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STAFF REPORT AND RECOMMENDATION

ON CONSISTENCY DETERMINATION

Consistency Determination No.	**CD-046-01**
Staff:	JRR-SF
File Date:	05/09/2001
60th Day:	07/08/2001
75th Day:	07/23/2001
Commission Meeting:	7/12/2001

FEDERAL AGENCY: U.S. AIR FORCE

DEVELOPMENT LOCATION: Vandenberg Air Force Base (Exhibit 1)

DEVELOPMENT DESCRIPTION: Interim Predator Management Plan for the protection of the Western snowy plover (Exhibit 2)

EXECUTIVE SUMMARY

The Air Force's consistency determination is for an interim predator management plan. The goal of that plan is to reduce impacts to snowy plovers from predation. The plan also identifies, as a priority, the protection of ecosystem stability and integrity from predator management activities. The species of concern that the plan focuses on are crows, ravens, raptors, and coyotes. The primary predator management activities identified in the plan are: 1) beach clean up of trash and carrion in order to eliminate debris that would attract predators to the beach; and 2) lethal and non-lethal removal of predators that the Air Force has identified as an individual responsible for predation on plovers. The plan also includes continued research into coyote behavior and aversion and diversion feeding techniques to manage coyote predation. Finally, the plan provides for limited use of exclosures if the Air Force, in consultation with the U.S. Fish and Wildlife Service, determines that exclosures would be an effective management tool. Because the Interim Predator Management Plan provides for the protection of the threatened snowy plover, it is dependent on the sensitive resource. In addition, the plan provides for the protection of snowy plovers from direct impacts associated with the predator management activities and for the protection of ecological stability and integrity from the removal of predators. Therefore, the Interim Predator Management Plan will not significantly disturb plover habitat. In conclusion, the Interim Predator Management Plan is consistent with the Environmentally Sensitive Habitat (ESHA) policy (Section 30240) of the Coastal Act.

SUBSTANTIVE FILE DOCUMENTS:

1. CD-023-01, consistency determination for interim beach management for snowy plover protection.

STAFF SUMMARY AND RECOMMENDATION:

I. **Project Description.** The Air Force submitted a consistency determination for an interim plan to manage predation of the nesting Western snowy plover, a federally listed threatened species. The Air Force describes its plan as follows:

> *The Plan addresses management of known avian and mammalian predators of snowy plovers, their eggs and young.... Management actions conducted under this Plan will emphasize selective control of individual problem predators, using non-lethal techniques wherever possible in the control of native predators. VAFB's predator management decisions must also include the assessment of these actions on the larger ecosystem, with the priority being that ecosystem stability and integrity are maintained.*

Specifically, the plan provides for the management of coyotes, crows, ravens, and raptors. The Air Force proposes to implement beach clean up and carrion removal to eliminate debris that attracts these predators to the beach. The Plan also includes both lethal and non-lethal removal of predators from the snowy plover nesting habitat. In its plan, the Air Force considered other non-lethal management techniques to deter plover predation, such as fences, exclosures, diversion feeding, and aversion feeding. The Air Force's plan provides for continued investigation into aversion and diversion feeding, and provides for limited use of exclosures if the circumstances warrant and the exclosure can be constructed without adversely affecting the plover. The Air Force rejected the other non-lethal management techniques as either infeasible or more damaging to the plovers than the predation.

The plan includes the following protocols to minimize the ecological effects from the lethal removal of predators:

1. No lethal removal of species that are listed by federal or state agencies as Threatened or Endangered (e.g. peregrine falcon).

2. For non-listed species, the Air Force will consider lethal removal of species that fall within the following categories:

    - Species that are known to be extremely difficult to trap;

- Species for which non-lethal management techniques are determined to be infeasible or not available (through consultation with professionals and/or organizations such as the Santa Cruz Predatory Bird Research Group); and

- Individual animals that are identified as being directly responsible for predation, when their removal is expected to result in reduced predation to snowy plover nests.

3. Lethal removal of top-level predators (i.e., coyote, raptors) will be considered within the following criteria:

    - Selective lethal removal will target individual problem animals, after failure to live-trap the animal (if applicable to the species in question), and after consultation with professionals.

    - Selective lethal removal will occur only if there is evidence of nest predation, there is evidence to indicate that further losses are probable due to observed foraging patterns in the area where the loss occurred, and there are other nests at risk of predation in that area.

    - Lethal removal will cease once it is confirmed that the identified predation problem in the area has ceased.

II. Status of Local Coastal Program.

The standard of review for federal consistency determinations is the policies of Chapter 3 of the Coastal Act, and not the Local Coastal Program (LCP) of the affected area. If the Commission certified the LCP and incorporated it into the CCMP, the LCP can provide guidance in applying Chapter 3 policies in light of local circumstances. If the Commission has not incorporated the LCP into the CCMP, it cannot guide the Commission's decision, but it can provide background information. The Commission has not incorporated the Santa Barbara County LCP into the CCMP.

III. Federal Agency's Consistency Determination.

The Air Force has determined the project to be consistent to the maximum extent practicable with the California Coastal Management Program.

IV. Staff Recommendation.

A. MOTION. I move that the Commission concur with consistency determination CD-046-01 that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the California Coastal Management Program (CCMP).

B. STAFF RECOMMENDATION. Staff recommends a **YES** vote on the motion. Passage of this motion will result in a concurrence with the determination and adoption

of the following resolution and findings. An affirmative vote of a majority of the Commissioners present is required to pass the motion.

C. RESOLUTION TO CONCUR WITH CONSISTENCY DETERMINATION. The Commission hereby concurs with the consistency determination by the **U.S. Air Force**, on the grounds that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the CCMP.

V. Findings and Declarations:

The Commission finds and declares as follows:

A. Environmentally Sensitive Habitat Areas. Section 30240 of the Coastal Act provides that:

> *(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*
>
> *(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

1. Resource Dependent. The proposed project involves the management of predators in order to protect nesting habitat for the Western snowy plover, a federally listed threatened species. The plover nests on sandy beaches above the high tide line. The Service has designated all of the plover-nesting habitat on Vandenberg as critical habitat. Its nesting location makes the plover susceptible to many natural and human threats. Some of the natural threats include wind, waves, and predation. On Vandenberg, the primary human threat is recreational use of the beach. (This issue is fully discussed in the findings for CD-023-01 and is incorporated into this report by reference).

The purpose of the predator management plan at Vandenberg is to reduce snowy plover nest and chick loss from predation. Since the plover is a threatened species, its habitat is an ESHA. Section 30240 of the Coastal Act protects ESHA resources of the coastal zone. Specifically, that policy limits the type of activities that can occur within an ESHA to those that are dependent on the sensitive resources and avoid significant disruptions to the habitat. In this case, the proposed predator management plan is an allowable activity within an ESHA. The purpose of the plan is to reduce predation of the snowy plover, which is the sensitive resource that makes these beaches an ESHA. Obviously, a plan to protect sensitive resources is dependent on the resources it protects. Therefore, the Commission finds that the proposed predator management plan is dependent on the ESHA.

2. Significant Disruptions. The second requirement of the Coastal Act's ESHA policy is that the proposed activity avoid significant disruption to the sensitive resource. Although predation is responsible for many nest and chick losses, management of predators could result in adverse effects on plovers unless the plan is designed to maintain the complex predator/prey relationships and avoid other ecological effects. Despite the potential risks to the ESHA, predator management is necessary to protect this species. The bird nests on the ground in loose colonies and relies mostly on camouflage as its protection from predation. However, because of its nesting location and behavior, predation can result in significant nest losses. In addition, human activities and invasive plants have eliminated much of the plover's nesting habitat, and thus the remaining habitat is much more sensitive to predation. Finally, the plover population has declined in recent years (a full discussion of plover declines can be found in CD-023-01, and is incorporated by reference). Because of these concerns, predator management is necessary to protect the plover, reduce future declines in the population, and increase nesting success.

Predation on Vandenberg is particularly a problem. Past monitoring shows that predators are responsible for the loss of as much as 80% of the failed plover nests during a nesting season. The table below put predation in the context other causes for nest failure.

Table 1, Percent of failed nests on north or south beaches attributed to various causes.[1]

Year	Predation		Human		Abandoned		Surf or Wind		Unidentified Causes	
	North	South	North	South	North	South	North	South	North	South
1994	51	51	0	1	7	15	1	5	41	28
1995	40	32	0	0	12	36	9	2	39	30
1996	54	38	0	3	19	36	4	1	23	22
1997	65	64	0	0.05	5	5	2	3	28	28
1998	80	73	0	4	3	7	6	7	11	9
1999	14	53	0	8	43	17	29	11	14	11
2000	60	82	0	0	20	8	10	3	10	7

[1] Modified from Western Snowy Plovers on Vandenberg Air Force Base, 2000 final Report, Thomas E. Applegate and Sandra J. Schultz, January 2, 2001, p. 22.

This table clearly shows that the percentage of failed nests attributed to predators is relatively high. Thus, predator management is necessary to protect the plover on Vandenberg. However, predator management must be implemented carefully, because if improperly done it could result in significant ecological effects and possibly adverse impacts to the plover. For example, if the population of the top-level terrestrial predator, the coyote, in this system is significantly reduced through predator management, it could result in increase predation by lower level predators (mesopredators), such as red foxes, raccoons, opossums, and skunks. The mesopredators may be better at nest predation then the coyotes and the snowy plover nests may be a more important food source than it is for the coyotes. (A snowy plover egg is relatively small and it is unlikely that a coyote comes to the beach just for these eggs.) In addition, predator/prey relationships are complex and too much interference with this relationship could have unintended ecological and biological effects. Therefore, it is best to move cautiously with any predator management program.

The goal of the Air Force's Interim Predator Management Plan is to reduce predation of the plover while minimizing ecological effects from predator management. Specifically, the plan states that:

> *Management actions conducted under this Plan will emphasize selective control of individual problem predators, using non-lethal techniques wherever possible in the control of native predators.* ***VAFB's predator management decisions must also include the assessment of these actions on the larger ecosystem, with the priority being that ecosystem stability and integrity are maintained*** (emphasis added).[2]

The primary predators that the interim plan focuses on are crows, ravens, and coyotes. These species account for most of the plover predation on the base. The Air Force proposes to use trash clean up and carrion removal as one of the tools to reduce predation by these animals. The Air Force proposes to conduct beach clean up weekly and continue to re-assess the situation to determine if more frequent beach clean up is necessary. The Air Force believes that human trash is one of the major attractants bringing predators to the beach. By removing this debris regularly, the Air Force hopes to reduce the number of predators attracted to the beach. Beach clean-up activities, however, can adversely affect plovers by increasing human activities on the beach. To minimize this impact, the interim plan requires that only trained individual will participate in the clean-up activities. In addition, the Air Force initially proposes to conduct the clean-up activities on a weekly basis, to limit the amount human activity on the beach. Decisions to increase the frequency of the clean-up activities will balance the need to keep the beaches free of human debris with potential impacts to the plovers from conducting the clean-up activities.

The Air Force's clean-up activities include removal of carrion from the beach. Carcasses of fish, marine mammals, and birds wash up on these beaches regularly.

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[2] Interim Predator Management Plan, p. 1.

Crows, ravens, and coyotes are scavengers that rely on carrion as part of their food source. The Air Force believes that the dead animals that wash up on its beaches also attract predators. The interim plan provides for removal of carrion when identified by the plover monitors. However, the decision to remove carrion will take into consideration potential impacts on the plover from the removal activities. Carrion will not be removed if it is determined that the removal activities will adversely affect the plover.

a. Crow and Raven Predation. The Air Force does not expect the beach clean-up and carrion removal programs to completely eliminate predator activities on the beach. With respect to crows and ravens, the plan provides for lethal removal of the animals when it is feasible to implement it without adversely affecting plover nesting activities. The Air Force believes that predation by crows and ravens are limited to a few individuals that have learned that the beach provides foraging opportunities. Although the Air Force investigated several alternative methods for managing crows and ravens, it concluded that none of the non-lethal alternatives are effective means for controlling crows and ravens. These birds are very intelligent and have been successful at avoiding capture and other methods to deter their predatory activities. Therefore, the Air Force intends to rely solely on lethal removal to manage crow and raven predation.

Although the Commission is concerned about the lethal removal of these birds, the question before the Commission is whether the activity will significantly disrupt the ESHA. Section 30107.5 of the Coastal Act defines environmentally sensitive areas as "*any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.*" Crows and ravens are not rare species nor do they have an especially valuable role in nature. In addition, these birds usually thrive in areas of human disturbances. Therefore, the Commission finds that crows and ravens are not environmentally sensitive species. However, the purpose of the control of these birds is to protect the snowy plover, which is an environmentally sensitive species. Activities necessary for management of crows and ravens have the potential to affect plover habitat by increasing human activities in their habitat. The Air Force has taken this issue into consideration and provides for the following protocols to prevent impacts on the plover:

- In consultation with the plover monitors, the Air Force's Wildlife Biologist will make the determination to kill crows and ravens;
- Authorized personnel from USDA-Wildlife Services will conduct the lethal removal;
- The Air Force's Wildlife Biologist will direct USDA-Wildlife Services to limit lethal removal of crows to those observed to access snowy plover nesting beaches;
- Removal will take place from pre-determined locations to avoid disturbance to nesting snowy plovers; and

- If a particular situation requires USDA-Wildlife Services to enter nesting habitat to remove crows, this action will be carefully coordinated between snowy plover monitors, USDA-Wildlife Services, and the Air Force's biologist.

With these measures, it is unlikely that the lethal removal activities will significantly disturb plovers. Therefore, the Commission finds that the lethal removal of crows and ravens will not significantly disturb plover habitat.

b. Coyote Predation. The other main focus of the interim predator management plan is coyotes. Since coyotes are not a listed threatened or endangered species, they are not, in the absence of their ecological role, environmentally sensitive. However, coyotes are the top-level predator in this area and, as such, they have a unique role in the ecosystem. This role is especially important in managing snowy plover habitat. Although coyotes will consume plover eggs, because of the small size of the eggs, it is unlikely that the coyotes actively search for plover eggs. The Air Force's biologist believes that coyotes consume the eggs because they happen to find a nest while on the beach searching for other food. Thus, the main effort in the management of coyote predation of snowy plovers is the elimination, or at least reduction, of other food sources on the beach. To that end, the Air Force proposes to clean beaches of human trash on a weekly basis and remove carrion as needed. The Air Force will monitor the trash clean-up program to determine if more frequent clean ups are necessary. The Air Force expects the clean-up programs to significantly reduce coyote activities on the beach. Recent monitoring of snowy plover nests would support this conclusion. From March to May of this year, the Air Force has closed all of Vandenberg's beaches to recreational use. Obviously, without recreational use on the beach, there is very little trash there. As a consequence, predation of snowy plover nests by coyotes is significantly lower that it has been at this time in previous years. In addition, the Air Force's coyote studies, which include radio telemetry, have shown that coyotes are spending less time on the beach. Thus, the Air Force expects beach clean-up and carrion removal to be an effective way to reduce coyote predation on the beach.

Coyote predation will also be managed through lethal removal. This management alternative is necessary to prevent individuals from decimating the plover nests. The Air Force considered several alternatives to coyote management, but concluded that these alternatives were more damaging to the plover, were not a feasible or effective tool, or require additional information before they can be implemented. Specifically, the Air Force considered the following alternatives: 1) Nest Exclosures; 2) Invisible Fencing/Electronic Collaring of Coyotes; 3) Exclusion Fencing; 4) Aversion Feeding; 5) Diversion Feeding; and 6) Relocation. The nest exclosures alternative is a management technique promoted by some representatives of environmental groups and other members of the public. However, in this case, nest exclosures may have significant adverse effects on nesting plovers and their effectiveness has been questioned in recent years. The Air Force determined that this alternative is not feasible for the following reasons:

> *Recent reports from Point Reyes Bird Observatory indicate that although exclosures have been successful at protecting nests from predators, some species of avian and mammalian predators (e.g. foxes, crows, ravens, owls) have keyed in on the presence of birds in these exclosures. If they are unsuccessful in entering the exclosure, predators often remain near the exclosure, harassing the adult and ultimately causing the abandonment of the nest and/or the predation of the adult when entering or exiting the exclosure (G. Page, pers. comm.).*
>
> *Snowy plovers nest along 12.5 miles of beaches on VAFB. Erecting exclosures would require access to beach areas with an all-terrain vehicle to carry the materials necessary for each exclosure. During peak nesting season, this would result in daily (and occasionally more frequent) disturbances to nesting birds by a motorized vehicle. In addition, the weather climate at VAFB is such that daily maintenance of the exclosures would be required to prevent their burial by sand. Placement of exclosures would be unfeasible in most beach sectors due to the distances between access points and locations of exclosures, the need to maintain them on a daily basis to prevent burial by sand, and the consequent disturbance to the plover and its habitat as a result of these activities.*[3]

For these reasons, Air Force believes that nest exclosures are not appropriate in most situations. However, the Air Force has acquired nest exclosure materials and will use exclosures if the circumstances warrant it and the plover monitors, Air Force biologists, and the Service agree that exclosures are appropriate.

In addition, the Air Force determined that the invisible fencing alternative is not feasible. This management method is similar to the electronic collars used by dog owners to maintain dogs within a non-fenced area. These collars emit a small electrical shock when the animal crosses into the forbidden area. The Air Force evaluated these electronic collars for coyotes as a potential technique to keep them away from the beaches during the snowy plover breeding season. However, Air Force concluded that it would not be feasible to implement this alternative:

> *The placement of an in-ground line along the entire 12.5 miles of beach sector is likely unfeasible due to geography and accessibility.*
>
> *Research on the use of electronic collars for the protection of San Clemente loggerhead shrike from island fox predation indicates that although this technique is successful in protecting individual nesting tree sites, it fails when applied to a larger area because animals will break through the invisible electric line to maintain and patrol their home ranges.*

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[3] Interim Predator Management Plan, pp. 6-7.

> *Excluding resident coyotes from such large areas could result in some of the same adverse ecological effects that are of concern with large-scale lethal coyote removal, such as increased predation by mesopredators and immigration by uncollared/uncontrolled coyotes.*[4]

The Air Force also considered the use of fences to exclude predators from various portions of the beaches. The Air Force considered both electric and standard fences and considered their use both to isolate specific areas of beach with fences perpendicular to the shoreline and block known coyote paths to the beach. However, the Air Force concluded that the use of fencing was not feasible:

> *The topography of the coastline and beaches on VAFB would require that fencing extend into the water perpendicular to the coastline. This eliminates electric fencing as an option, and would not be feasible for standard non-electric fencing as the tides would be constantly damaging it.*
>
> *The routine inspection and maintenance required to ensure fence integrity would not be possible due to the extent of the coastline.*
>
> *Predators finding their way around, under or over these extensive fences could become trapped inside the area where we want to exclude them, posing additional risk to snowy plovers. In addition, standard non-electric fencing would not be effective in preventing some predators (i.e., raccoons) from entering the area.*[5]

Aversion feeding is another predator management alternative that the Air Force considered. Although the Air Force believes that this alternative may be effective and feasible, the Air Force cannot implement it at this time. Aversion feeding involves the application of a noxious chemical compound to eggs, to train potential predators that the ingestion of such items is undesirable. The problem with this alternative is the chemical that is most effective in deterring predators is potentially toxic to eggs.[6] Thus, this chemical would be more damaging to plover reproduction then the predation. However, the Air Force intends to continue researching this alternative and if it finds a safe chemical to use for aversion feeding, it will implement it in consultation with the Service.

Another technique that manages predation through the use of food is diversion feeding. This management technique aims to train animals to use specific areas for foraging and reduce their presence in other areas of their home range. This training is accomplished through the strategic placement of carcasses within their home range. The Air Force believes that this technique can be used to reduce the presence of coyotes on the beach. However, the Service is concerned that placement of carcasses would increase

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[4] Interim Predator Management Plan, p. 7.
[5] Interim Predator Management Plan, p. 8.
[6] Interim Predator Management Plan, p. 8.

available food supply and might result in increased reproduction of both coyotes and other predators that forage on the carcass. In response to these concerns, the Air Force agreed to continue its research into diversion feeding and coyote population before it decides to implement diversion feeding. The Air Force believes that this technique is viable, likely to succeed, and, if done right, would not affect predator populations in the area. Therefore, the Air Force intends to continue to gather data and information that will support implementation of the diversion-feeding plan.

The final predator management alternative considered by the Air Force is to trap and relocate coyotes. However, the Air Force concluded that such a program would not be a practical alternative because it might adversely affect the relocated animal, could have significant ecological effects, and might result in a mesopredator release effect. The Air Force describes its considerations of this alternative as follows:

> *Relocation is a practicable and feasible alternative for some wildlife species, but not practicable or ecologically sound for others. Ecologically, relocation has the same effect as lethal removal of the predator from the ecosystem. Relocation efforts, like lethal control, must therefore be limited, highly selective, and include evaluation of potential ecological effects. In addition, relocated animals may compete with resident animals at the relocation site, with potential consequences to the stability of predator populations there. Some species that are territorial, such as coyotes, would also be expected to have poor survival rates, as they would likely be excluded from the new habitat by the resident coyotes.*[7]

Although the Air Force will continue to investigate aversion and diversion feeding methods to manage coyote predation, the primary approach that the Interim Predator Management Plan proposes is to minimize trash and carrion, which attract coyotes to the beach, and lethally remove a coyote if it becomes a significant source predation of plover nests. The Air Force is cognizant of potential ecological effects from removal of the top-level predator in this ecosystem. The Air Force is especially concerned about adverse effects from an aggressive coyote removal program. Such a program could result in increased predation from mesopredators, increased coyote reproduction, or immigration of new coyotes into the area. The Interim Predator Management Plan includes the following measures to minimize ecological effects from lethal removal:

1. The Air Force will not lethally remove species that are listed by federal or state agencies as Threatened or Endangered (e.g. peregrine falcon).

2. The Air Force will limit lethal removal to the following categories:

   - Species that are known to be extremely difficult to trap;

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[7] Interim Predator Management Plan, pp. 8-9.

- Species for which non-lethal management techniques are determined to be infeasible or not available (through consultation with professionals and/or organizations such as the Santa Cruz Predatory Bird Research Group); and

- Individual animals that are identified as being directly responsible for predation, and when their removal is expected to result in reduced predation to snowy plover nests.

3. Lethal removal of top-level predators (i.e., coyote and raptors) will be considered within the following criteria:

   - Selective lethal removal will target individual problem animals, after failure to live-trap the animal (if applicable to the species in question), and after consultation with professionals;

   - Selective lethal removal will occur only when evidence indicates a nest or nests has been predated by an animal, there is evidence to indicate that further losses are probable due to observed foraging patterns in the area where the loss occurred, and there are other nests at risk of predation in that area; and

   - Lethal removal will cease once it is confirmed that the identified predation problem in the area has ceased.

Thus, the Interim Management plan includes measures to minimize ecological effects from predator management, including selective lethal removal.

In conclusion, the plan's provision for selective lethal removal is intended to protect plovers from individuals whose predation is causing significant habitat losses and includes protocols to minimize ecological effects from the activity. Based on these protocols and commitments, it is clear that the purpose of the selective lethal removal is to address specific animals that are causing significant impacts to plover nests and is not to prevent all predation of the plovers by removing the predators from the system. Therefore, the Commission finds that the proposed selective removal of coyotes will not significantly disrupt the ESHA.

c. <u>Raptors and Other Predatory Birds</u>. Raptors are another class of predators that are included in the predator management plan. The Air Force's past monitoring of snowy plovers on Vandenberg has not identified raptors and other predatory birds (other than crows and ravens) to be responsible for a significant amount of predation. However, the Air Force has attributed some chick and nest losses to raptors and shrikes. Therefore, the Interim Predator Management Plan provides for the management of predation by these birds. The plan emphasizes measures to capture and relocate responsible individuals. The plan also includes selective lethal removal of these birds if all other non-lethal methods are ineffective. Selective lethal removal of raptors and shrikes will used only as a final control method when all other non-lethal alternatives have failed to eliminate the problem. In addition, the Air Force will implement selective lethal removal after consultation with the Santa Cruz Predatory Bird

Research Group, which participates in the management, capture, and relocation of predatory birds on Vandenberg. The Air Force describes its approach to managing predatory birds as follows:

> *Upon determining that an individual predator poses a threat to snowy plovers on VAFB beaches, an effort will be undertaken to trap, band, and relocate the predator as soon as possible.*
>
> - *The determination will be made by the VAFB Wildlife Biologist upon consultation with the SCPBRG and plover monitors.*
> - *Knowledge of the avian predator's habits will determine the trapping technique to employ.*
> - *The decision to remove a predator must take into account the potential disturbance of the removal activity on nesting plovers relative to the potential threat of the predator. Trapping will be conducted in coordination with plover monitors and the VAFB Wildlife Biologist to avoid disturbance to plovers to the maximum extent practicable. As described elsewhere in this Plan, early identification of "plover-safe" trapping locations will minimize response time once a threat has been identified.*
> - *Trapped birds will be held in a licensed and permitted rehabilitation/holding facility until they can be released back into the wild.*
> - *Relocated birds will be released in an area with suitable habitat at a distance from which they would not be expected to return. The distance will be determined through consultation with the SCPBRG.*
>
> *Lethal control will only be used when trapping attempts have failed, when there is a continued and immediate direct threat to snowy plovers, their nests or chicks, and when, in consultation with the SCPBRG, VAFB determines that additional live-trapping efforts are not likely to be successful.*
>
> - *The decision to lethally remove an avian predator will be determined on a case-by-case basis, after taking into consideration the degree of threat, breeding phase of the snowy plovers, feasibility (or lack thereof) of live-trapping options, legal status and rarity of the predator species, and professional knowledge of the situation and species involved. Peregrine falcons, although federally delisted, are still state-listed as Endangered. Only live-capture by qualified and permitted biologists from SCPBRG will be utilized to control peregrine falcons; no lethal removal of this species will occur.*

- *Lethal removal will only be conducted by authorized USDA-Wildlife Services personnel under the direction of the VAFB Wildlife Biologist.*

- *Lethal removal will only be done when there are no people present in the area, to avoid any human safety hazard.*

All avian predator removal actions will be implemented by authorized personnel from SCPBRG or USDA-Wildlife Services, under the direction of the VAFB Wildlife Biologist.[8]

In addition, past monitoring data indicates that raptor predation of plovers is relatively low. Since 1994, the Air Force has identified only one nest lost to raptors.[9] Thus, it is likely that the Air Force's raptor management activities will be relatively low. However, the Commission is concerned about any lethal removal of raptors. Although the removal activities are not likely to significantly disrupt the plover habitat, which is an ESHA for Coastal Act purposes, some raptors are sensitive species and the Commission considers their habit to be an ESHA. Obviously, the lethal removal raptors will disrupt that ESHA. In this case, the Commission is placed in a dilemma of protecting one ESHA by adversely affecting another ESHA. Although the Commission is very concerned about the impacts to the raptors, protection of the snowy plover is a high priority because it a federally listed species whose population is declining. However, the Air Force proposes to only lethally remove raptors that are not state or federally listed threatened or endangered species.

In addition, it is impracticable to protect plovers from raptor predation without providing for lethal removal. If an individual bird has learn to hunt plovers or their nests and cannot be captured, lethal removal may be the only method for protecting the plovers. In conclusion, because the plover is a threatened species, the Commission concludes that the protection of the plover is the paramount concern and that the lethal removal of raptors under the conditions described by the Air Force is consistent with the ESHA policy of the Coastal Act.

3. <u>Conclusion</u>. In conclusion, the Commission finds that the purpose of the predator management plan is to protect snowy plover habitat and, therefore, is dependent on the sensitive resource of the ESHA. In addition, the Commission finds that the management of predators, including crows, ravens, coyotes, and raptors described in the Air Force's Interim Predator Management Plan will not significantly disrupt the ESHA. Therefore, the Commission finds that the proposed plan is consistent with the ESHA policy of the CCMP.

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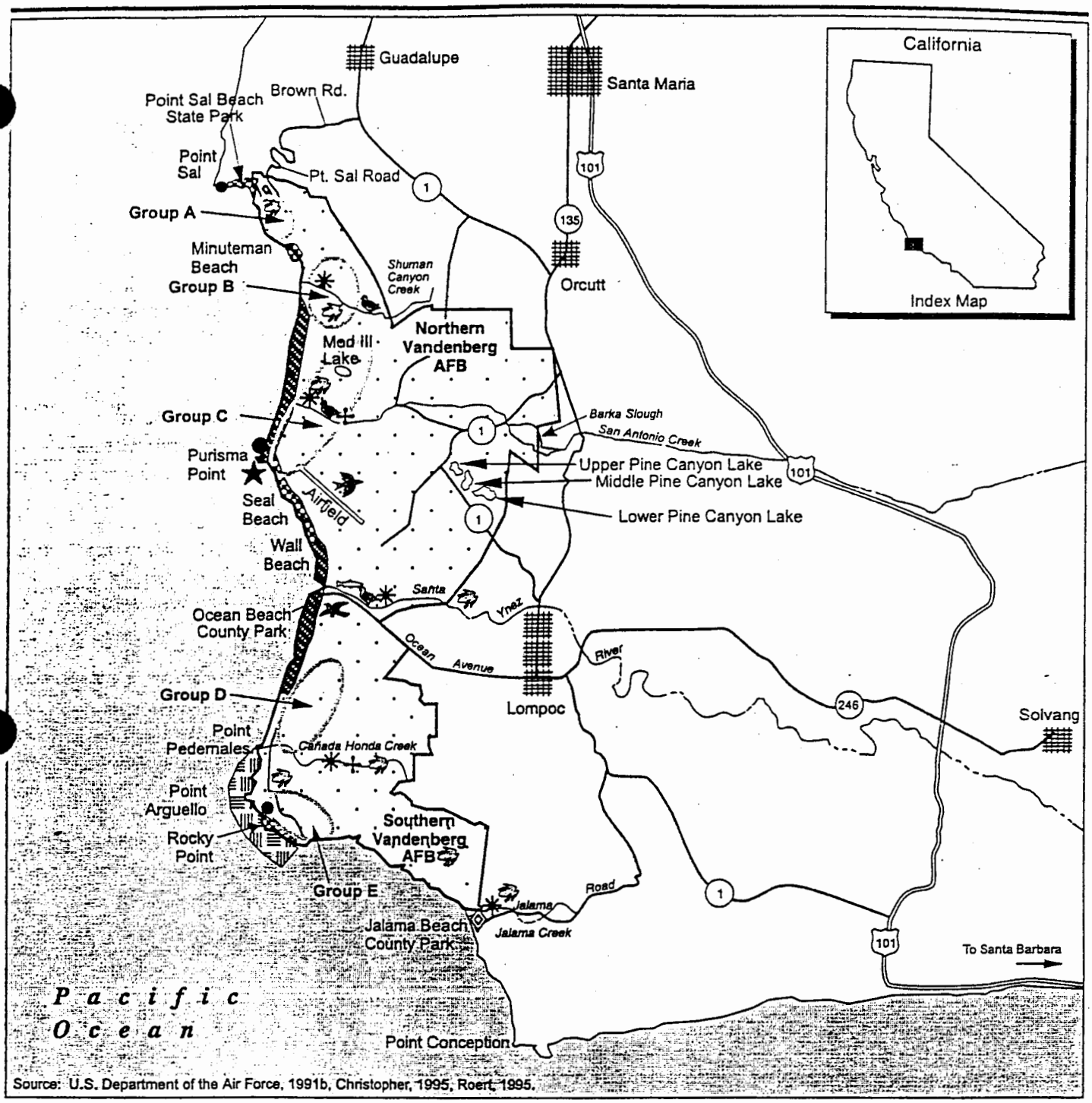
[8] Interim Predator Management Plan, pp. 11-12
[9] Interim Predator Management Plan, p. 19.



EXPLANATION

- Nesting Location of California Least Tern/ Western Snowy Plover
- Haulout Location of California Sea Lion, Northern Elephant Seal, and Pacific Harbor Seal
- Marine Ecological Reserve
- Tidewater Goby
- Unarmored Threespined Stickleback
- Roosting Location of California Brown Pelican
- Southern Sea Otters
- Launch Site Areas
- California Least Tern (CLT) Foraging Areas
- California Red-legged Frog (Wide Distribution Also Includes Ponds and Vernal Pools
- Steelhead Trout
- Mountain Plover (Winters Only)
- Southwestern Willow Flycatcher
- Snowy Plover (Winters Only)

0 4.6 9.2 Kilometers
0 2.85 5.7 Miles

Sensitive Habitat for Listed Faunal Species on Vandenberg AFB

Western Range
Candidate Test Area

EXHIBIT NO. 1

APPLICATION NO. CD-046-01

California Coastal Commission

Cdr/030lance

Preliminary Final TBM Targets EA

Air Force

Atch 2
1 of 3

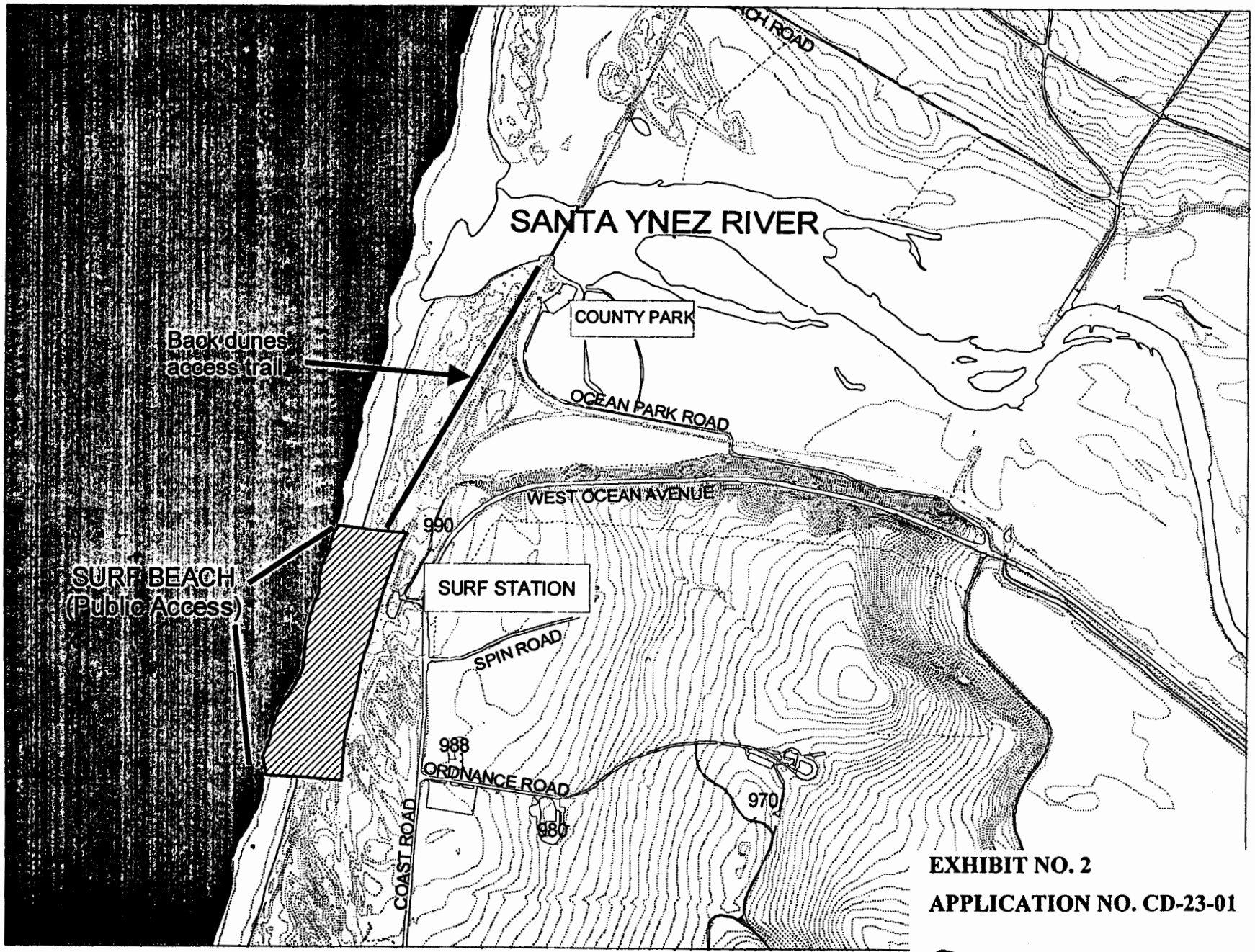


EXHIBIT NO. 2

APPLICATION NO. CD-23-01

California Coastal Commission

INTERIM PREDATOR MANAGEMENT PLAN FOR PROTECTION OF BREEDING WESTERN SNOWY PLOVERS AT VANDENBERG AIR FORCE BASE 1 MARCH 2001 THROUGH 30 SEPTEMBER 2001 14 June 01

INTRODUCTION

This Interim Predator Management Plan (Plan) was developed by Vandenberg Air Force Base (VAFB) to address protection of breeding Western snowy plovers (*Charadrius alexandrinus nivosus*) (snowy plover) on VAFB beaches. This interim Plan fulfills USFWS requirements under Biological Opinion (B.O.) 1-8-01-F-13 of March 9, 2001, supports ecosystem-based predator management objectives as established in VAFB's Integrated Natural Resources Management Plan (U.S. Air Force 1997), and complies with Air Force Instruction 32-7064 (U.S. Air Force 1997). The Plan reflects an adaptive management approach, developed and implemented in coordination with USFWS, that can be modified and refined as new information becomes available from VAFB studies and elsewhere on snowy plovers and their predators. The goal of the Plan is to reduce the rate of predation on breeding snowy plovers, eggs, and young. Specific target hatching and fledging rates that would achieve this goal can be better quantified when the Snowy Plover Recovery Plan is completed. At this time, a public draft of the Recovery Plan is expected in June 2001.

The Plan addresses management of known avian and mammalian predators of snowy plovers, their eggs and young, and is subject to cooperative review and modification by VAFB and the USFWS if the management techniques described fail to achieve an adequate reduction in predation. In developing this Plan, VAFB has endeavored to obtain the best scientific information available, including predation data from past snowy plover monitoring reports, consultations with expert snowy plover and predator biologists, extensive literature reviews, and field studies conducted on base. Management actions conducted under this Plan will emphasize selective control of individual problem predators, using non-lethal techniques wherever possible in the control of native predators. VAFB's predator management decisions must also include the assessment of these actions on the larger ecosystem, with the priority being that ecosystem stability and integrity are maintained.

BACKGROUND

The Pacific coast breeding population of the snowy plover was listed as threatened under the Endangered Species Act (ESA) in March 1993 (USFWS 1993). In 1999, all beaches on Vandenberg were designated as critical habitat for the federally listed snowy plover population with an effective date of 6 January 2000 (USFWS 1999). Habitat loss and degradation, disturbance by humans, and predation have been cited as important causes of the decline of the species (USFWS 1993).

EXHIBIT NO. 2

APPLICATION NO. CD-046-01

California Coastal Commission

As a federal agency, the Air Force is required to participate in the conservation and recovery of federally listed species. The USFWS has identified snowy plover conservation as a very high priority at VAFB because a significant percentage of the total coastal population breeds on its beaches, and because of the high quality and quantity of habitat on VAFB.

In evaluating the factors that affect the survival and reproductive success of federally listed species, the number of factors subject to human control are limited. For example, weather extremes can adversely affect survival and productivity. Food supply is not known to be limiting in this region; however, current sandy beach studies conducted by the University of California, Santa Barbara in this area may help determine if physical beach characteristics and/or prey distribution influences plover distribution on VAFB. Habitat is limiting throughout much of the range of snowy plovers, largely due to human encroachment and development. However, VAFB is one of the few locations where extensive habitat is still available. Direct and indirect human disturbance has been proven to adversely impact snowy plovers. Recreational beach management practices developed by VAFB and the USFWS are aimed at protecting snowy plovers and their nesting habitat from human disturbances.

Predation is one of the factors presently limiting snowy plover reproductive success on VAFB. Human activity exacerbates predation by avian predators by providing attractants such as perches and nest sites, and influence foraging behaviors of both avian and mammalian predators by attracting predators to trash and food discarded on snowy plover beaches. Human influence on predator presence and predation rates is of particular concern on beaches that are used for recreation (primarily Surf and Wall, also referred to as South beaches). This concern is heightened by the fact that in recent years, the relative proportion of both adult plovers and nests has increased on South beaches as compared to North beaches (Table 1).

Table 1. Nesting attempts of North beaches and South beaches on Vandenberg Air Force Base.

	Total Nests		
	North beaches	**South beaches**	**All VAFB**
1994	139 (53%)	121 (47%)	260
1995	135 (61%)	88 (39%)	223
1996	157 (55%)	129 (45%)	286
1997	203 (49%)	208 (51%)	411
1998	81 (54%)	69 (46%)	150
1999	44 (42%)	60 (58%)	104
2000	53 (38%)	87 (62%)	140

The objective of this Plan is to describe an approach and lay a framework for reducing predation on snowy plovers using selective, sustainable measures with the emphasis on maintaining ecosystem integrity. This Plan describes and builds upon measures that are already being implemented on VAFB. Predation is a natural phenomenon that cannot and should not be eliminated; however, it has the potential to be reduced through the implementation of specific management techniques and actions.

PREDATION

Predation has been identified as a major factor limiting snowy plover reproductive success at many Pacific Coast sites (Wilson-Jacobs and Meslow 1984; Page 1988, 1990; Applegate and Schultz 1999; 2000). Predation can cause abandonment of nests when breeding adults are lost. Additionally, broods are likely to be lost if the chicks are not close to fledging when an adult is captured by a predator (USFWS 2001). Unsuccessful attempts to prey on snowy plovers can result in injury to the adults and a subsequent inability to incubate eggs or care for chicks, separation of adults and chicks, and excessive energy demands resulting in the abandonment of the nest (Warriner et al. 1986).

As with other limiting factors, the nature and severity of predation is site-specific. Predators of snowy plover eggs, chicks, and adults at many sites include native species such as American crow (*Corvus brachyrhynchos*), gulls (*Larus* spp.), American kestrel (*Falco sparverius*), American peregrine falcon (*Falco peregrinus*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), and coyote (*Canis latrans*); as well as non-native species such as red fox (*Vulpes vulpes*), and domestic dogs and cats.

Substantial evidence exists indicating that human activities affect the type, number, and activity patterns of predators, thereby altering natural predation patterns. The presence of trash on beaches increases visitation by opportunistic predators and scavengers. Some predators can become accustomed to the presence of humans and even rely on their presence for securing food supplies (Stern et al. 1990; Hogan 1991).

The presence of the non-native red fox at snowy plover breeding sites is a mounting concern due to its specialized ability to prey on ground nesting birds and documented evidence of devastating impacts to nesting snowy plovers (Wilson-Jacobs and Meslow 1984; Page 1998, 1990; Stern et al. 1991). The red fox has not been documented at VAFB beaches. Only one confirmed sighting of red fox has occurred on VAFB (in 2000 outside of snowy plover nesting habitat), although their presence in surrounding areas and sites has been confirmed. This is likely a result of the stable coyote population on VAFB property. Coyotes are known to suppress and even exclude red fox populations in areas where they coexist through direct competition and even predation (Sergeant 1982; Schmidt 1986; Major and Sherburne 1987; Sargeant et al. 1993; Blankenship 1995; Allen 1996). The only non-native predator documented to date in snowy plover habitat is the feral pig. This Plan includes measures to address the threat of feral pigs to nesting snowy plovers.

Predation Losses of Western Snowy Plovers on Vandenberg Air Force Base

Predation is a factor affecting snowy plover nesting success on VAFB beaches. Predators that are known to have affected snowy plover reproductive success on VAFB include American crow, gulls, and coyotes. Substantial numbers of nests are also lost to predators that cannot be identified to species due to lack of clear tracks or other evidence. Historically, predation has resulted in annual nest losses ranging between 21 % and 52 % of total nests (Table 2).

Table 2. Snowy plover nests lost to predators at VAFB, 1994-2000. (Based on monitoring reports for the years 1994 through 2000. Note: predator species breakdown by beach segment is not available for 1994 and 1995)

	1994		1995		1996		1997		1998		1999		2000	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
North beaches														
Known fate nests	105		97		134		178		60		30		38	
Total Predation	**39**	**37%**	**27**	**28%**	**31**	**23%**	**90**	**51%**	**28**	**47%**	**1**	**3%**	**12**	**32%**
Coyote					12	9%	24	13%	5	8%	1	3%	5	13%
Crow					5	4%	23	13%	17	28%			1	3%
Bird of Prey														
Gull					2	1%	4	2%						
Unidentified predator					12	9%	39	22%	6	10%			6	16%
South Beaches														
Known fate nests	110		81		123		205		62		56		83	
Total Predation	**40**	**36%**	**14**	**17%**	**24**	**20%**	**116**	**57%**	**32**	**52%**	**19**	**34%**	**49**	**59%**
Coyote					19	15%	49	24%	26	42%	15	27%	27	33%
Crow							20	10%	1	2%	4	7%	5	6%
Bird of Prey													1	1%
Gull							14	7%	2	3%				
Unidentified predator					5	4%	33	16%	2	3%			16	19%
Purisima Beaches														
Known fate nests	16		17		14		15		12		9		6	
Total Predation	**3**	**19%**							**3**	**25%**			**5**	**83%**
Coyote									1	8%			2	33%
Crow														
Bird of Prey														
Gull														
Unidentified predator									2	17%			3	50%
Total														
Known fate nests	231		195		271		398		134		95		127	
Total Predation	**82**	**35%**	**41**	**21%**	**55**	**20%**	**206**	**52%**	**63**	**47%**	**20**	**21%**	**66**	**52%**
Coyote	41	18%	20	10%	31	11%	73	18%	32	24%	16	17%	34	27%
Crow	13	6%	4	2%	5	2%	43	11%	18	13%	4	4%	6	5%
Bird of Prey													1	1%
Gull	2	1%			2	1%	18	5%	2	1%				
Unidentified predator	26	11%	17	9%	17	6%	72	18%	10	7%			25	20%

Overall, nest losses to predators are higher on South beaches than North beaches. Total nest loss to predators 1994-2000 was 36 percent on north beaches and 41 percent on south beaches. This higher rate of loss is likely influenced by various factors including the topography of the beaches, and the attraction of human influenced predators to beaches with higher human presence. Also, for 1996-2000 (when specific predator information by beach segment is available), different predator species have had varying impact on the different beach segments. Crows have had a relatively greater impact on north beaches (7 percent) compared to south beaches (4 percent), while coyotes have had far less impact to snowy plovers on north beaches (7 percent) compared to south beaches (19 percent).

Nest losses to opportunistic predators are likely also influenced by the presence of carrion on the beaches and the yearly and seasonal variability in density of preferred prey species. Monitoring reports from VAFB indicate that the presence of carrion on beaches influences the abundance of predators on beaches and the subsequent losses of nests to predation or destruction by predators (Persons 1995a, 1995b; Applegate and Schultz 1999).

Another factor that may influence predation rates are the cyclic microtine rodent population trends. Although there are no indications that rodent prey are limiting on VAFB, relative prey abundance and availability influences opportunistic predator foraging patterns. Analyses of these cycles and predation rates observed at VAFB beaches indicate the potential for a direct relationship between predation rate and rodent population levels (Figure 1). The only exception to this trend within the seven years of data collection is the year 1998. However, the 1998 monitoring report (Applegate and Schultz 1999), states that a high number of dead seabirds and marine mammals were observed on the beaches that year, with many coyote tracks seen near these carcasses in proximity to predated nests.

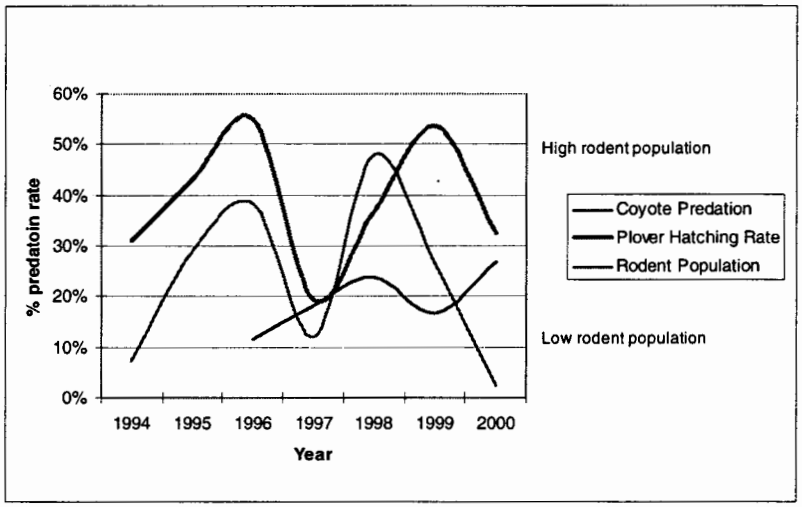


Figure 1. Snowy plover predation and microtine cycle. Rodent population data collected in Orange County and provided by Steve Bennett (Orange County Vector Control District). This pattern of microtine population fluctuations is consistent with observations from the local region (R. Davis pers. comm).

INTERIM MANAGEMENT PLAN FOR 2001 WESTERN SNOWY PLOVER NESTING SEASON

The objective of this Plan is to protect the snowy plover and increase its reproductive success by reducing predation without significantly altering the natural ecosystem on VAFB. As previously discussed, natural threats from predation are exacerbated by human activities in beach areas. The cumulative impacts from habitat loss, human disturbance, and small population size decrease the snowy plover's ability to withstand predation. The Air Force is aware that some level of predator management is essential to the recovery and survival of the western snowy plover. The Air Force is also mindful of the role keystone native predators play on natural systems, including control of non-native predators and mesopredators (e.g. skunks, raccoons, and opossums), that can themselves be significant snowy plover nest predators. VAFB has not routinely controlled native predators through lethal removal since 1978.

On VAFB, two wildlife species that are known to significantly impact snowy plover reproductive success are American crows and coyotes. Although other predators are present on the beaches and have on occasion been documented as being directly responsible for the loss of

nests, their impact to date has been minimal and is considered to be within the natural levels of predation expected in a natural system. This Plan addresses avian and mammalian species in a general manner, but focuses on methods for reducing losses of snowy plovers to these two target species, during the breeding season. VAFB will also be prepared to respond to threats by other predators. In 2001, raccoon activity in particular is being carefully monitored due to observations by snowy plover monitors of raccoon tracks in nesting areas. Efforts will also be undertaken, in consultation with tracking experts, to identify species that are responsible for nest losses that are presently categorized as "unknown predator".

Snowy plovers will continue to be monitored to determine hatch and fledge rate, adult survivorship, and population size.

Effective response to predation threats requires close communication between the VAFB Wildlife Biologist and field personnel. Key field personnel for the 2001 nesting season include:

- Two USFWS-permitted snowy plover monitors from the Point Reyes Bird Observatory;
- Two raptor biologists from the Santa Cruz Predatory Bird Research Group (SCPBRG) conducting raptor and shrike monitoring, and live-trapping as required;
- Three biologists from SRS Technologies conducting the coyote research study. Two of these biologists are also USFWS-permitted to work in snowy plover and least tern habitat, and can assist other predator biologists when they need to work in plover habitat;
- One predator control specialist from USDA-APHIS-Wildlife Services (USDA-Wildlife Services), who conducts selective lethal predator control only as directed by the VAFB Wildlife Biologist, occasional live-trapping of avian predators, and also assists the coyote research project.

In an effort to increase response time to particular predation threats, the above team will work together early in the season to select as many locations as possible where predator monitoring and control activities can safely be conducted without disturbing nesting snowy plovers. Changes to these locations will be made as needed based on the judgement of snowy plover monitors, who will notify other field personnel and the VAFB Wildlife Biologist if new snowy plover nesting activity makes an established location unusable.

All nests located on VAFB are mapped using Global Positioning System (GPS) coordinates. This data will be used to map locations of predated nests, to help identify areas of particular concern for predator management.

Management techniques considered for implementation on VAFB to reduce the impact of predators on snowy plover nesting success are described below.

Nest Exclosures

Nest exclosures are used at several snowy plover nesting sites to protect nests from predators as well as human disturbance and trampling. Exclosures were considered at VAFB and are not currently considered as a feasible alternative for the following reasons:

- Recent reports from Point Reyes Bird Observatory indicate that although exclosures have been successful at protecting nests from predators, some species of avian and mammalian predators (e.g. foxes, crows, ravens owls) have keyed in on the presence of birds in these exclosures. If they are unsuccessful in entering the exclosure, predators often remain near the exclosure, harassing the adult and ultimately causing the abandonment of the nest and/or the predation of the adult when entering or exiting the exclosure (G. Page, pers. comm.).

- Snowy plovers nest along 12.5 miles of beaches on VAFB. Erecting exclosures would require access to beach areas with an all-terrain vehicle to carry the materials necessary for each exclosure. During peak nesting season, this would result in daily (and occasionally more frequent) disturbances to nesting birds by a motorized vehicle. In addition, the weather climate at VAFB is such that daily maintenance of the exclosures would be required to prevent their burial by sand. Placement of exclosures would be unfeasible in most beach sectors due to the distances between access points and locations of exclosures, the need to maintain them on a daily basis to prevent burial by sand, and the consequent disturbance to the plover and its habitat as a result of these activities.

For these reasons, exclosures are currently not considered a feasible and practicable alternative. However, nest exclosure materials have been purchased by VAFB, and exclosures may be placed if, in particular circumstances, plover monitors, VAFB and USFWS agree that exclosures are warranted.

Invisible Fencing/Electronic Collaring of Coyotes

Similar to the electronic collars used by dog owners to maintain dogs within a non-fenced area, the use of electronic collars on coyotes was evaluated as a potential technique to keep these predators away from the beaches during the snowy plover breeding season. These collars emit a small electrical shock when the animal crosses into the forbidden area. Various concerns arose when this option was evaluated:

- The placement of an in-ground line along the entire 12.5 miles of beach sector is likely unfeasible due to geography and accessibility.

- Research on the use of electronic collars for the protection of San Clemente loggerhead shrike from island fox predation indicates that although this technique is successful in protecting individual nesting tree sites, it fails when applied to a larger area because animals will break through the invisible electric line to maintain and patrol their home ranges.

- Excluding resident coyotes from such large areas could result in some of the same adverse ecological effects that are of concern with large-scale lethal coyote removal, such as increased predation by mesopredators and immigration by uncollared/uncontrolled coyotes.

Exclusion Fencing

Fencing (electric and standard non-electric) to exclude predators from a sector of beach was also considered. This approach was not deemed feasible due to the following:

- The topography of the coastline and beaches on VAFB would require that fencing extend into the water perpendicular to the coastline. This eliminates electric fencing as an option, and would not be feasible for standard non-electric fencing as the tides would be constantly damaging it.

- The routine inspection and maintenance required to ensure fence integrity would not be possible due to the extent of the coastline.

- Predators finding their way around, under or over these extensive fences could become trapped inside the area where we want to exclude them, posing additional risk to snowy plovers. In addition, standard non-electric fencing would not be effective in preventing some predators (i.e., raccoons) from entering the area.

Aversion Feeding

Aversion feeding involves the application of a noxious chemical compound to eggs, to train potential predators that the ingestion of such items is undesirable due to the ensuing sickness that occurs. This technique has been used to increase productivity of waterfowl in some regions of the United States and is successful in reducing predation by some wildlife species. However, there is concern about the aversion chemical's potential toxicity to eggs. VAFB is currently researching this management technique and assessing whether a chemical compound exists that provides the desired results and is safe to non-target terrestrial and avian species.

Diversion Feeding

This management technique aims to train animals to use specific areas for foraging and reduce their presence in other areas of their home range. This is accomplished through the strategic placement of carcasses within their home range in an area where we want them to forage and away from the area where we want them to minimize their presence. On VAFB this technique is being researched to reduce the presence of coyotes on the beach. Additional information about this approach is included in Section 2 (Mammalian Predators).

Relocation

Relocation is a practicable and feasible alternative for some wildlife species, but not practicable or ecologically sound for others. Ecologically, relocation has the same effect as lethal removal of the predator from the ecosystem. Relocation efforts, like lethal control, must therefore be limited, highly selective, and include evaluation of potential ecological effects. In addition, relocated animals may compete with resident animals at the relocation site, with potential consequences to the stability of predator populations there. Some species that are territorial, such as coyotes, would also be expected to have poor survival rates, as they would likely be

excluded from the new habitat by the resident coyotes. However, VAFB has successfully relocated some raptor species (e.g. great horned owls) to reduce predation on California least terns, with subsequent monitoring confirming survival of the birds and no return to the vicinity of the capture site. Relocation of raptors and shrikes may therefore be considered on a case-by-case basis.

Lethal Removal

Species that are themselves listed by federal or state agencies as Threatened or Endangered (e.g. peregrine falcon) will not be lethally removed. For non-listed species, lethal removal will be considered by VAFB for species that fall within the following categories:

- Species that are known to be extremely difficult to trap.

- Species for which non-lethal management techniques are determined to be infeasible or not available (through consultation with professionals and/or organizations such as the Santa Cruz Predatory Bird Research Group).

- Individual animals that are identified as being directly responsible for predation, when their removal is expected to result in reduced predation to snowy plover nests.

Lethal removal of top-level predators (i.e., coyote, raptors) will be considered within the following criteria:

- Selective lethal removal will target individual problem animals, after failure to live-trap the animal (if applicable to the species in question), and in consultation with professionals.

- Selective lethal removal will occur only when evidence indicates a nest or nests has been predated by an animal, there is evidence to indicate that further losses are probable due to observed foraging patterns in the area where the loss occurred, and there are other nests at risk of predation in that area.

- Lethal removal will cease once it is confirmed that the identified predation problem in the area has ceased.

Carcass and Trash Removal

To avoid attracting predators to snowy plover nesting habitat, VAFB will conduct regular clean-up of litter in open beach areas, and educational materials and displays will encourage trash removal and discourage feeding of wildlife by beach visitors. Trash containers are available for public use at each beach access location. On VAFB property at Wall and Minuteman beaches, large plastic containers with lids and disposal hatches are available for use by beach visitors, and their use is encouraged. Trash receptacles at Surf Station are maintained by Santa Barbara County and/or Union Pacific Railroad. Containers at Ocean Park are the responsibility of the County of Santa Barbara.

Trash collection will take place throughout public access sectors of VAFB beaches weekly on Tuesdays, or more frequently if required, to reduce potential of attracting scavengers and predators to nesting areas. This clean-up activity will be accomplished in the presence of or by the VAFB Wildlife Biologist or other USFWS authorized personnel. VAFB snowy plover monitors will be contacted prior to accessing these sectors to confirm whether any nests or chicks are potentially present. Disturbances to adults, nests and chicks will be avoided or minimized to the maximum extent possible.

Where feasible, carcasses of animals will be removed from nesting habitat to avoid attracting scavengers that are potential predators on snowy plovers (e.g. coyotes, raccoons, crows). In some cases, carcass removal could entail substantial disturbance to nesting plovers, and removal will not be attempted in these instances. The biological monitors will be contacted for coordination to minimize disturbance to nesting snowy plovers. Protocols for carcass removal are described in Attachment A

1. AVIAN PREDATORS

Nixalite® will be installed on posts and fencing where practicable in snowy plover nesting habitat to deter perching of avian predators. Avian predators observed foraging within the vicinity of the beaches will be monitored. Monitoring will include recording the species, number of individuals, exhibited behaviors, and habits.

American Crows and Common Ravens

American crows are known to be opportunistic predators of eggs and chicks. Although crows are widely seen throughout VAFB, their presence near beaches is sporadic. Crows are known for their affinity to consume bird eggs and nestlings. On VAFB beaches, the destruction of plover nests by crows has been documented. Whereas most avian behaviors are stereotyped, growing evidence indicates that American crows, as well as other members of the Corvid family, possess a heightened level of intelligence. This "intelligence" has enabled the crow to develop avoidance techniques and therefore live-trapping of specific individuals is quite difficult. At the Purisima Point California least tern colony on VAFB, placement of crow carcasses around the perimeter of the colony has successfully deterred crows from frequenting the tern colony. However, plover nesting areas on VAFB are far too extensive to make this technique practicable. For these reasons, under this Plan, crows observed frequenting snowy plover nesting areas will be lethally removed. The determination will be made by the VAFB Wildlife Biologist upon consultation with the plover monitors. Removal of crows will be done by authorized personnel from USDA-Wildlife Services. USDA-Wildlife Services will be directed by the VAFB Wildlife Biologist to lethally remove crows observed to access snowy plover nesting beaches. Removal will take place from pre-determined locations to avoid disturbance to nesting snowy plovers. If a particular situation requires USDA-Wildlife Services to enter nesting habitat to remove crows, this action will be carefully coordinated between snowy plover monitors, USDA-Wildlife Services, and the VAFB biologist. However, past experience suggests that this circumstance will likely arise very rarely or not at all.

Although very rare on VAFB, common ravens have been observed in 2001 on snowy plover nesting beaches. Ravens in plover habitat will be controlled in the same manner as crows.

Other avian predators

VAFB began a program to live-trap raptors and loggerhead shrikes that threatened nesting California least terns *(Sterna antillarum browni)* in 1994. Permission was obtained from the California Department of Fish and Game and USFWS to relocate some captured birds, with the requirement they be monitored post-release. Others are released near their capture site at the end of the nesting season. To date great horned owls, barn owls, American kestrels, northern harriers, and loggerhead shrikes have all been successfully relocated away from least tern nesting habitat, with no evidence of either return of the predator to the capture site, or of adverse impacts to the predator from relocation. The program has been successful in reducing the threat of avian predation on least terns. VAFB proposes to expand this program to protect nesting snowy plovers by selectively live-trapping raptors and shrikes that prey on nesting snowy plovers, their nests or chicks.

Upon determining that an individual predator poses a threat to snowy plovers on VAFB beaches, an effort will be undertaken to trap, band, and relocate the predator as soon as possible.

- The determination will be made by the VAFB Wildlife Biologist upon consultation with the SCPBRG and plover monitors.

- Knowledge of the avian predator's habits will determine the trapping technique to employ.

- The decision to remove a predator must take into account the potential disturbance of the removal activity on nesting plovers relative to the potential threat of the predator. Trapping will be conducted in coordination with plover monitors and the VAFB Wildlife Biologist to avoid disturbance to plovers to the maximum extent practicable. As described elsewhere in this Plan, early identification of "plover-safe" trapping locations will minimize response time once a threat has been identified.

- Trapped birds will be held in a licensed and permitted rehabilitation/holding facility until they can be released back into the wild.

- Relocated birds will be released in an area with suitable habitat at a distance from which they would not be expected to return. The distance will be determined through consultation with the SCPBRG.

Lethal control will only be used when trapping attempts have failed, when there is a continued and immediate direct threat to snowy plovers, their nests or chicks, and when, in consultation with the SCPBRG, VAFB determines that additional live-trapping efforts are not likely to be successful.

- The decision to lethally remove an avian predator will be determined on a case-by-case basis, after taking into consideration the degree of threat, breeding phase of the snowy plovers, feasibility (or lack thereof) of live-trapping options, legal status and rarity of the predator species, and professional knowledge of the situation and species involved. Peregrine falcons, although federally delisted, are still state-listed as Endangered. Only live-capture by qualified and permitted biologists from SCPBRG will be utilized to control peregrine falcons; no lethal removal of this species will occur.

- Lethal removal will only be conducted by authorized USDA-Wildlife Services personnel under the direction of the VAFB Wildlife Biologist.

- Lethal removal will only be done when there are no people present in the area, to avoid any human safety hazard.

All avian predator removal actions will be implemented by authorized personnel from SCPBRG or USDA-Wildlife Services, under the direction of the VAFB Wildlife Biologist.

Avian predators that are captured and relocated will be fitted with USGS bands. In addition, color bands and/or radio-transmitters will be applied when practicable to aid in the identification of the birds after their release. Monitoring of avian predators at the beaches will include efforts to identify individuals with bands and/or transmitters, and to evaluate whether release sites are sufficiently distanced from snowy plover nesting habitat.

These management actions will occur from 1 March 2001 through 30 September 2001, excepting crow control which was initiated in February.

2. MAMMALIAN PREDATORS

Coyote Research on Vandenberg Air Force Base

A 1993 Biological Opinion issued by the USFWS for the Delta II and Taurus launch programs in the Purisima Point area of VAFB mandated actions to address the threat of predation to the endangered California least tern and the snowy plover. In 1998, VAFB re-initiated consultation with the USFWS regarding launches from SLC-2W and 576-E in the Purisima Point area of VAFB. During that consultation, the USFWS expressed interest in seeing VAFB expand its predator studies to encompass snowy plover nesting areas outside Purisima Colony, and expand the scope of the studies to include mammals, particularly coyotes. As a result, VAFB developed a plan aimed at developing and implementing non-lethal, selective, sustainable techniques for reducing predation on least terns and snowy plovers. The USFWS established Term and Condition (1)(a)(vi) in the final 1999 Biological Opinion, which reads: "The Air Force shall expand current predator management activities to include a scientifically defensible study of predator populations in the vicinity of Purisima Point. The Air Force shall develop a predator management plan in coordination with USDA-Wildlife Services to address control measures at the existing Purisima Point colony..."

In December 1999, a multifaceted approach for investigating predators on VAFB was initiated. The objective of the study is to obtain data on the population size, territoriality and stability of coyotes inhabiting coastal areas of VAFB, specifically the vicinity of Purisima Point and the Surf/Ocean Beach area. Coyotes are captured, sexed, checked for overall health, aged and fitted with radio-transmitting collars. To understand how coyotes are using the habitats in those areas, the extent of their travels, and the stability of their territories, radio-telemetry locations are collected on the animals residing near Surf/Ocean Beach.

The results of the first year of coyote research on VAFB demonstrate that coyotes on VAFB generally maintain small, stable, and exclusive home ranges, with very little overlap between territories. For example, home ranges of coyotes in the vicinity of Surf Beach range from 1.1 to 7.9 square kilometers, (mean = 3.0 square kilometers), with core activity areas at Ocean Park and Surf Station beach access points. In addition, a shift observed in coyote activity within one home range appeared to coincide with feeding of wildlife that occurred at a base facility (against VAFB policy). These results indicate that coyotes are attracted to areas of concentrated human activity where food is made available, either intentionally or unintentionally. This situation makes coyotes on VAFB good candidates for further research into non-lethal techniques that endeavor to modify coyote behavior to reduce their presence on snowy plover nesting beaches.

VAFB will continue this research for at least two additional years (2001 and 2002). In addition, an extensive review of scientific literature and consultations with experts on coyote behavior, predation, and management techniques (both lethal and non-lethal), in exploited and non-exploited populations, is ongoing to determine those management actions most likely to reduce predation on snowy plover nests, while maintaining a healthy and stable native faunal community. The goal of these investigations is to develop science based non-lethal management approaches that may be implemented in the future. Such measures may include diversion feeding, aversion techniques, or other actions designed to modify coyote behavior to reduce nest predation, while maintaining stability within the coyote population and the ecosystem at large.

An additional aspect of the coyote research project includes routine small mammal trapping in the vicinity of Surf beach and the Purisima Point tern colony, to assess microtine population trends and determine the strength of the link between predation on listed species and microtine population cycles.

With the results of continued research on the VAFB coastal coyote population, and the projected publication of the Recovery Plan for the Pacific Coast Population of Western Snowy Plovers, VAFB will develop a long-term predator management program in coordination with the USFWS that will address snowy plover productivity, projections for population recovery and sustainable, adaptive management techniques.

Coyote predation control for the 2001 snowy plover nesting season

VAFB proposes to reduce predation by coyotes by implementing the following actions during the 2001 snowy plover nesting season:

- Coyote activity on beaches will be monitored to identify their impact on snowy plover nesting efforts.
    - Night vision video cameras will be strategically placed at suspected coyote access points to attempt to identify individuals frequenting snowy plover nesting beaches as well as potential locations for placement of traps.
    - The biological monitors will report coyote activity at nesting areas and will provide the VAFB Wildlife Biologist with all available information that indicates potential predation by this species. To the extent possible, monitors will attempt to recognize any distinguishing features of coyotes they see in the field, and distinguish between animals using the beach as a travel corridor and those actively foraging in plover habitat.
    - Telemetry data will be collected on collared animals to attempt to identify animals frequenting snowy plover nesting beaches.

- If the biological monitors report the loss of a nest to coyotes, night video recordings and telemetry data collected for the Coyote Research Project will attempt to identify the animal or animals that are foraging in snowy plover nesting areas. Upon identification of the animal or animals, the VAFB Wildlife Biologist will direct USDA-Wildlife Services to remove the animal or animals.

- If the predating coyote has not previously been trapped and fitted with a radio-collar, traps will be placed at the closest beach access points. Any animal trapped while accessing a beach for which documented predation exists, will be lethally removed.

- Lethal removal will only be conducted by authorized USDA-Wildlife Services personnel or 30 SFS/SFOW Fish and Wildlife personnel, at the direction of the VAFB Wildlife Biologist.

- Whenever practical, lethal removal will be done outside of snowy plover nesting habitat to minimize disturbance to nesting birds.

- Lethal removal within snowy plover nesting habitat will only be done when the public is not present in the area, to avoid any human safety hazard.

- Lethal removal within nesting habitat will be accomplished in such a manner that will minimize disturbance to nesting snowy plovers (i.e., silencers will be used to reduce noise impacts; snowy plover biologist escort where warranted).

All coyote predator management actions will be implemented by authorized personnel from USDA-Wildlife Services and/or 30 SFS/SFOW Fish and Wildlife, under the direction of the VAFB Wildlife Biologist. If coyote predation continues at a level above that considered acceptable by VAFB and the USFWS, the management techniques recommended in this plan will be reevaluated and modified, and/or new techniques will be adopted to further reduce coyote presence on snowy plover nesting beaches, within the framework of achieving ecosystem stability and integrity.

Feral pig control in snowy plover nesting habitat

Feral pigs have not been reported in past years as being responsible for the losses of nests. However, their presence in beach areas, especially in North beaches between Shuman Creek and San Antonio Creek, is of increasing concern. Feral pigs could predate eggs and chicks and destroy nests by trampling. The presence of large groups of feral pig on the beaches north of San Antonio Creek was confirmed as recently as October of 2000, and pig tracks have been seen in snowy plover nesting habitat in 2001.

Control of feral pigs in North beaches will be a difficult task due to the remoteness of the beaches and the very limited number of access points to these beaches. VAFB will attempt to identify areas where feral pigs are accessing nesting habitat and will control their presence on snowy plover nesting beaches through the following measures:

- Feral pig activity on beaches will be monitored to identify their impact on snowy plover nesting. The biological monitors will report feral pig activity at nesting areas and will provide the VAFB Wildlife Biologist with all available information that indicates potential losses caused by this species.

- USDA-Wildlife Services personnel will be directed by the VAFB Wildlife Biologist to locate pig trails away from nesting areas, used by pigs to access plover nesting habitat. USDA-Wildlife Services and/or 30 SFS/SFOW personnel will then remove pigs by shooting and/or trapping. Because pigs are an invasive non-native species that does considerable damage to Vandenberg's ecosystem lethal control will be emphasized in an ongoing effort to attempt to avoid any and all pig impacts to nesting plovers.

- Feral pigs that are trapped will be euthanized by 30 SFS/SFOW Fish and Wildlife and/or authorized USDA-Wildlife Services personnel.

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Attachment A

PROTOCOL FOR RETRIEVAL OF MARINE MAMMAL CARCASSES AND STRANDED ANIMALS FROM VAFB BEACHES DURING WESTERN SNOWY PLOVER NESTING SEASON (1 MARCH TO 30 SEPTEMBER)

It is well documented that animal carcasses on the beach are potential attractants for various predators and scavenging avian and mammalian species. To reduce the potential for predation of nests and chicks on beaches during the nesting season, VAFB proposes the removal of carcasses from the beaches in accordance with the protocol described below. In addition, live marine mammals that are injured, orphaned or diseased are observed periodically on the beaches of VAFB. VAFB also proposes the retrieval of these stranded animals in accordance with this same protocol.

- The VAFB Wildlife Biologist will contact the USFWS and National Oceanic and Atmospheric Administration Fisheries Division (NOAA Fisheries) and obtain necessary authorizations to retrieve carcasses and live stranded animals from the beach and dispose and/or transfer them accordingly.

- The biological monitors will inform the VAFB Wildlife Biologist of the presence of any carcass or diseased animal that could result in increased risk to plover nests and/or their chicks.

- In consultation with the monitors, the VAFB Wildlife Biologist will assess the situation and determine whether retrieval of the carcass or animal is feasible and beneficial.

- The VAFB Wildlife Biologist will coordinate with 30 SFS/SFOW Fish and Wildlife personnel to access the beach sector and retrieve the carcass or animal. Beach access will be accomplished in the following manner:

    1. The VAFB Wildlife Biologist, a biological monitor, or other USFWS authorized personnel will accompany the 30 SFS/SFOW personnel to the location of the carcass.

    2. Retrieval of the carcass or animal will be accomplished as speedily as possible but only during low tide, avoiding activity in snowy plover nesting habitat to the maximum extent feasible. Beaches will only be accessed through established access trails. All personnel will travel below the high tide mark to minimize disturbance to adult plovers and their chicks. If the size of the carcass or animal so requires, all-terrain-vehicles (ATVs) driven by 30 SFS/SFOW personnel will be used. ATVs will not exceed 10 mph and the VAFB Wildlife Biologist, biological monitor or USFWS authorized personnel will monitor for presence of adult plovers, chicks and nests ahead of the ATV at all times.

- Retrieved carcasses will be disposed of as indicated by the USFWS or NOAA Fisheries. If burial of carcasses is indicated, this activity will occur at least one-half mile inland of nesting

habitat to avoid attracting local resident scavengers and predators to the vicinity of the habitat. (Note: Carcasses to be disposed of in the vicinity of Minuteman and Shuman beaches, will be taken east of Point Sal Road to avoid all potential nesting habitat.)

- Retrieved live stranded animals will be transferred to an authorized facility for treatment.

- Live and dead strandings of pinnipeds and cetaceans will be documented and reported in accordance with NOAA Fisheries protocols for the Marine Mammal Stranding Network. Live and dead strandings of sea otters will be reported to the USFWS and California Department of Fish and Game (CDFG) and turned over to appropriate personnel per USFWS and CDFG direction.