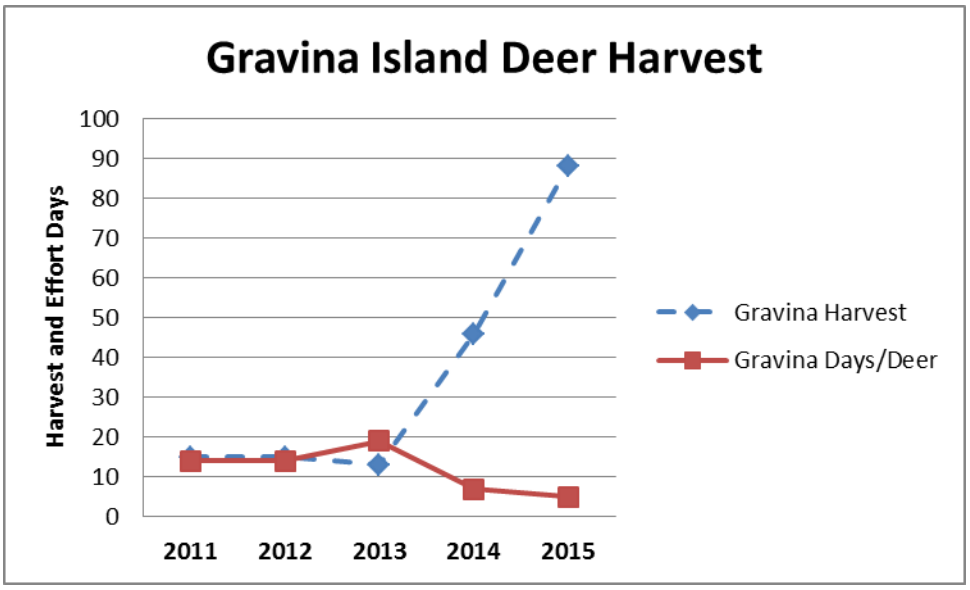


Figure 4. Days hunted in Unit 1A to harvest a deer.

Both the treatment area (Gravina) and the control area (Cleveland) show inverse relationships during the past few years with hunter effort in days invested to harvest a deer and overall deer harvest in these areas. Harvest has increased and hunters are reporting fewer days hunting to harvest each deer (Figure 5).



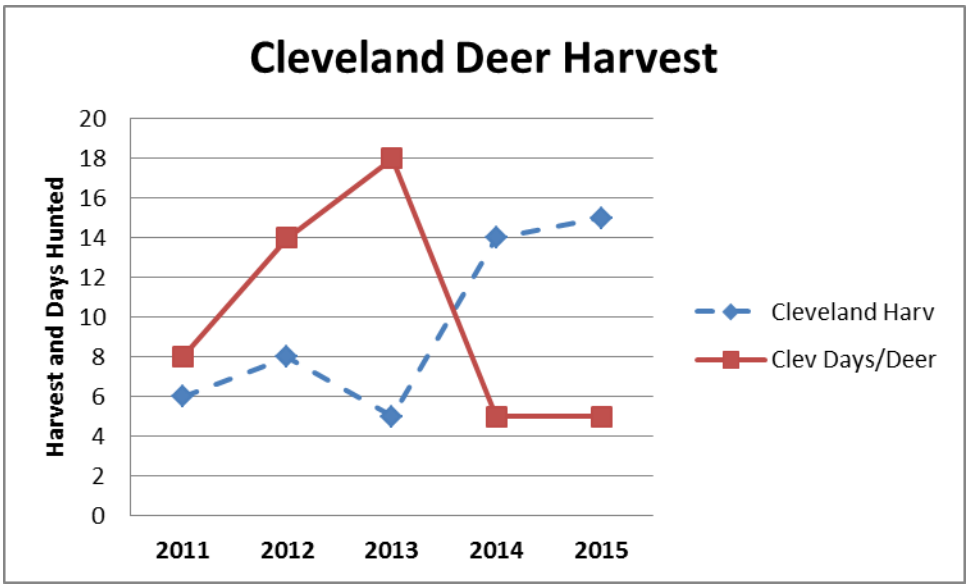


Figure 5. Deer harvest and hunter effort for Gravina and Cleveland.

3. Predator data

Date(s) and method of most recent spring abundance assessment for wolves: No spring abundance surveys have been conducted for wolves in Unit 1A or within the entire IM area. However, we continue to maintain a trail camera array on Gravina Island with cameras installed at locations previously identified as most commonly travelled by wolves (Figure 6). Some camera locations were treated with small amounts of gland lure as an attractant to increase the chance of obtaining clear pictures. No bait was used at any sites. The objective is to identify individual wolves to obtain minimum counts of wolves inhabiting the island for comparison over time. We opportunistically checked cameras from the road system by land vehicle and boat. We reviewed and catalogued pictures by camera location, tabulated by date stamp, and any animals captured on camera were noted. Pictures of wolves were catalogued and compared from all camera locations in an attempt to distinguish individual animals using hair color and pattern, relative body size, and pup/adult age class. Deer and black bears were also commonly photographed, and those images may be useful for monitoring trends in those species. Black bears are not targeted by this IM program so no attempt was made to monitor changes in abundance.

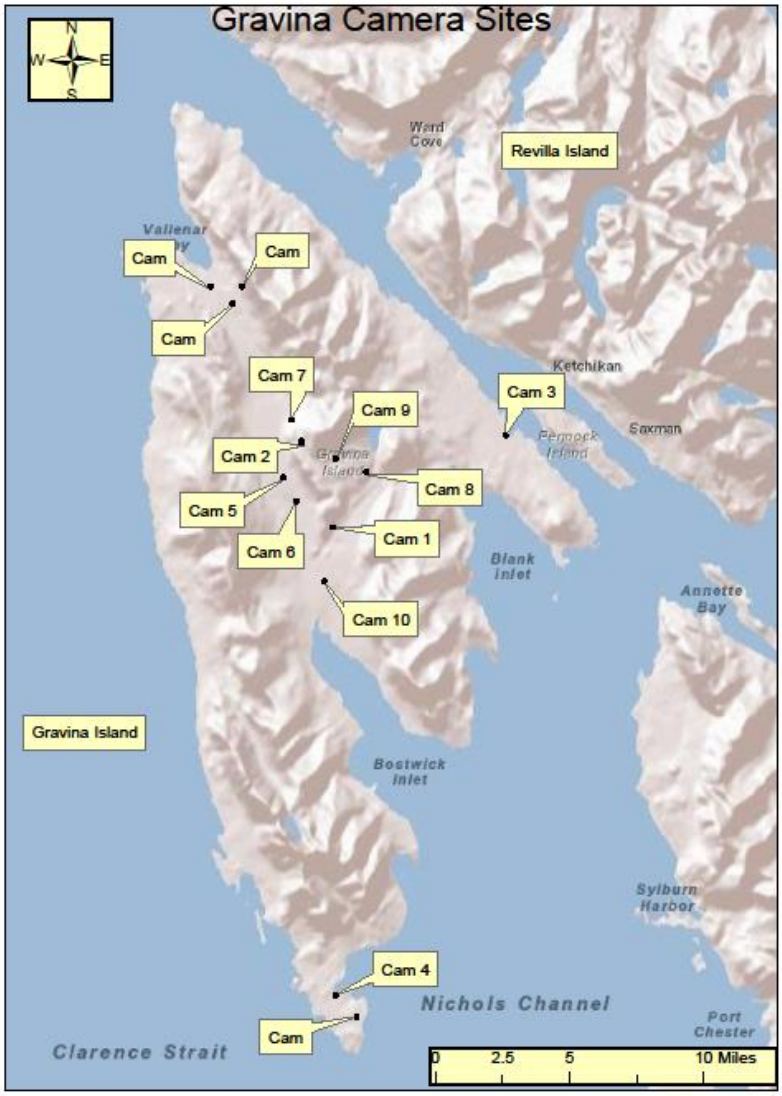


Figure 6. Gravina Island trail camera locations.

Summary of Gravina Camera Sites

Site Name	Site #	Buck	Deer [a]	Fawn	Wolf	Bear	Total deer	Total days	Days/Deer	Site type*
CornerMusk	1	48	47	8	5	53	103	884	8.6	1,2,3,4
Alderslide	2	24	25	10	2	2	59	259	4.4	1,3
Duckpond	3	17	36	26	0	4	79	287	3.6	1,3
DallHead	4	42	182	11	11	20	235	370	1.6	1
Bostcreek	5	3	16	2	25	39	21	491	23.4	1,4
Surveyline	6	4	1	0	0	0	5	68	13.6	1
EndRoad	7	0	15	6	1	1	21	74	3.5	2,4
LittleBost	8	26	22	2	0	23	50	423	8.5	1,4
CatRoad	9	2	11	0	0	3	13	73	5.6	1
CornerPit	10	4	4	2	0	0	10	100	10.0	1
All Cameras		170	359	67	44	145	596	3029	5.1	

[a] Doe or any deer of unknown sex.

Table 3. Picture summary for trail cameras located on Gravina Island (2012-2013).
*Site types included: 1=main trail, 2=trail funnel point, 3=mock rub tree, 4=hairboard site**.**

For all Gravina Island camera sites combined 68 camera days of operations were required per wolf photo, 20 days per bear photo, and 5 camera days per deer photo (Table 3).

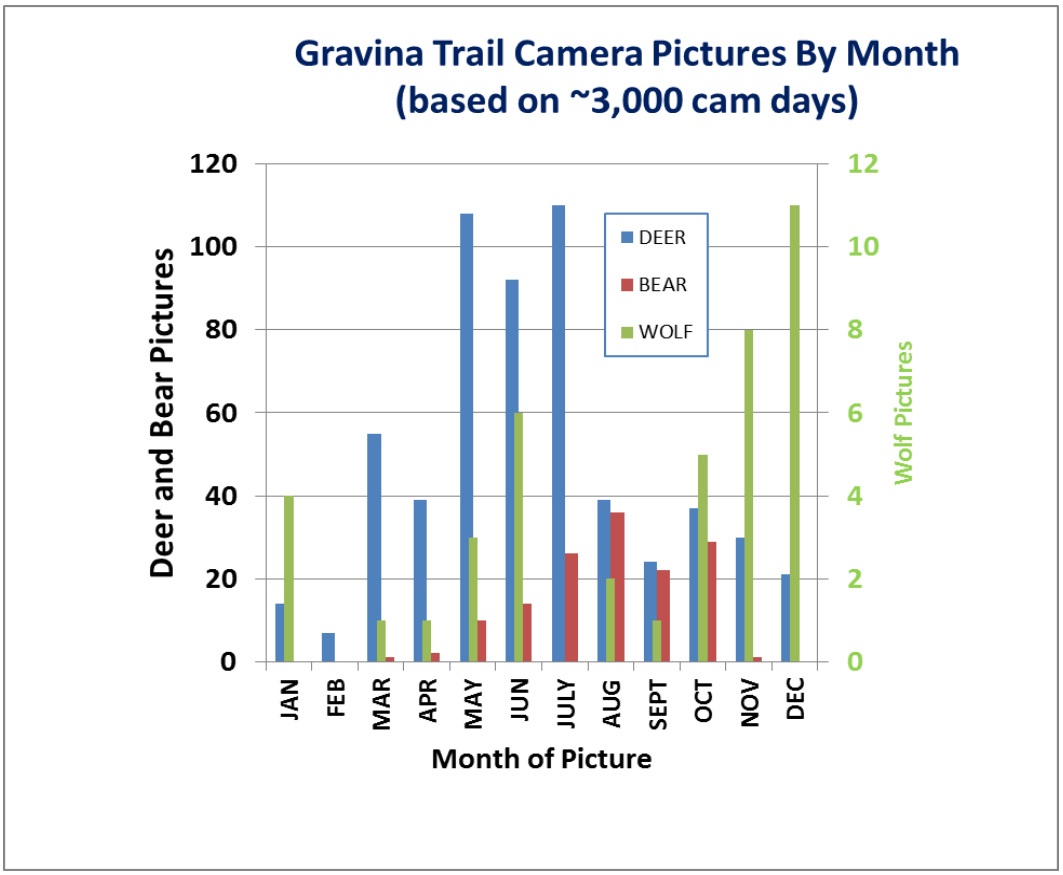


Figure 7. Gravina Island trail camera pictures by month.

Other research or evidence of trend or abundance status in wolves: During the 4 years of camera monitoring on Gravina Island (2012-2015) we never detected wolf pups and the population appeared to remain low and stable. Young of the year wolves would be significantly smaller during the first summer and distinguishable from adult wolves detected at camera sites. However, wolves were most commonly photographed in late fall and early winter when young wolves are more difficult to distinguish from adults (Figure 7).

Harvest of wolves by hunting and trapping may indicate some measure of wolf abundance. Since 2013 three wolves were harvested on Gravina Island. However, other factors affect wolf harvest such as: trapper effort, weather, fur and fuel prices, and general costs of operating a trap line.

Unit 1A wolf harvest is currently moderate (Figure 6) compared to the long term average but also continues to produce more wolves than the other three Unit 1 subunits (Figure 8). After reaching a high harvest of 10 wolves from Gravina Island during 2007, six during 2010, and five during 2011, the more recent harvest has remained extremely low (Figure 9).

At the beginning of the camera project (2012) we documented a group of 7 distinguishable adult wolves on Gravina Island. Using pictures and comparing harvested wolf hides we estimated 3 of the 6 adults were harvested, two during winter of 2013 and one in winter of 2014. Another lone wolf was shot near a homestead on Gravina during winter of 2015.

From 1-3 trappers have focused effort on Gravina during the past 10 years. Currently there are no seasoned trappers actively making wolf sets on Gravina due to lack of current wolf sign and low wolf target opportunity. Wolf harvest in the control area on the Cleveland Peninsula is also low (Figure 10).

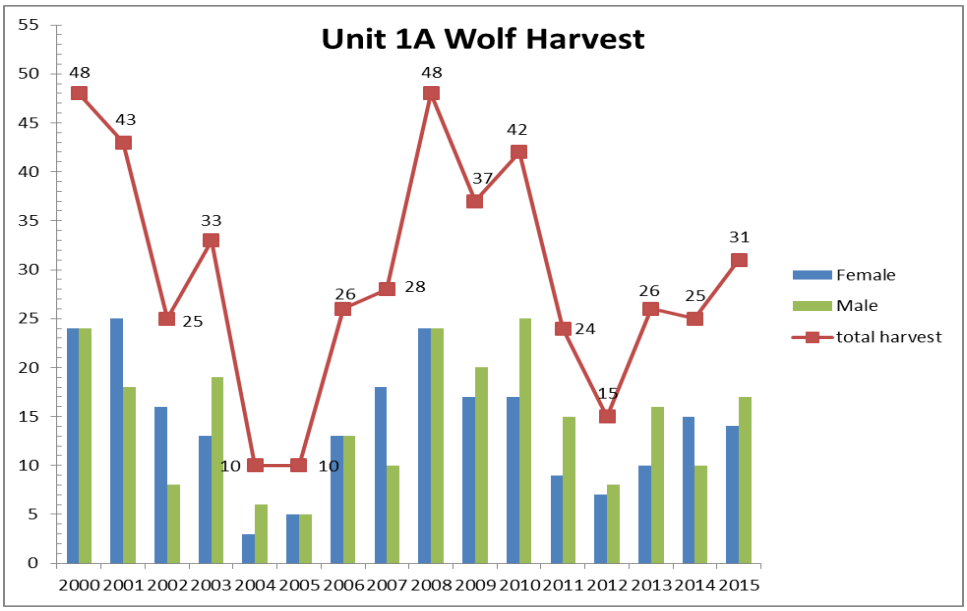


Figure 8. Unit 1A wolf harvest by sex (2000-2015).

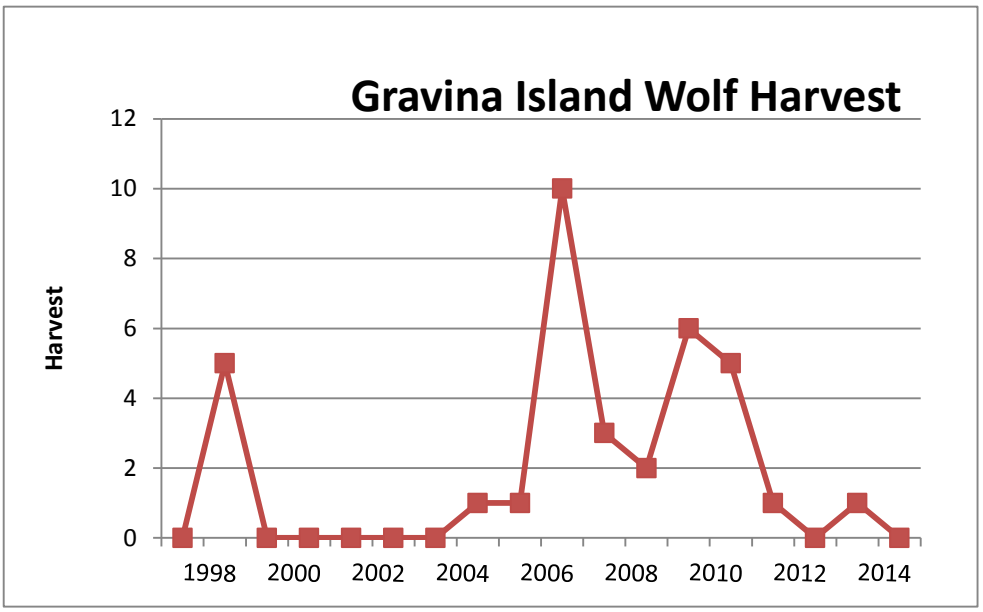


Figure 9. Gravina Island wolf harvest 1998-2015.

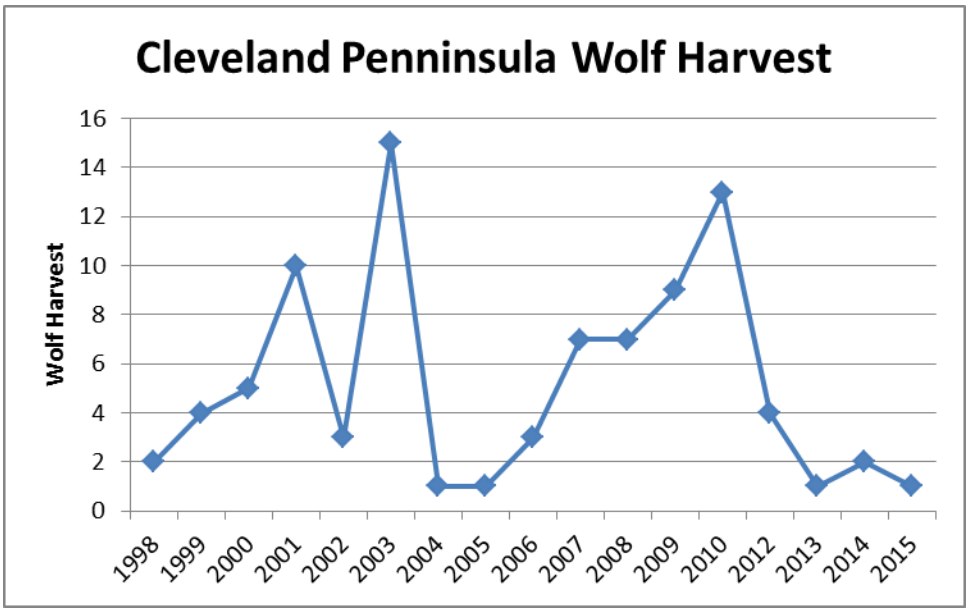


Figure 10. Wolf harvest Cleveland Peninsula (1998-2015).

If this program was activated, the wolf abundance objectives and removal in wolf assessment area (N) of the Unit 1A IM Area. **Removal objective is 100 % of pre-control fall abundance in year 1 of wolf predation control program, so the estimated or confirmed number remaining by spring each RY in the wolf assessment area (N) must be** 0 wolves**.**

4. **Habitat data and nutritional condition of prey species**

Where active habitat enhancement is occurring or was recommended in the Operational Plan, describe progress toward objectives. The Operational Plan did not include recommendations for habitat enhancement, and no habitat enhancement activities have been planned or conducted within the IM area.

Preliminary browse assessment and protocol development

In spring 2014 staff initiated a pilot study designed to test a low cost and efficient method for assessing the quantity and use of key deer overwinter forage plants to aid in the assessment of deer carrying capacity in portions of Unit 1A. The main question to be investigated was whether or not the existing overwinter range in a portion of the IM Treatment Area could support more deer.

This initial effort focused on developing efficient vegetation sampling methods, but it also provided initial insights into the current condition of deer winter range on a small portion of Gravina Island. Unfortunately, results of that work are not yet summarized in a report.

Describe any substantial change in habitat not caused by active program.
Forest Management activities, including extensive clearcut and partial/selective harvest of old-growth forest and road construction have occurred within the IM treatment area and more

timber sales are planned in the near future. Also large portion of southern Gravina Island was involved in a forest fire that still shows fire scars. This area is currently all even age hemlock and cedar trees with a sparse understory plant community. Consequently the southern end of Gravina is low quality deer winter habitat.

Where objectives on nutritional condition were listed in the Operational Plan, describe trend in condition indices since inception of (a) habitat enhancement or (b) enhanced harvest: The Operational Plan did not include plans to evaluate deer nutritional condition.

5. Costs specific to implementing Intensive Management.

Cost ($1000 = 1.0) of agency salary based on estimate of proportional time of field level staff and cost of operations for intensive management activities (e.g., predator control or habitat enhancement beyond normal Survey and Inventory work) performed by personnel in the Department or contractors in the Unit 1A IM Area. **Fiscal year (FY) is also 1 July to 30 June but the year is one greater than the comparable RY (e.g, FY 2010 is 1 July 2009 to 30 June 2010).**

Costs associated with the traditional pellet group transects and the DNA-based density estimate to monitor deer in the Gravina Island IM project area include: technician field time, travel, lodging, food, per diem, fuel, and lab costs for sample genotyping. Costs to monitor abundance of wolves and other species under "other" IM activities included the deployment and maintenance of remote trail cameras on Gravina Island during 2013-2016 (Table 4).

Table 4. Costs associated with IM and research activities Gravina Island (2013-2016).

Period	FY	Predation control[a]		Other IM activities		Total IM cost	Research cost[d]
		Time[b]	Cost[c]	Time	Cost		
Year 1	2013	0	0	0.5	$3.4	$3.4	$27.0
Year 2	2014	0	0	0.5	$3.4	$3.4	$82.0
Year 3	2015	0	0	0.5	$3.4	$3.4	$9.1
Year 4	2016	0	0	0.5	$3.4	$3.4	$5.2
Total	All Years					$13.6	$115.2

[a]State or private funds only.
[b]Person-months (22 days per month)
[c]Salary plus operations
[d]Separate from implementing IM program but beneficial for understanding of ecological or human response to management treatment (scientific approach that is not unique to IM).

6. Department recommendations[2] for annual evaluation 1 February, following year 2016 for a portion of Unit 1A.

[2] Prior sections include primarily objective information from field surveys; Sections 6 and 7 involve professional judgment by area biologists to interpret the context of prior information for the species in the management area.

Has progress toward defined criteria been achieved? Yes Wolf abundance on Gravina Island remains low and deer harvest has increased.

Has achievement of success criteria occurred? Yes Although we have difficulty documenting short-term changes in deer abundance using traditional pellet transects, harvest has increased over six-fold from 13 bucks in 2013 to 88 bucks in 2015 and hunter effort per deer harvested has declined by over 30%. The IM goal for deer harvest on Gravina Island is 75 bucks.

Recommendation for IM practice(s) (specify practices and choose one action for each):
Continue to suspend wolf control activities and continue to monitor deer and wolf abundance and harvest using current methods.

Refine techniques for measuring changes in deer abundance: Continue with traditional deer pellet transects and harvest monitoring, but suspend fecal DNA density estimate work.

Employ methods to assess wolf abundance within the IM Project area: Continue to monitor wolf abundance using trail cameras, field observations, and reports of hunters, trappers, and others in the field.

Active wolf control efforts: Suspend.

Harvest strategy: Continue current deer and wolf harvest strategies.

Recommendation for IM program
While the intensive management plan for a portion of Unit 1A was authorized by the BOG in March 2013, the predator control program has remained inactive pending refinement of techniques for measuring changes in deer and wolf abundance, and evaluating the current status of the predator prey dynamics. During that inactive period we have had a series of mild winters in southern Southeast Alaska and notable improvements in the reported deer harvest on Gravina Island. During 2013 deer harvest was only 13 bucks, but by 2015 harvest had increased over 6 fold to 88 bucks. Deer harvest information for 2016 is not yet available.

Harvest objectives were established for the entire Unit and were not broken down by island. Gravina comprises approximately 2 percent of Unit 1A land. Using 2 percent of 700 (Unit 1A objective) deer would equate to an annual harvest objective of only 14 deer for Gravina Island. In our IM assessment we set a goal of 75 deer harvested on Gravina as a measure of IM program success. For the first time in over 10 years the estimated harvest for 2015 exceeded that goal. We should continue to educate and encourage hunters to accurately report deer harvest and deer hunting effort.

Using cameras and anecdotal comments from trappers, hunters, and staff observations we believe wolf numbers have remained low (3-5 wolves) in the proposed treatment area for several years, and we have never detected evidence of reproduction. Also, if as expected reported 2016 deer harvest continues to grow over previous years, we will have met the primary ungulate objective for two consecutive years. We should continue to monitor the camera sites to compare deer per

camera day and individual wolves to identify new animals, or any sign of wolf pups. If the camera data indicate more wolves or reproduction on Gravina Island, efforts should be made to work with local trappers to reduce wolf numbers before activating predator control measures.

We should also continue to monitor predator and prey dynamics the comparison area on the Cleveland Peninsula.

Rationale for recommendation on overall program: Estimated wolf numbers in the treatment area are low, and since 2013 no evidence of reproduction has been detected. Deer harvest has grown 6 fold from 13 bucks in 2013 to 88 bucks in 2015, exceeding the IM program objective. We expect that trend to continue in 2016. We should continue to monitor the current camera array on Gravina Island, continue to educate hunters about the importance of reporting deer hunting effort and success, continue deer pellet surveys on Gravina to document long term trends in deer abundance.