OPERATIONAL PLAN FOR INTENSIVE MANAGEMENT OF SITKA BLACK-TAILED DEER IN A PORTION OF GAME MANAGEMENT UNIT 1A

Prepared by:

DIVISION OF WILDLIFE CONSERVATION

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INTRODUCTION

This operational plan has been prepared by the Alaska Department of Fish and Game (ADF&G) to provide supporting information on the intensive management (IM) plan for Sitka black-tailed deer in a portion of Game Management Unit (GMU 1A). The IM plan for Sitka black-tailed deer in a portion of GMU 1A has been submitted to the Alaska Board of Game (BOG) for consideration at its March 2013 meeting. Based on the biological and management information for this area (Appendix A), this operational plan describes rationale for evidence of limiting factors; choice of indices for evaluating treatment response; and decision frameworks on implementation, suspension, or termination for predator control, habitat enhancement, and prey harvest strategies. *Intensive Management Protocol* (ADF&G 2011) describes the administrative procedures and the factors and strategies in adaptive management of predator-prey-habitat systems to produce and sustain elevated harvests of caribou, deer, or moose in selected areas of Alaska. The IM plan for Sitka black-tailed deer in a portion of Game Management Unit 1A has been developed at the request of the Alaska Board of Game (BOG). The IM plan and this operational plan may include information and recommendations from a feasibility assessment (ADF&G 2012) and the recommendations by the BOG following public comment at the January 2013 BOG meeting. This is an experimental treatment program to evaluate whether (a) wolf control in a focused portion of GMU 1A can allow reallocation of deer from predators to humans and (b) whether 1-2 hired wolf trappers operating during the established wolf trapping season and using standard trapping techniques, can reduce wolf numbers sufficiently to bring about an increase in the areas deer population. A critical aspect of this process is being able to measure changes in the prey abundance and thus the effectiveness of these IM actions. Although we describe possible methods in the text below, we are unsure at this time of our ability to meet this need.

BACKGROUND

IM objectives For the purposes of implementing AS 16.05.255(e) – (g), the Alaska Board of Game (Board) established the deer population and harvest objectives for Unit 1A at 15,000 and 700, respectively in 2000 (5 AAC 92.108). The IM population objective was developed by assessing the deer habitat carrying capacity within the unit and the local Area Biologist's subjective assessment of where the unit's deer population stood relative to carrying capacity. However, significant habitat changes from commercial timber harvest have occurred in Unit 1A since this estimate was developed that has significantly lowered the habitat capability for deer in this area. The IM deer harvest objective was developed using the unit's average estimated annual deer harvest from 1994-1998 plus an additional 10%. Although we do not have a reliable way to estimate deer numbers in Unit 1A, our deer pellet-group trends suggest we are at a much lower level than 15,000, while our harvest estimates have remained below the 700 deer threshold established by the BOG in 2000 each year since 1995. Between 1984 and 1995 the estimated Unit 1A deer harvest ranged from 347 to 914. After 1996 the estimated unit-wide deer harvest began decreasing and is a trend that continues to present (Figure 1). Aside from the decline in deer harvest during this period, we have also seen a decline in the number of hunters.

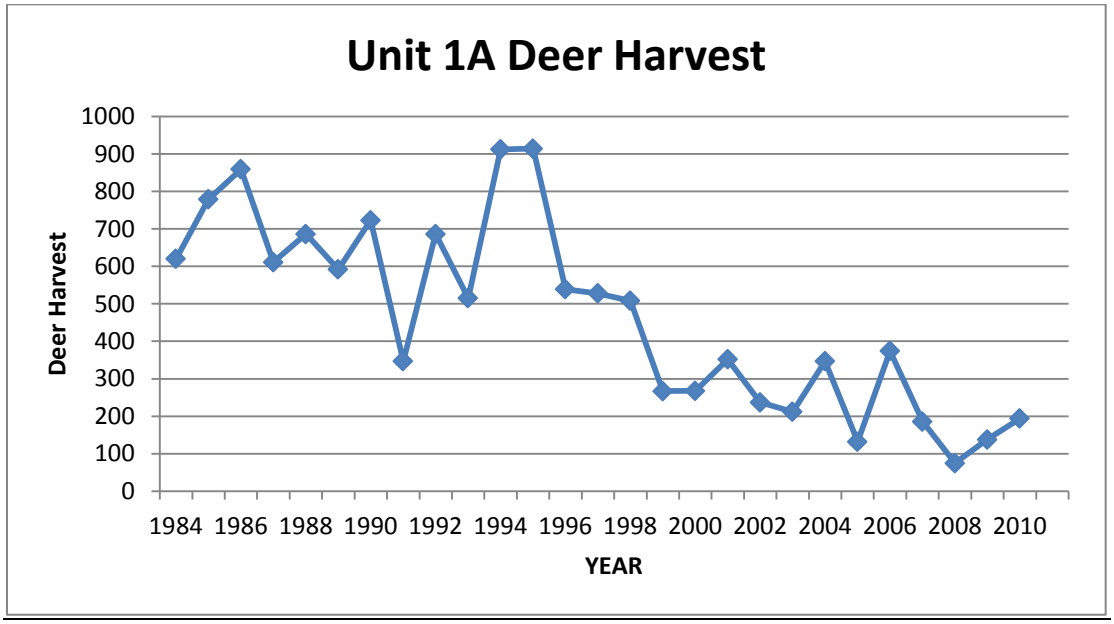

Figure 1. Estimated deer harvest in Unit 1A, RY 1984-2010.

In 1993, we estimated 2,335 deer hunters in Ketchikan. That number dropped to 1575 in 2001 and by 2003 it was only 1167. This decline in hunters was largely due to the closing of the pulp mill in 1997 and changes in demographics for the Ketchikan area.

Major predators: Both wolves and black bears are present in Unit 1A and both species are known to prey on deer, however whether these predators are holding Unit 1A deer populations at low levels remains unknown. What their respective roles are within the predator prey dynamics is also unknown. Therefore, the degree to which removing wolves will enhance the deer population given that bears will not be targeted for removal remains unknown. Data from an ongoing fawn mortality study in neighboring Unit 2 indicates that black bears represent an important source of mortality for deer fawns. Although their impacts on deer appear to be largely limited to the fawn age class, they have been shown to prey on adults as well.

Precise population estimates are not currently available for black bears in the unit; however, we did our best to estimate bear density, population size, and harvest rates during BOG preparations in 2010. For all of Unit 1A, our estimated densities ranged from 0.5-2.5 bears/mile^2, our estimated population size ranged from 2,600-4,400 and our estimated harvest rate ranged from 2.3-13%. These density estimates were derived from subjective assessments made by area biologists by comparing each area to Kuiu Island (where bear density estimates have been scientifically derived), along with habitat capability models. Harvest records and anecdotal information and observations from big game guides, hunters, and agency biologists suggest that the Unit 1A black bear populations may have either declined or remained constant over the last decade. Black bears are known to prey on deer, and particularly on deer fawns. Therefore,

reducing wolf numbers at a time when black bear populations are at lower levels may increase the likelihood that wolf removal will increase deer survival and result in increased deer numbers.

Important management factors (habitat, nutritional condition, winter severity, and key regulatory changes affecting ungulate harvest or predator management, etc.)

Winter weather is one of the main factors influencing deer numbers in Southeast Alaska. Heavy snow winters, such as those experienced during Regulatory Years (RY) 2006-2008, are thought to be primarily responsible for the most recent deer declines, while predation by wolves is suspected of forestalling recovery of the deer population. Unit 1A has also experienced habitat alterations due to clear-cut logging that can exacerbate the effects of severe winters. Clear-cut logging removes productive old growth stands that are important winter habitat for survival of deer. Productive old growth stands are important to deer during heavy snow winters because the dense canopy of large trees serves to intercept snowfall, thereby preventing forage plants from being covered by snow. Such stands also allow deer to move about the landscape without having to expend a great deal of energy. As more forest stands important for deer over-winter survival are removed by logging, deer are forced to winter among smaller remaining stands where they must compete more intensively for available forage while at the same time being made increasingly vulnerable to predation.

Also of concern is the reduction in forage biomass that occurs 25–40 years after clearcut logging. During early seral stages, clearcuts may provide abundant forage during snow-free months (Alaback 1982, Farmer and Kirchhoff 2007). However, even-aged conifer regeneration eventually forms a dense canopy that shades out understory plants. After 2–3 decades (depending on site quality), clearcuts transform into stem-exclusion seral forest, which is characterized by a closed canopy and sparse understory vegetation. Stem-exclusion forest may provide some cover from snow but it offers little forage during all seasons. All telemetry studies in Southeast Alaska that included deer within logged watersheds reported that they selected clearcuts <20 years old during snow free months (Yeo and Peek 1992, Farmer 2002, Doerr et al 2005) and most concluded deer avoided stem-exclusion seral forest. Doerr et al. 2005 reported no differences in use of clearcuts 25-40 years old compared to younger cuts, however, they acknowledged that most older cuts in their study area were pre-commercially thinned.

To better assess habitat condition in the proposed treatment area we initiated a pilot habitat study on Gravina Island. The product of this study should help us determine if: 1) deer are limited by habitat constraints, 2) where deer abundance is relative to winter carrying capacity, and 3) how those factors might interact to affect our ability and strategy of increasing deer numbers through an IM program that focuses on wolf removal. Moreover, if deer are proximal to winter K, releasing them from top-down forcing (predation) may not be beneficial in the long term, i.e., they could cause long term damage to their habitat and the habitat carrying capacity. We do have some vegetation plot data that provides insight into this issue, which was not included in the feasibility assessment. These plots were initiated in 2008 and continued into 2009 to measure potential food available to deer on Gravina Island. Plants in $2m^2$ plots were identified and noted whether they contained shrubs and whether the stems had been browsed by herbivores. Data were obtained from 53, $2m^2$ vegetation plots located on the east side of California Ridge and 30

plots at Dall Bay on Gravina Island. Those transects were chosen because of their proximity to the pellet transects along Tongass Narrows and at the south end of the island respectfully. Only 30 of 53 plots at California Ridge had *vaccinium* shrubs. The mean proportion of stems browsed was 90% with many plots indicating 100% of stems browsed.

Most of the other shrub species are not preferred deer browse but still many plots indicated 100% browsing. Browsing intensity was very high, even on non-preferred species and suggests a deer population close to the winter K in those areas. An expansion of this effort could provide us with valuable information as to where this deer population is relative to the carrying capacity of the available habitat. Additional efforts could involve capturing deer to determine their condition and productivity indices which would tell us the fitness of deer in this area.

In November 2010, the Board extended the wolf hunting season until the end of May to provide more opportunity for black bear hunters to take wolves. This action, however, contributed little to the Unit 1A harvest as no wolves were harvested during that time during 2011. However, in RY 2011 the wolf season extension resulted in the harvest of 4 additional wolves, or about 10% of the unit-wide wolf harvest that year.

The IM plan should characterize trends (table or graph may be appropriate) from time of first formal sampling estimates of ungulate abundance or composition,

Estimating deer numbers in Southeast Alaska is very difficult, so our estimates of deer population size have been through a combination of indices: 1) habitat capability models, 2) deer pellet densities, and 3) hunter harvest. Between 1984 and 1995 the estimated Unit 1A deer harvest ranged from 347 to 914. After 1996 the estimated unit-wide deer harvest began decreasing and has been below 200 deer in 5 of the past 6 years. Deer pellet transects were established to measure long term trends in deer numbers.

This operational plan describes an experimental approach to adaptive management that will test predator control in a relatively small area on a low density deer population. The intent of this IM program will be to increase deer for harvest primarily by residents of Ketchikan using a cost efficient predator control strategy that could potentially be conducted near other rural communities in Southeast Alaska where similar deer harvest concerns exist. Evaluation of hunter harvest as a metric for predator control effectiveness will be an important element of this adaptive management program.

Most of the IM area is federal owned public lands (National Forest), and state forest. Because the hunting seasons are the same for federally qualified hunters as well as non-federally qualified hunters, this program would benefit all hunters equally.

ADAPTIVE MANAGEMENT FRAMEWORK

Adaptive management is designing programs to maximize what can be learned from field experiments for potential application elsewhere, not simply modifying management in light of experience (National Research Council 1997:122). Managers wishing to use the best available information for management decisions or recommendations often need to generate new

information for specific field situations (National Research Council 1997:174). Any section of the following framework may be modified as new information comes to light in the study area or the scientific literature. Lack of an anticipated response may require evaluation of additional criteria or a research project to understand which additional factors may be influencing the system and whether they are feasible to manage.

I. TREATMENTS A. *Predator Control:*

The proposed IM action would involve hiring 1 or 2 experienced wolf trappers to remove wolves (during the established wolf trapping season) from a relatively small portion of Unit 1A in an attempt to increase the deer population and reallocate harvest from wolves to humans. This reallocation will occur in proximity to the community of Ketchikan, where deer populations have remained stagnant at low levels for more than a decade. The reallocation of harvest will be restricted to bucks thereby allowing the population to grow by protecting female deer.

The area being considered for this experimental wolf reduction plan encompasses approximately 248 km^2 (96 mi^2) or approximately 2% of the land area in Unit 1A. The proposed treatment area would be Gravina Island and the comparison area would be the Cleveland Peninsula. Figure 2 highlights the location of the treatment and comparison areas.

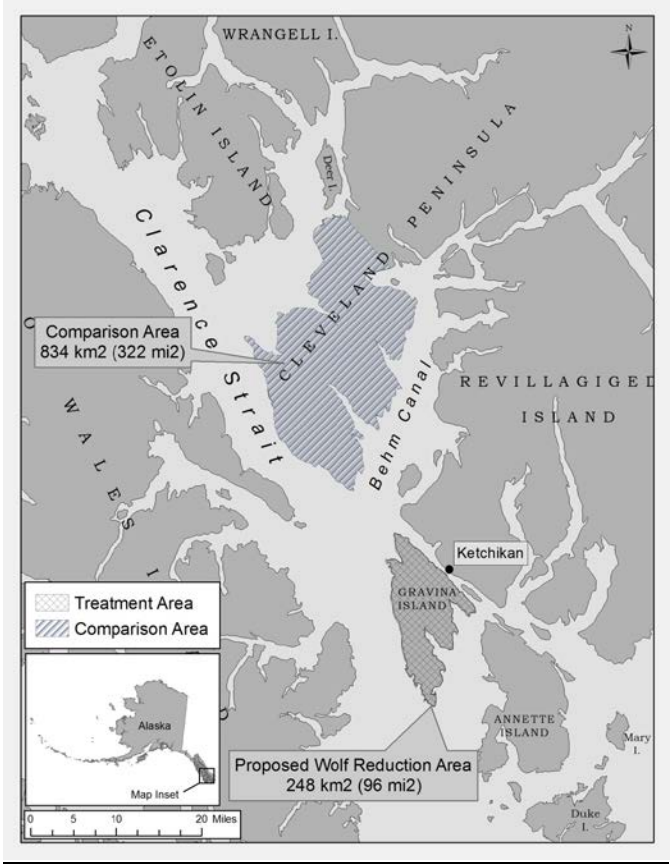

Figure 2. Treatment and Comparison areas located within Unit 1A.

The treatment area is restricted to Gravina Island. The community of Ketchikan (population 14,000) is located on Revilla Island and is near the considered proposed treatment area. Gravina Island and Revilla are separated by a narrow body of water (Tongass Narrows) and because of their proximity to one another, established ferry systems and ease of access; both locations are important deer hunting areas for Ketchikan residents. In order to evaluate whether or not treatment effects are working, and to ensure that any desired results are not simply an artifact of nontreatment effects, an approximately 834 km^2 (322 mi^2) non-treatment or "comparison area" will be established on the Cleveland Peninsula for comparison to the area being treated under the intensive management program (Figure 2).

There are currently no precise estimates for the wolf population in Unit 1A. Population estimates for Unit 1A wolves are based on inferences derived from extensive wolf research conducted on neighboring Prince of Wales Island in (GMU 2) during the late 1990s. Based on estimates of average pack and home range sizes derived from extensive wolf radio-telemetry studies on Prince of Wales Island, our best estimate for wolf numbers in Unit 1A is approximately 250 (range from 125-385) of which approximately 40 (6%) are harvested by hunters and trappers annually (data from 2000-2010).

In the treatment area, our goal is to remove all the wolves initially, then continue to monitor and trap the area to assure that wolves do not become established during the life of this program (5 years).

Duration

We propose to continue the state sponsored trapping effort for a minimum of 4-5 years in an attempt to increase deer numbers and achieve and maintain the desired reduction in wolf numbers.

Operational difficulties unique to method or area

Although trapping by the public has seldom been shown to significantly reduce wolf numbers in Alaska, by hiring 1 or 2 experienced wolf trappers who will work full time within the treatment area, the department believes there is a moderate likelihood that wolf numbers will be reduced through this method.

Variations in winter weather conditions from year to year can also have a profound influence on wolf trapping effort and success. If a decision is made to proceed with the considered IM action, our ability to achieve and maintain the desired level of wolf reduction will similarly be affected by winter weather conditions and whether or not those conditions prove favorable or unfavorable to wolf trapping success.

Public role

While there are a number of wolf trappers operating within portions of the treatment area, high fuel prices and low pelt prices tend to limit most wolf trapping activity to a few individuals operating relatively few sets. This may, however, work to our advantage as it is preferable to have 1 or 2 experienced and dedicated trappers intensively working an area than several less experienced trappers who may only "educate" wolves to the dangers of approaching trap sets.

B. *Habitat Enhancement:*

Winter habitat for deer in the form of large volume forest is probably the most limiting habitat in the treatment area. The components of this forest type and its importance for snow interception, thermal cover, and forage availability cannot be replaced through enhancement.

C. *Prey Harvest:*

Although seasons and bag limits will be restrictive, hunting seasons for deer will remain open (for bucks-only) within the treatment area. If the IM program is successful in achieving the desired increase in deer numbers, liberalization of both the deer hunting season and bag limit will be considered (including the harvest of does if appropriate) to prevent the population from exceeding the areas carrying capacity.

II. ANTICIPATED RESPONSES TO TREATMENTS

A. *Predator Abundance:*

It is currently only possible to develop crude population estimates for Unit 1A wolves based on average home range and pack sizes derived from extensive radio-telemetry studies conducted on Revilla Island in the early 1980s (Smith 1983) and Prince of Wales Island during the 1990s (Person 2001). If the Intensive Management Program is implemented, approximately 2% of the land area in Unit 1A including Gravina island 96 mi^2 (or 248 km^2) would be established as a treatment area. Approximately 8-12 wolves in one pack would be removed. Previous research, for example Adams, et al. (2008) has shown that harvests of less than 29% of a wolf population do not result in reduced summer population size.

Wolf numbers would have to be monitored for the life of the IM action to help evaluate the failure or success of the program to meet the specified objectives. Determining wolf numbers and monitoring them over a period of several years would only be feasible through the marking of animals with radio collars. This, in turn, would require the capture and handling of wolves within both the treatment and comparison areas. GPS radio collars with remote download capabilities would provide the best means of gathering data and assess home ranges and travel corridors, which would be important to effectively direct removal efforts. Additionally, radio collared wolves could then be radio tracked and subsequent observations made regarding pack sizes. This, along with home range information, would provide biologists with site-specific data for use in estimating Unit 1A wolf numbers.

Other predators of this deer population include black bears. Precise population estimates are not currently available for black bears in the unit, however, we estimated bear density, population size and harvest rates during Board of Game preparations in 2010. For all of Unit 1A, our estimated densities ranged from 0.5-2.5 bears/$mile^2$, our estimated population size ranged from about 2,500-4,500, and our estimated harvest rate ranged from about 2.3-13%. These density estimates were derived from subjective assessments from area biologists by comparing each area to Kuiu Island (where bear density estimates have been derived using scientific data and findings), along with habitat capability models. Harvest records and anecdotal evidence from big game guides, hunters, and agency biologists all suggest black bear populations may have declined over the last decade.

While brown bears are known to occur in most of Unit 1A, their numbers on the islands within the unit and along the Cleveland Peninsula are believed to be very low. Therefore, brown bears are not believed to be a significant contributing factor to low deer numbers in the treatment or comparison area.

B. *Predation Rate:*

While little area-specific information is available regarding predation on deer in Unit 1A, research conducted on deer, wolves, and black bears in neighboring Unit 2 (Prince of Wales Island) provides useful information on the predator/prey relationship of these species in a similar environment. For example, where Sitka black-tailed deer represent the primary prey species for wolves in Southeast Alaska, the estimated predation rate is 26 deer per wolf per year (Person et al. 1996) based on wolf nutritional requirements. Black bear predation on deer also occurs, and although we have no specific data from Unit 1A, we are able to draw some inferences from an ongoing fawn mortality study in neighboring Unit 2 (Prince of Wales Island). In that study, deer fawns sustained substantial predation by black bears. Black bears took 50% of fawns and wolves took another 5% of young fawns each year (Gilbert pers.comm). It is unknown whether similar predation patterns occur on fawns in Unit 1A. Reducing black bear numbers enough to address mortality of deer fawns is likely not feasible as black bears are at least as important economically as are deer.

C. *Prey Abundance:*

Despite the fact that the Unit 1A deer harvest has been restricted to bucks-only, the deer population throughout most of the unit has remained at low to moderate levels for decades. If the proposed IM program is successful in achieving the desired 100% reduction in the wolf population within the proposed "treatment" area, and habitat is not limiting, then we could expect up to a 20-25% annual increase in the deer population (Lou Bender (ADFG), pers. comm.). This rate of increase would change depending where our deer population is relative to carry capacity (K). The closer our deer are to K the slower they would rebound from current levels even in the absence of predators.

The considered IM action would involve hiring 1 or 2 experienced wolf trappers to remove wolves (during the established wolf trapping season) from a relatively small portion of Unit 1A in an attempt to increase the deer population and reallocate harvest from wolves to humans. This reallocation will occur in proximity to the community of Ketchikan, where deer populations are currently low. The reallocation of harvest will be restricted to bucks, and by protecting does the population would be allowed to increase.

Although seasons and bag limits will be restrictive, hunting seasons for deer will remain open (for bucks-only) within the proposed treatment area. If the proposed IM program is successful in achieving the desired increase in deer numbers, liberalization of both the deer hunting season and bag limit will be considered (including the harvest of does if appropriate) to prevent the deer population from exceeding the areas carrying capacity.

D. *Prey Recruitment:*

We do not have any area specific information on fawn mortality, nor the recruitment of young animals into the breeding population. This data as well as data on deer condition, pregnancy rates, fecundity and survival would be some of the first data collection efforts we would like to initiate if we proceed with this IM effort. However, data from an ongoing fawn mortality study in neighboring Unit 2 indicates that black bears are an important source of deer fawn mortality, while wolves were seldom implicated in predation on this age cohort. Additionally severe winter weather has been shown to play a significant role in the mortality of deer during their first winter. Unit 1A contains a multiple predator system that includes both black bears and wolves. Both are known to prey on deer, however, the respective role each plays in deer predation in Unit 1A remains unknown. We can speculate though that similar to Unit 2, wolves prey mostly on yearling and adult deer while bears are more instrumental in fawn predation. The degree to which removing wolves would enhance the deer population given that bears will not be targeted for removal remains unknown.

E. *Prey Productivity or Nutritional Condition:*

We do not have any area specific information on deer productivity, i.e., pregnancy rates, twinning rates or fecundity. Deer densities on neighboring POW are much higher than Unit 1A, yet research indicates those deer have pregnancy and twinning rates indicative of a productive deer population. Deer habitats in Unit 1A are generally less productive than those on Prince of Wales Island, and thus we would expect productivity and densities to be lower in this area.

F. *Harvest:*

The considered IM action would involve hiring 1 or 2 experienced wolf trappers to remove wolves (during the established wolf trapping season) from a relatively small portion of Unit 1A in an attempt to increase the deer population and reallocate harvest from wolves to humans. This reallocation will occur in proximity to the community of Ketchikan where deer populations are currently low. The reallocation of harvest will be restricted to bucks thereby allowing the population to grow by protecting female deer.

G. *Use of Nontreatment Comparisons:*

It is not feasible to perform intensive management on Unit 1A as a whole because of the remote and logistically challenging landscape, and lack of system closure to delay recolonization of predators after treatment. However, within this unit there are two key areas close to communities where deer were once abundant and where prey numbers are currently chronically low that would be best suited for a predator control effort. These include the Cleveland Peninsula and Gravina Island, both located a short distance from Ketchikan and both once popular deer hunting areas for Ketchikan residents (Figure 1). The area being considered for this experimental wolf reduction plan is Gravina Island, which encompasses approximately 248 km^2 (96 mi^2), or approximately 2% of the land area in Unit 1A. Gravina Island, though near Ketchikan, is semi isolated by the Tongass Narrows on the north, Clarence Strait on the west and south, and Nichols Passage along the east coast. It is accessible by vehicle via the airport ferry to a limited road system and by boat along an extensive shoreline. This area is popular for deer hunting, fur trapping, and recreation from residents of Ketchikan and Saxman, located on nearby Revilla Island, and Metlakatla, located on nearby Annette Island.

The Cleveland Peninsula would be the comparison area and is located west of Ketchikan encompassing approximately 834 km^2 (322 $mi^{2)}$.

H. *Other Mortality Factors:*

The amount of winter snow accumulation has direct effects on deer survival. Severe winter weather has the potential to not only affect wolf trapping success, but also to confound or prevent recovery of the deer population, even if wolves are successfully reduced in the treatment area. However, severe winters generally occur in cycles and appear to be associated with the Pacific Decadal Oscillation. Usually two or three bad winters are followed by seven to ten mild winters. Separating the effects of severe winter weather and wolf predation is difficult because these two factors are strongly linked. For example, during periods of heavy winter snowfall, deer tend to use low-elevation portions of their home ranges that are typically closer to shorelines. As a result, wolves typically frequent these same areas in search of prey, where they can more efficiently locate and kill deer.

III. Evaluation Criteria and Study Design to Document Treatment Response

Adaptive management with the intent to increase harvestable surplus of prey requires evaluating the biological response and achievable harvest after treatments are implemented. Evaluation will be reported to BOG each year with an interim update of selected criteria semiannually.

A. Predator Abundance and Potential for Return to Pre-treatment Abundance:

The portion of Unit 1A proposed for experimental wolf reduction represents a semi "closed system." Wolves from adjacent non-treatment areas Revilla and Annette Island 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.

B. Habitat and Forage Condition:

As mentioned previously, we do have some limited vegetation plot data that speaks to this issue. We established 53 $2m^2$ vegetation plots on the east side of California Ridge on Gravina Island. Data was collected during the summers of 2008 and 2009 during a period when pellet group density was dropping to very low levels. Only 30 of 53 plots had *Vaccinium* shrubs. The mean proportion of stems browsed was 90% with many plots indicating 100% of stems browsed. Additionally, non-*Vaccinium* shrub stems (mostly rusty menzesia, sweet gale, and salal) were also heavily browsed in spite of them being less preferred browse species. Browsing intensity was very high, even on non-preferred species and suggests a deer population close to winter K.

C. Prey Abundance, Age-sex Composition, and Nutritional Condition:

For the purposes of implementing AS 16.05.255(e) –(g), the Alaska Board of Game established the unit-wide deer population objective for Unit 1A at 15,000 (5 AAC 92.108) There is no area-specific population objective for the relatively small portion of Unit 1A for which this

experimental wolf reduction effort is being considered. The treatment area represents only a portion of Unit 1A (2%), so anticipated increases in deer abundance from this IM program is not expected to provide enough deer to meet the IM harvest objective on a unit-wide basis. Although anticipated increases in harvest are not likely to achieve Intensive Management Harvest objectives for Unit 1A identified in 5 AAC 92.108, the improved harvest levels will represent progress toward achieving those objectives. It may; however, allow for some deer to be reallocated from wolf predation to hunter harvest, which would provide local residents with additional harvest opportunity. The program will be treated as a management experiment to determine if wolf numbers can be reduced sufficiently by trapping to improve deer harvest, and to see if the results can be measured. If successful, this program could provide a blueprint for expanding the program to other parts of Unit 1A to further increase deer numbers and possibly meet the unit-wide population and harvest objectives.

D. Prey Harvest:

Beginning with the 2011 season, all deer hunters are required to submit hunt reports indicating the locations they hunted, the number of days hunted, and the number of deer harvested. We believe the mandatory deer hunt reports will improve our ability to detect changes in harvest and catch per unit effort. Harvest statistics (including days hunted per deer harvested) will be an important measure of deer abundance that will be useful for evaluating progress toward achieving the program's objectives.

IV. DECISION FRAMEWORK TO IMPLEMENT OR SUSPEND A TREATMENT

A. *Predation Control:*

1. Prey Population Abundance

At this point we do not have the methodology perfected to directly measure deer population size or change (other than general trends) in either the comparison area or treatment areas of GMU 1A. However, we are presently investigating several methods that are listed below that we are hoping will prove useful in assessing deer population size and density, and changes in deer numbers:

a) Pellet group densities established within both the treatment and comparison areas. In addition, advances in the DNA technique for deer density estimation may be an option should the analysis that is ongoing support the use of that method.

b) Hunter harvest. At present, our best gauge of deer abundance is probably deer harvest. With the deer harvest report in place, we should be able to get accurate estimates of deer harvest in both the treatment and control areas. If reporting is not as high as we believe necessary, we will consider requiring a registration permit for deer hunters to assure we get harvest effort and take from all hunters.

c) Deer observed on trail cameras. This method of detecting deer, measuring density, and detecting changes in density would need to be studied and perfected. However, we are considering this as a technique worth investigating.

d) Aerial surveys of alpine areas. This is a technique we would need to test with marked animals to determine the utility of it as a way to measure deer numbers and thus changes in deer density.

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

Deer Abundance:

a) If a combination of 2 of the 4 indices of abundance indicates that deer abundance has doubled in the treatment area after 5 years, control will be suspended and normal hunting and trapping of wolves in the treatment area will be allowed to continue.

b) If a combination of 2 of the 4 indices of abundance indicate that deer abundance has not changed in the treatment area versus the comparison areas after 5 years of Department sponsored wolf trapping will be reevaluated.

c) Intermediate results (i.e., less than a doubling of 2 of the 4 indices of deer abundance). If indices of deer abundance indicate some improvement in deer numbers in the treatment area versus the comparison area, the Department sponsored trapping program will be reevaluated to find ways to improve the effectiveness of the program.

d) Vegetation plots established on Gravina Island will be monitored for browsing intensity. We will be looking at the number of stems of vaccinium as well as less preferred species and comparing the browsing intensity and utilization across time. This will provide some insight into the relationship of deer density to habitat carrying capacity.

2. Prey Harvest Catch Per Unit Effort

Because the focus of the proposed IM program is to increase the deer population and harvest in a portion of Unit 1A, critical information needs include the ability to accurately measure changes in both deer and wolf abundance to evaluate the success or failure of the program. Outreach stressing the importance of accurate reporting of hunter effort and success by state and federal designated hunters will be conducted via the local Ketchikan Fish and Game Advisory Committee and the local written and radio broadcast press. Deer harvest, especially if estimates of hunter effort (days per deer) are included, could be a measure of deer abundance, and would be particularly useful because improved deer harvest is the main goal of the predator control program. Beginning with the 2011 season, all deer hunters are required to submit hunt reports indicating the locations they hunted, number of days hunted, and the number of deer harvested. We believe mandatory deer hunt reports will improve our ability to detect changes in harvest and

catch per unit effort. Consequently, these metrics of harvest may be our best means of detecting increases in deer numbers as a result of IM efforts.

B. *Habitat Enhancement:*

No habitat enhancement efforts are planned in this area. However, if we do proceed with research to better understand the predator prey dynamics in Unit 1A, the capture and handling of deer will provide us the opportunity to assess their physical condition and productivity, which in turn would provide us with insight into the condition of their habitat. Enhancing the habitat however is a difficult undertaking given the successional changes and time needed to reproduce large canopy forests which are likely the limiting component of deer habitat in this area. Although early seral stages post clearcutting can be beneficial to deer during some periods of the year, the overall carrying capacity of the habitat for deer suffers with clear cutting of forests. Once this habitat alteration takes place, no amount of enhancement can recreate the closed canopy forests over the short term that this IM action is being considered.

C. *Prey Harvest Strategy:*

1. Prey Harvest.

The estimation of deer harvest levels has recently changed from a questionnaire method to a Harvest Ticket Report Card method. This should provide us with specific data to the experimental and comparison areas, something the previously used survey was not designed to do.

If the proposed IM program is successful in reducing wolf numbers sufficiently to achieve the desired increase in deer numbers, a 20-25% annual increase in deer numbers could be expected (Lou Bender pers. comm.) liberalization of both the deer hunting season and bag limit will be considered (including the harvest of does if appropriate) to prevent the population from exceeding the areas carrying capacity.

2. Prey Nutritional Index.

Although we have no quantitative information on deer body condition, one of our first objectives if we proceed with IM will be to capture deer and gather condition and reproductive and condition data from female deer.

V. PUBLIC INVOLVEMENT

A. *Continued Outreach by Department:*

Because the focus of the proposed IM program is to increase the deer population and harvest in a portion of Unit 1A, our most critical information needs along with habitat and condition information will include the ability to accurately measure changes in both deer and wolf abundance via changes in hunter and trapper harvest. Such information will be critical to our ability to evaluate the success or failure of the program. Outreach stressing the importance of accurate reporting of hunter effort and success by state and federal designated hunters will be conducted via the local Ketchikan Fish and Game Advisory Committee and the local written and broadcast press.

Public participation in predator (wolf) harvest through standard hunting and trapping seasons will be encouraged. Department management staff will work with local wolf trappers to develop a strategy for public participation and will monitor and attempt to mitigate public trapper concerns that may arise from any perceived displacement of public wolf trappers by department sponsored wolf trapping efforts. Prior to engaging in IM wolf removal activities the department will meet with local wolf trappers to encourage public participation, discuss and partition public and state sponsored trapping coverage, and to encourage high trapping intensity, regular trap checks and proper maintenance of wolf sets operated by public trappers.

B. *Continued Engagement to Confirm Criteria Chosen for Evaluating Success:*

Several parameters will be monitored to evaluate response of deer hunter success to the proposed wolf control treatment, including the deer harvest trends, number of days hunted and days of effort per deer harvested

C. *Participation in Prey and Predator Harvest or Predator Control:*

Local hunters and trappers will be encouraged to continue to harvest of wolves during established hunting and trapping seasons to increase the effectiveness of the predation control effort.

D. *Monitoring and Mitigation of Hunting Conflict:*

Few, if any, hunting conflicts currently exist, nor are they anticipated as a result of the IM activity under consideration. Conflicts between hunters and nonhunters are extremely rare.

VI. OTHER CONSIDERATIONS

Severe winter weather has the potential to confound or prevent recovery of deer populations, even if wolves are successfully reduced significantly in the treatment area. Continued or periodically severe winter weather could negate or confound recovery of deer, and if deer numbers are low enough, predation on deer fawns by black bears could also prevent deer recovery. Neither of these factors can be effectively mitigated .

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APPENDIX A. Summary of supporting information.

Geographic Area and Land Status	
Management area(s)	Prey abundance assessment (We do not have an estimate of deer abundance in either the treatment or comparison areas), prey harvest assessment (See Figure 1), predator abundance assessment (Wolves, no estimate; Black bears, .5-2.5 mi^2), predator control (96 mi^2) – see Figure 2 [*map*]
Land status	The majority of the land area in Unit 1A, including the proposed treatment area, is under federal ownership (National Forest) with small State, Mental Health, University, and private in-holdings.
Biological and Management Situation	
Prey population	IM objectives: (No precise estimate available): For the purposes of implementing AS 16.05.255(e) –(g), in 2000 the board established the deer population and harvest objectives for Unit 1A at 15,000 and 700, respectively (5 AAC 92.108).
Prey harvest (human use)	IM objectives (rate): (No precise harvest rate available): The Amount Necessary for Subsistence (ANS) in Unit 1A (unit-wide) was set by the board at 225-250 deer per year in 2000. The unit-wide ANS has been consistently achieved until recently.
Feasibility of access for harvest	The proposed treatment area is highly accessible using highway vehicles, boats, ATV's, snow machines, float planes or a combination of these means of transportation.
Nutritional condition	At present we do not have the data to determine if : 1) if deer are nutritionally limited in this area, 2) if deer are limited by wolf predation or some other factor, 2) where deer abundance is relative to winter carrying capacity, and 3) how those factors might interact to affect our ability to manipulate deer numbers through an IM program.
Habitat status and enhancement potential	Precommercial thinning of the dense second-growth stands that have resulted from clear-cut logging provides a very limited opportunity to improve habitat conditions for deer. Most of the unit is comprised of Federal lands (National Forest) and it is not within the State's authority to undertake such activities.
Predator(s)	No precise population estimates are available. Wolves, black bears and brown bears occur within Unit 1A. Precise population estimates are not

abundance	available for wolves in the unit or within the proposed "treatment" area. Based on estimates of average pack and home range sizes derived from extensive wolf radio-telemetry studies on Prince of Wales Island in neighboring Unit 2, our best estimate for wolf numbers in Unit 1A is approximately 250 (range from 125-385) of which approximately 40 (6%) are harvested by hunters and trappers annually (data from 2000-2010). Normal harvest outside the treatment area is not expected to reduce the overall wolf population within the treatment area to unsustainable levels. Previous research, for example Adams, et al. (2008) has shown that harvests of less than 29% of a wolf population do not result in reduced population size. Precise population estimates are not currently available for black bears in the unit, however, we estimated bear density, population size and harvest rates during Board of Game preparations in 2010. For all of Unit 1A, our estimated densities ranged from 0.5-2.5 bears/mile^2, our estimated population size ranged from about 2,500-4,500, and our estimated harvest rate ranged from about 2.3-13%. These density estimates were derived from subjective assessments from area biologists by comparing each area to Kuiu Island (where bear density estimates have been derived using scientific data and findings), along with habitat capability models. Harvest records and anecdotal evidence from big game guides, hunters, and agency biologists appears to indicate that black bear populations have declined over the last decade. Black bears are known to prey on deer, and particularly on deer fawns. Therefore, reducing wolf numbers at a time when black bear populations appear to be at lower levels could increase the likelihood that wolf removal will increase deer survival and result in increased deer numbers.
Predator(s) harvest	Reported in 2013 (sustained yield rate): The unit-wide wolf harvest has remained relatively stable at approximately 40 wolves per year over the last 2 decades. The unit-wide black bear harvest has averaged 75 during 1991-2011, with a range from the mid 30's to just over 100 in some years.
Evidence of predation effects	While little area-specific information is available regarding predation on deer in Unit 1A, research conducted on deer, wolves, and black bears in neighboring Unit 2 (Prince of Wales Island) provides useful information on the predator/prey relationship of these species in a similar environment. For example, where Sitka black-tailed deer represent the primary prey species for wolves in Southeast Alaska, the estimated predation rate is 26 deer per wolf per year (Person et al. 1996). Black bear predation on deer also occurs,

	and although we have no data from Unit 1A, we are able to draw some inferences from an ongoing study in neighboring Unit 2 (Prince of Wales Island). In that study, deer fawns are subject to fairly intensive predation by black bears. It stands to reason that similar predation patterns on fawns may occur in Unit 1A.
Feasibility of predation control	The considered treatment area is accessible using either highway vehicles, boats, ATV's, snow machines, or a combination of these means of transportation. The land ownership in this area is mixed with some federal (USFS), State, Mental Health, and University of Alaska lands. Land ownership patterns are not expected to hinder an effective control program. While stopping short of providing a definitive answer, US Forest Service staff has indicated that the agency has no policy that specifically prohibits predator control or intensive management activities on Forest Service lands. Furthermore, if the activities were consistent with hunting and trapping regulations, the agency would have no basis to prohibit such activities since the agency supports the sustainable use of fish and wildlife (Deputy Forest Supervisor Patricia O'Connor, pers comm. via email Sept. 11, 2012).
Other mortality	Severe winter weather and habitat alterations are other factors aside from predation that play a role in limiting deer numbers in this area. The harvest of productive old growth forest stands important for overwinter survival, and second growth forest stands entering stem exclusion, have and will continue to reduce the unit's carrying capacity for deer. However, the role habitat loss has played with regard to the most recent decline in deer numbers remains unclear. Unit 1A deer are at such low density that populations may not currently be limited by the availability of winter habitat. However, it is possible that reductions in the amount of winter habitat exacerbated the effects of the severe winters experienced in Unit 1A in the past thereby causing deer numbers to decline further than they might have had the habitat remained intact. As noted earlier, severe winter weather has perhaps the greatest impact on Unit 1A deer populations, often resulting in high levels of mortality.