Pine Mountain Lake Association

Canada Geese Management Plan

September 2022

Canada Geese on dam spillway, spring 2020

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1 Introduction

Canada geese can over-populate communities such as Pine Mountain Lake Association (PMLA), leading to significant staff time to remove their feces and feathers from swimming beaches yet still contributing high loads of coliform bacteria in the swimming areas. Geese are attracted especially to nitrogen-fertilized lawns (including the golf course), and can be significant sources of nutrients to lakes.

This plan is intended to control the goose population pressure at Pine Mountain Lake Association (PMLA) to preserve the health and quality of PMLA facilities. This section summarizes the issues with geese in the PMLA community. A set of frequently-asked questions and answers is provided in **Appendix A**.

This section attributes the contributors to the plan's development, then describes the geese characteristics, concerns and legal constraints to managing them. The remainder of this document characterizes PMLA's geese management activities and provides information on both their costs and benefits. The types of activities are outreach, prevention, deterrent and hunting. Most successful goose management programs incorporate multiple methods, many of which already have been tried and found unsuccessful at PMLA.

1.1 Plan Contributors

This plan was developed by Dr. Stephen McCord, President of McCord Environmental in Davis, California. He is a registered Professional Engineer in the State of California and a Certified Lake Manager with the North American Lake Management Society. He has served as PMLA's Lake Manager since early 2019.

Staff who contributed content to this Plan and are responsible for implementing the measures described included: Joe Powell (General Manager), Michelle Cathey (Recreation & Seasonal Operations Manager), Rick Laffranchi (Maintenance & Operations Manager), and Rob Abbott (Golf Course Superintendent).

This plan has also been reviewed and commented on by the following helpful state and federal wildlife management agency staff:

- Caroline Brady, Wildlife Biologist at CA Dept. Fish & Wildlife; (916) 767-9306; Caroline.Brady@Wildlife.ca.gov.
- Brian Popper, Central District Supervisor at USDA APHIS WS – California; 5151 Pentecost Dr., Suite H, Modesto, Ca 95361; (209) 579-2891 Office; email Brian.J.Popper@usda.gov.

PMLA members also contributed to this plan through comments at board of director meetings and a town hall meeting in August 2022.

1.2 The Canada Goose Lifestyle

Canada geese are generally migratory—recognized for their large, aesthetically pleasing, V-shaped, honking flocks as they migrate south in fall and north in spring. Migrations can span up to 3,000 miles, flying up to 1,500 miles in a single day. They migrate to return to the area where they were born for mating and nesting. Western Canada geese historically bred in Northeastern

California and wintered in the valley. In addition, northern migrants from Alaska and Canada spent winter in northern California.

But these days, Canada geese are often found in parks, golf courses, lakes, ponds, and well-manicured and fertilized lawns throughout California and throughout the year. Geese are commonly found on the grass lawns at PMLA's community beaches (**Figure 1**). Geese residing in PMLA in summer have not followed the natural pattern of migrating north for summer.

As the largest geese in the world, they typically eat aquatic plants and grains, and occasionally eat fish and insects. They mostly eat grasses, so manicured lawns are attractive. Geese provide ecological services such as dispersing insects and seeds, feeding predators, and recycling nutrients. But in many areas their disservices outweigh their services (Buij et al., 2017).

Figure 1. Canada Geese grazing the lawn at the Marina swim area, spring 2022.

Geese nests are nearly always near open water but concealed and protected: islands; in shoreline vegetation; at the base of mature trees; under shrubs; in flower boxes and landscaping; and on roofs. They lay 4-10 eggs together in spring that mature in about four weeks. Goslings can swim a day after they hatch, and can fly after a couple of months, but tend to stay with their parents for their first year. In early summer each year, adult geese "molt"—replacing damaged or lost flight feathers all at once, and so are flightless for about six weeks while they grow their new flight feathers.

The life span of a Canada goose is typically 10-25 years. They start breeding after only three years, and pairs usually stay together for life. There are about 50,000 geese in California and 5 million geese in North America. Hunting is allowed as most goose populations can sustain regulated hunting. Their natural predators (such as fox, coyote, raccoons, owls, bears, and eagles), on the other hand, have generally decreased in populated areas which, in contrast, welcome geese.

1.3 Canada Geese Concerns

As a social migratory bird, Canada geese are a ubiquitous problem in many urban and suburban waterbodies of all sizes, throughout North America. Geese invade golf courses, lakes, ponds and many well-manicured, nitrogen-fertilized lawns. They defecate about a pound of feces per adult per day[1] and shed feathers on the shores, docks, boats, structures and swimming areas.

Within the PMLA community, geese are most commonly found in the areas identified in **Figure 2**. The total numbers of geese residing in the PMLA community are about 150-300, lower in winter and higher in summer.

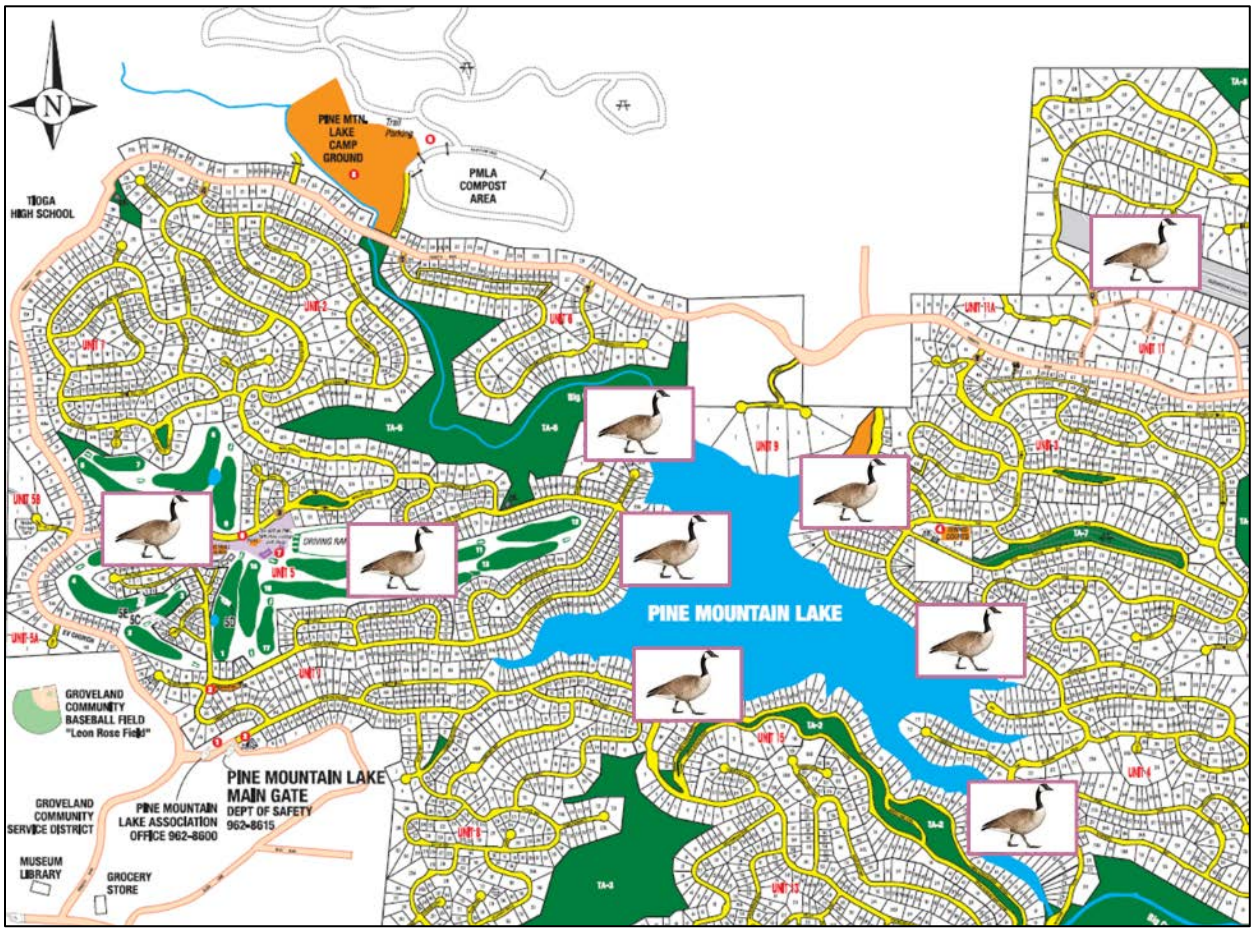

Figure 2. Map of Pine Mountain Lake community. Goose images indicate locations where geese are often problematic.

Geese are problematic because they are both a nuisance and a hazard in multiple ways:

- Feces and feathers accumulate quickly and are a significant burden for staff to clean up after (**Figure 3**).

[1] The actual amount seems to be uncertain. Kear (1963) estimated about half a pound per day; online articles often state two pounds per day without references.

- Pathogenic micro-organisms are associated with fecal waste and can cause a variety of illnesses (such as stomach flu, ear/nose/throat infections and skin rashes) and diseases (such as typhoid, cholera and hepatitis) through the ingestion of contaminated water. E. coli O157:H7 and Shigella spp. pathogens are commonly associated with animal feces. Geese could carry and transmit avian influenza (otherwise known as bird flu) to other birds and humans.
- Additional nutrients in deposited feces can produce higher concentrations of algae in lake water and more dense stands of aquatic weeds around docks and along the shoreline.
- They can be aggressive towards people to keep them away from nests, startle them to relinquish food, or simply use a common area.
- They forage on cultivated plants, and in general their foraging on plants can increase soil erosion.
- They risk colliding with vehicles on the roads and airplanes in the sky.
- Feeding young geese processed grains (such as sandwich bread) can cause a deformity called "Angel Wing".

Figure 3. Geese feces on a marina dock, spring 2021.

More intensive geese management is warranted when Canada geese damage golf courses and community parks; reduce water quality; and endanger human life at beaches, roads and airports. Key thresholds that drive more intense activity and more drastic measures include:

- Workers spend over 4,000 hours during peak season (May-October) cleaning up geese feces and feathers.
- Pathogen indicator exceedances trigger beach closures.
- Community members (including beach users, golfers, airplane pilots and boat operators) regularly complain about geese.

Several PMLA staff are assigned every morning throughout the summer season to pick up geese feces and sweep up their feathers. The additional cost in terms of reduced use to beach users is difficult to quantify, but complaints to staff are regular and heated throughout the summer. The beaches were closed for several weeks in summer 2020 after staff found high pathogen indicator concentrations in swimming area waters.

1.4 Legal Considerations

Canada geese are migratory birds protected by federal and state law. The Migratory Bird Treaty Act of 1918 prohibits the "taking" of migratory birds and their nests and eggs except during established hunting seasons. According to the California Code of Regulations Title 14, Section 502, the regular hunting season for Canada geese runs from late October to late January (dates vary slightly each year) and the maximum daily bag limit is 10 geese.

Per Title 14, Section 503, a registered permit holder can now oil eggs at any time of year necessary to resolve or prevent injury to people, property, agricultural crops, or other interests.

2 Community Outreach

The purpose of community outreach for geese management is to enlist members to support (and not counteract) staff activities through education and appreciation for the situation. Multiple tools and methods are needed to impact a significant portion of the target population.

2.1 Key Outreach Messages

The following key messages are considered for most outreach activities:

- **Do not feed the geese.** Geese are wild animals and can fend for themselves, eating what is naturally available. People feeding geese are encouraging geese to frequent those areas.
- **Avoid contact with geese feces**. Wash hands, clothes and equipment immediately after exposure. Keep small children, pregnant women and immune-compromised individuals away from these areas.
- **Communicate to Association staff**. Alerting staff about problematic wildlife allows them to address wildlife conflicts more quickly. Staff working under a state permit can coat eggs with corn oil so the eggs will not hatch.

2.2 Community Forums

There are three primary means for community members to engage in geese management decisions and activities:

- This plan and any major changes to it are to be endorsed by the Homeowners Association Board. The issues and activities described in this plan are presented to the Board.
- Community members can learn about, discuss, and comment on geese management activities in Town Hall meetings. Directors, staff and external experts participate to explain activities and receive public input.
- Community members are surveyed every three years in April. A question on concerns about geese is included.

2.3 Written Material

Many residents can be educated and communicated directly to through written materials. To educate visitors about the problems caused by the over-population of geese and the effect of illegally feeding them, primary outlets include:

- **Newspaper Articles**—Half-page articles are typically written once during peak lake use season.
- **Social Media**—PMLA's Facebook pages (www.facebook.com/PineMountainLakeCA and www.facebook.com/groups/pinemountainlake)
- **Direct Emails**—Staff distribute announcements about the use of its amenities via its eSNAP listserv (https://mailchi.mp/0d84ade4495e/pinemountainlakeamenities)
- **Flyers and Handouts**—Provided at the main gate, equestrian center, golf course and Marina

2.4 Posted Signs

Feeding waterfowl encourages them to congregate in an area and may make geese more aggressive towards people. Feeding young geese processed grains (i.e., bread) can cause a deformity called "Angel Wing". Thus, reducing food handouts may help make an area less attractive to geese, ducks, and other birds, as well as protect the geese.

PMLA posts signs at all lake access facilities. The key message, consistent with those described in section 2.1, is to not feed geese or other wildlife (**Figure 4**). Warning signs are posted when the beach areas are closed because of pathogen indicator exceedances.

Figure 4. Signs posted at prominent at PMLA lake facilities.

The signs are regularly ignored. Members and guests continue to feed the geese and other wildlife.

2.5 Past Outreach Experiences

In 2010 PMLA formed a Waterfowl Management Committee of volunteer members to work on ways to control the resident Canada geese population in PML. Committee members identified many ideas on how to reduce the geese population, helped the PMLA limnologist and staff oil and addle eggs, and tracked geese numbers by location. These efforts did not last, however, as years went by with no real success, which led to disappointment and apathy. Committee members stopped attending meetings.

3 Prevention

Prevention means keeping geese from residing and proliferating in the area.

3.1 Clean Grounds

Geese flock to areas where they can safely eat near water, and return to places where they hatched or had successful nesting, even with deterrents there. Staff constantly remove geese droppings and nesting materials from the beach areas.

Activities include:

- ⇨ Throughout the swimming area use period, ground crews spend dozens of worker-hours per week removing geese feathers and feces.
- ⇨ Lakeshore landowners are encouraged to regularly clean areas used by geese by sweeping up feces into containers and placing them in gardens rather than swept into the lake.

3.2 Oil Eggs

Removing or destroying eggs will not control geese populations because geese will often lay a new clutch of eggs. An effective strategy can be to coat geese nest eggs with corn oil to halt development. This measure was attempted (under permit) in spring 2020-2022, but few nests were found around the lake shoreline. Previous oiling efforts were reportedly somewhat more successful. The optimal period for seeking eggs to treat is typically late March to early April.

Success in locating nests with eggs may require cooperation (and possible permission) from property owners around the lake. Workers need help finding breeding pairs and their nests. It is important to know when all the eggs are laid and the actual incubation begins. Eggs are laid over a period of several days, but the female usually doesn't start incubating until all eggs are laid. Eggs can be coated with corn oil, which prevents gas exchange across the shell and thereby prevents the development of an embryo.

Useful gear for egg oiling work includes: oil spray bottle, marker pen for coated eggs, disposable gloves, and sturdy umbrella to protect from angry geese while working on nests.

Activities include:

- ⇨ The PMLA Lake Manager obtains an egg oiling permit. Oiling must be done under a CA Dept. Fish & Wildlife permit, which can be obtained annually by requesting a permit renewal by letter/email to Caroline Brady.
- ⇨ PMLA staff help locate eggs around the lake and throughout the community in March-May. Those helping in location of breeding pairs and nests need to watch for geese that show aggressive behavior toward other birds, or a male goose standing guard around a nest site.
- ⇨ Apply only 100% corn oil to nest eggs. Staff can also oil under the same permit as long as they are "supervised" by the named permittee.
- ⇨ The PMLA Lake Manager maps nest sites for monitoring purposes.
- ⇨ The PMLA Lake Manager completes a wildlife incident report (https://apps.wildlife.ca.gov/wir/incident/create) to track human-wildlife conflicts and report numbers of nests found and eggs oiled.

Egg oiling and addling was seen to be reducing or at least stabilizing the Canada geese population in PML. However, over time the geese have become wary and adapted by hiding nests on private property around the lake and other secluded areas. For various reasons, some property owners have refused to allow staff to enter their property to treat eggs.

Elsewhere, piercing eggs has been found to be more successful than oiling them. If oiling is found to be only partially successful, piercing should be considered and requested for permitting.

The permit for oiling (or piercing) eggs is given with the condition that preventative and deterrent activities are conducted and found to be incapable of controlling the geese population.

3.3 Modify Physical Landscaping / Habitat

While the main features attracting Canada geese to PMLA are the golf course and lake, some landscaping can be done on surrounding properties to discourage geese use. Three modifications are implemented, where feasible:

- ⇨ Allow lawns used by geese to grow taller (around 6 inches), do not fertilize or water to make it less attractive to geese. Geese are especially attracted to lawns that are heavily fertilized, watered, and mowed. This practice is infeasible on the swim area lawns and around the golf course.
- ⇨ Develop buffer strips of plants and trees between the lake or pond edge and the grass to discourage access. Geese do not like to nest in or walk through tall grasses, plants, or shrubs. They also prefer open areas to watch for predators. Such buffer strips should be encouraged anyway to minimize runoff of nutrient-rich waters into the lake. Buffer strips of grass and American Bullrush around both ponds on the golf course did not deter the geese in any way as they flew over or pushed through the grass.
- ⇨ In winter and early spring, trim or remove concealing ground cover around the water's edge to deter geese from nesting there. Geese choose covered, concealed foliage for their nesting spots to protect their eggs.
- ⇨ Plant Latitude 36 hybrid Bermuda turf. This variety is extremely tolerant to the traffic and heat stress seen at the Marina and requires less water through the summer. In the past, geese have grazed turf on the Marina lawn to less than half inch in height, causing even more stress. Latitude 36 grows well when short (less than half inch). The lawn has a dark green color during the warm season and goes dormant (brown) to discourage use during the cold season. Need to replace very five years.

3.4 Alternative Preventative Measures Attempted or Rejected

These measures have been considered (and some attempted), but are considered impractical.

3.4.1 Fencing

Marina staff has deployed orange plastic fencing from one end of the Marina to the other every evening and then remove it in the morning during opening. The geese would fly in and around it and walk or swim around it to get to the lawn area to feed after the staff went home. Thus, the fences were largely ineffective.

Golf Maintenance installed taut perimeter wire 6 inches off the ground around the golf course ponds to keep geese from accessing the water. The ponds are areas of safety for the geese and they feel comfortable feeding there. The geese flew over the wires onto the ponds. The installation of

the wire fencing was very labor intensive and did not work. Putting grid wires over the ponds would be more effective at keeping geese off the ponds; however, such measures would be time consuming to set up and maintain.

3.4.2 Vasectomize / Sterilize

Adult male geese could be captured in summer, surgically vasectomized, and then returned to the wild. No studies have been found that evaluated the efficacy or cost of vasectomization as a population control method, but in this case with hundreds of geese it would likely be expensive and ineffective. While this practice may be physically possible, PMLA would have to obtain individual approval (via a permit) from the State.

Around 2012, PMLA deployed automatic feeding units in areas where geese normally congregate. First, the units served regular grain to attract the geese and then sterilizing pellets were served. The geese never got used to the units, as the natural grass feed was plentiful. In contrast, deer did consume the pellets.

A program of hand-feeding sterilizing pellets to geese could be developed, but would likely require specialized training and monitoring/oversight to ensure uneaten pellets were not consumed by non-target animals or washed into the lake. Regardless of the feeding method, sterilization chemicals are short-lived and so must be used consistently and comprehensively for multiple years.

4 Deterrents

Because the geese have proliferated despite preventative measures, non-lethal removal measures are needed. Some of the many physical, visual, and noise-producing deterrents and repellants employed at PMLA are described here, with pros and cons listed for each. In general, geese adapt to hazing within about days. Most wildlife require 2-3 weeks of consistent hazing to modify their behavior.

4.1 Physical Deterrents

Physical deterrents are meant to physically prevent or force the movement of geese, as a way to discourage their use of certain areas.

Pros	Cons
• Encourages geese to nest in specific areas • Addresses instinct to return to nesting/feeding areas	• Too many sites within PMLA community • Barriers also inhibit legitimate users • Costs for materials, setup and maintenance

Along the lake shoreline, many dock owners have installed physical deterrents such as shown in **Figure 5**. Docks with deterrents seem to have much less feces than docks without such devices.

Figure 5. An exemplary lake dock with geese deterrent metal "spiders".

4.2 Proactive Harassment

It is legal to harass geese without a permit as long as they are not injured, touched or handled by a person or trained animal. It is most effective when practiced heavily for 1-2 weeks, then less frequent harassing should suffice. At night, high-power lights can scare geese off lawns or water.

Harassment needs to be done at least once in the morning and once around sunset, or any time of day when geese are seen at the site. Use should be irregular/random so that geese will not become accustomed to a schedule. If practiced in spring as geese are seeking nesting sites, they may migrate elsewhere for the year.

Pros	Cons
• Effectively scare off geese without geese getting acclimated • Encourages geese to nest elsewhere	• Too many sites within PMLA community • Must be operated/managed and tended • Limited times of use

Specific experiences are documented below in section 5.4.

In the future, PMLA may consider:

- Foxlights Night Predator Deterrent (or similar), which emits strong, random, multi-colored LED lights during darkness. Such lights would need to cover many use areas concurrently and be directed away from homes. Replacements would be needed to overcome theft and damage. Staff time would be needed to place, reset and replace lights.

4.3 Chemical Deterrents

Liquid chemical deterrents can be used against Canada geese. The compound methyl anthranilate, used in most goose and bird repellants, is an EPA-registered bird repellant and is also approved by the FDA. Formed from grape extract, methyl anthranilate creates an undesirable taste for geese when it is sprayed over the grass and lawns. The chemical irritates geese and will ideally cause them to leave for better feeding grounds. Many products contain a colorant that is only visible to geese, motivating them to leave if they even see it.

Pros	Cons
• Nonhazardous, non-toxic • Does not harm wildlife • Safe for application on lawns and will not harm vegetation	• Majority of reviews limited to individual households/ lawns—uncertain effectiveness over large areas. • Need sprayers or foggers to apply • Would need to reapply to irrigated areas • May influence behavior of other wildlife • Possibly upsets geese constitution

Most methyl anthranilate-based deterrents are $75 to $80 for a half-gallon or $130 to $160 for one gallon. A gallon of product covers 16,000 square feet of ground. The marina area is on the order of 160,000 square feet; thus, 10 gallons would be needed per application ($1,300-$1,400 per

application). Because it can be washed away by rain or irrigation water, multiple applications are needed on grassy areas.

Experience: Around 2012, PMLA Maintenance purchased a liquid deterrent that is sprayed on lawns and turf. The manufacturer reports that the geese can see the spray as it is visible in their spectrum and that the taste causes them to stop eating the grass. However, geese continued to eat the sprayed grass. It did give them diarrhea which was even harder to clean up. In 2022, PMLA sprayed several gallons of Avian Migrate® with an ultraviolet dye that the geese can see at Dunn Court and a small area at the Marina. Staff observed the geese continue to eat the treated grass with no effect.

4.4 Alternative Deterrent Measures Attempted or Rejected

The measures described in this section have been implemented at PMLA but were found to be ineffective for the reasons noted.

4.4.1 Capture and Relocate

Geese can be trapped in cages one at a time or corralled with the aid of herding dogs. The work effort is typically inefficient, because setting up a containment area alerts the geese, automatic traps capture only one at a time, and the geese can often avoid capture by flying away. All the while, they will honk with distress to alert other geese away.

Captured geese could then be relocated, but there are no open spaces that welcome geese. And their homing instincts would lead them back to the area anyway. Instead, captured geese could be rendered into edible meat. However, there is no known recipient for goose meat, the meat could not be sold, and costs for processing in an approved facility could be a significant additional expense. Approval would have to be obtained from US Fish & Wildlife Service.

This method may be effective with feral domestic geese, but appears impractical (even if allowed) for PMLA.

4.4.2 Chasing

Several methods for chasing off Canada geese have been attempted at PMLA, including:

- PMLA owns a radio-controlled Goosinator (www.goosinator.com) made of stiff foam, painted bright fluorescent orange and black, and shaped like a wolf. They are amphibious, skidding across grass and water driven by a propeller. These units are expensive (over $3,000) and require someone working to operate them. A key challenge is operating one unit over varied terrain (parking area, lawn, beach, and swim area). We used the unit at the Marina. As of 2022, the unit was in disrepair. A replacement Goosinator was ordered in 2022.
- Golf Maintenance staff outfitted a heavy-duty, fast radio-controlled car with a foxtail and used it to chase geese. At first the unit startled the geese and they flew off. Over time they got used to it and only flew a short distance away and continued to feed on the course turf.
- Golf Maintenance staff tried chasing geese with regular golf carts.
- Golf Maintenance used a radio-controlled boat to chase geese of the ponds on holes #1 and #9.

- A green laser pointer tested on the Golf Course was reportedly successful, but staff are generally not available outside of daytime work hours.
- An aerial drone could be deployed to chase geese off community areas and the golf course. Pilots would need to be licensed and any such activity would need to comply with the Federal Aviation Administration's Small Unmanned Aircraft Systems Rule (Part 107).

4.4.3 Trained Dogs Handled by Volunteers

Dogs used to chase geese have been attempted in the past (2014-2017) with some success but substantial controversy.

The Waterfowl Management Committee identified using well-trained border collies as a way to chase and haze geese. They met with a dog trainer who specialized in border collie geese hazing to learn the basics of hazing. PMLA initiated a volunteer dog hazing program in which volunteers took a short course (with their dog) and then were issued vests (for the volunteers and their dogs). None of the member-owned dogs were actually border collies. Volunteers committed to a patrol schedule covering the Golf Course and areas around the lake. Members were instructed to keep their dog on a leash for control and safety.

Some members apparently signed up for the program with minimal interest in hazing geese; rather, they were able to take their dog into areas that were normally off-limits while ignoring the leash law and training provided. Volunteers were found playing catch with their dogs, and there were conflicts between the dogs and children in the swim areas. Owners did not consistently pick up their dogs' feces on the lawns at Dunn Court and the Marina. The dogs also urinated on the trees, lawns and other areas where other members with children played.

The dog program was suspended after an incident on the Golf Course in which a member of the dog patrol allowed their German Sheppard to chase deer from the Golf Course and through neighboring properties. The dog knocked over and damaged items and attacked a small dog in its yard. The deer was almost hit by a passing vehicle. The incident was reported to the California Department of Fish and Wildlife and the enforcement officer pointed out that it is illegal to allow a dog to chase after (versus chase off) wildlife.

4.4.4 Trained Dogs Handled by Professionals

Companies (such as Dog & Whistle Goose Control) provide professional handlers directing trained Border Collie dogs to safely harass geese away from an area. The primary constraint would be covering so many geese use areas concurrently. Otherwise, geese will simply move onto the 180-acre lake, or fly out of reach to any of the many other use areas along the 5-mile lakeshore and 70-acre golf course when harassed.

Alternatively, assigning trained dogs to multiple PMLA maintenance staff would need to purchase several trained dogs, train staff, provide full-time animal care, and deal with handler-dog attachment issues. Training one dog costs about $5,000 and requires someone to house and transport the dog to harassment sites. Multiple dogs would need to be trained to cover the multiple geese use areas and periods of their daily cycle.

4.4.5 Trained Falcons

Trained falcons are used in some settings to provide nuisance bird abatement services. Unfortunately, the distance from the one facility identified (West Coast Falconry; www.westcoast-falconry.com) is about 3.5 hours one way and they confirmed that raptors will not create much of a disturbance with Canada geese, which are larger than hawks and falcons.

4.4.6 Live Swans

The Association purchased and introduced two live swans at the Lake. The intent was that these territorial waterfowl would chase the geese away from areas. Over time, we have increased the number of swans.

While the swans can be aggressive and attack some geese during nesting season or when they are competing for food, they are ineffective in reducing the resident geese population. Community members hand-feed the swans leading to aggressive behavior towards humans as the expectation is that they will be fed.

4.4.7 Predator Decoys

Predator decoys (coyote, dog and owl) have been placed on the Marina lawn and elsewhere to deter geese. In 2022, staff placed a floating alligator head (with reflective red eyes) at the Golf Course ponds on #1 and #9 but geese still congregated in these areas to feed. Staff also deployed inflatable round ball "owl eyes" at the Marina along with two more coyote decoys. Golf Maintenance deployed two dog silhouettes at one of their ponds. Staff moved them around and mounted them so that they would move in the wind. This measure is inexpensive (less than $100 per decoy), easy to set up, and safe.

Staff observed no changes in geese behavior due to the decoys. Reasons why such decoys have not worked include:

- The decoys need to be moved almost daily to stay realistic, as geese quickly lose fear of stationary decoys.
- Geese still eventually learn to recognize decoys and stop avoiding them.
- The decoys are portable and have been stolen and vandalized.

4.4.8 Light/Flash Deterrents

Light/flash deterrents have been developed that use powerful LED lights to scare off Canada geese. These products typically range from $300 to $500 per unit.

Pros	Cons
• Low energy (solar powered) • Low maintenance (reportedly long-lasting and well-reviewed) • Does not affect people (flashes are at eye-level of geese and untroubling to human eye) • Humane and eco-friendly • Deters geese within 100-yard radius • Available in water, residential, and industrial models	• Need many units to effectively deter geese away from an area • Geese become accustomed and return • Portable—can be stolen

Several experiences at PMLA indicate limited effectiveness:

- Staff evaluated the use of "Away with Geese" LED lights at the Golf Course ponds and lawn areas. Lights would not be effective as the geese do not rest at the ponds at night. Instead, they overnight on open water at the Lake and in other areas. The lights are expensive ($400 plus) and subject to theft and/or vandalism.
- Bird-X Scare-Eye bird repellent predator eye balloons have been placed in areas frequented by geese. The geese ignored them even though we moved them around and mounted them so that they would move in the wind.
- Windmill geese deterrent units reported to scare geese as they moved with the wind have been deployed]. The geese ignored them and continued feeding in the area.

4.4.9 Audio Deterrents

Audio devices play loud auditory signals to startle geese. These products use recorded audio of destressed goose calls or predator noises to deter geese. Authentic goose screams and cries indicate danger, causing geese to leave the area.

Another option used is bird-scaring pyrotechnics (i.e., fireworks). Pyrotechnic shots discharged from a plastic launch pistol can scare off geese. The shooter aims for an area with a group of geese. The projectile is launched and then explodes near the geese or emits a whistling sound with sparklers. While effective on agricultural landscapes, there are obvious downsides of using fireworks in PMLA such as startling neighbors, starting fires, and harming workers. The geese got used to them while PMLA members who lived nearby did not—the sounds at sunrise and sunset were like guns or bombs.

Pros	Cons
• Environmentally friendly and humane • Can be programmed to also have coyote barks or gunshot sounds • Both outlet and solar-powered options • Effective up to 1.5 acres, or 4-6 acres by pairing units	• Difficult to set up on beaches • Portable—prone to theft • Nuisance for people using area or in nearby homes

These products typically cost $250 to $400. Links to some options are:

- https://www.globalindustrial.com/p/janitorial-maintenance/pest-control/bird-control/bird-x-goosebuster-pro-single-sonic-goose-repellent-system-gb?infoParam.campaignId=T9F&utm_source=google&utm_medium=organic&utm_campaign=shopping_feed&utm_content=free_google_shopping_clicks
- https://www.gardenfun.com/goosebuster-pro.html

Recent experiences include:

- Staff have tried bird bangers and bird sparkler shots at both the Marina and Golf Course. The sounds made by these projectiles when they explode are like gunshots. These shots startled and annoyed members at neighboring properties and at the amenities, especially when used in early morning or at dusk when the geese were feeding. When used during the day, they startled and frightened members on both the Golf Course and the Marina even with proactive announcements about the practice. Regardless, these tools became ineffective as the geese became accustomed to them and simply flew or waddled a short distance away to continue feeding.
- Golf Course maintenance staff purchased an audio system that emitted goose predator calls and deployed it around the pond on the #9 fairway. The audio predator calls had little to no effect on the geese. The geese quickly became accustomed to and ignored the audio deterrent.
- A Bird-X audible deterrent installed in 2022 did not scare off or deter geese from foraging on the Marina lawn. It just scared and annoyed members, guests and employees.

5 Hunting

Hunting is an effective method for limiting geese populations where sufficient open space exists for the safe discharge of shotguns. Hunting can impact the overall Canada geese population quickly, safely and inexpensively. Nonetheless, effort may need to continue for up to four years to break the cycle of geese born at the lake returning to nest (geese do not begin to lay eggs until age 4. Two options are available, which can be implemented complimentarily as they each have unique constraints.

For any type of hunting to proceed in the community, PMLA needs to amend its policy (**Appendix B**) that states that the community is a private wildlife refuge, to allow invited hunting as needed to help manage nuisance populations of residence wildlife.

5.1 Facilitate Guided, Licensed Hunters

Licensed, professional hunting guides have business licenses, insurance, and a guide license. The guide would organize and oversee a small crew of licensed hunters. PMLA does not need a permit to allow hunting on its property. Such hunting is legal as long as: (1) all hunters have current licenses and follow their conditions, (2) PMLA does not pay the hunters, and (3) PMLA is not guiding the hunters (versus simply allow them to hunt in certain areas of the community at certain times). The California Code of Regulations §502, Title 14 (Waterfowl, Migratory) stipulates current allowance for hunting periods and bag limits, by region.

Hunters would still need to hunt within the waterfowl hunting season. There is an early season in September where only Canada geese can be taken (developed specifically to deal with resident Canada geese, which are problematic statewide). The general waterfowl hunting season (late October through late January) is also open for Canada geese. The "bag limit" (number of birds harvested) in the Balance of State Zone for Canada geese is 10 per day per hunter. A guided hunter group could quickly remove on the order of 100 adult birds (4-6 hunters working 1-2 days), assuming the geese are found in huntable areas.

The hunting process should proceed as follows:

- PMLA [Maintenance Manager and Golf Course Superintendent] schedule a conference call with knowledgeable staff and a site visit for the guide to identify the optimal days, times of day and locations for hunting. Provide at least two weeks lead time of when they could hunt
- PMLA [General Manager and Recreation Manager] outreach to the community about the planned, approved activity (but for security not the *exact* locations or times) and set up physical controls to prevent accidental shootings (such as closing the golf course). See FAQ in **Appendix A** and the sample message below.
- PMLA [General Manager] sign permission statement and hunting guide sign liability waiver.
- Guide organize and lead a team of 4-7 licensed hunters, who can each legally "bag" up to 10 geese per day.
- Guided hunters take away all shot geese for rendering (not disposal) and personal use (not for sale).

There is no need to report the hunting activity external to PMLA. Hunting will not be the primary means of control. Active hazing, harassment or other non-lethal techniques will continue in conjunction with any lethal hunting of migratory birds. Hunting may need to be repeated every 1-5 years depending on success of other measures and geese migration patterns.

5.2 Obtain a Depredation Permit

As a slight alternative to guided hunting, PMLA could seek to be authorized itself to lethally remove enough Canada geese to prevent landscape damage and public safety hazards. PMLA can apply for a depredation (a.k.a. removal) permit for adult and young geese as described in **Appendix C**. A depredation permit authorizes "take" of birds protected under the Migratory Bird Treaty Act. The permit would be given with the condition that preventative and deterrent activities are conducted and found to be incapable of controlling the geese population.

Advantages of this option are that PMLA maintains complete control of the depredation and could be given more flexibility in how the geese are taken (numbers of geese taken per day and in what season). *Disadvantages* include (potentially) years to obtain and comply with the permit, and complete responsibility (and expense) for the hunting operation. Such a permit would likely include significant constraints and restrictions (including disallowing oiling eggs), and it may not allow take of enough of the population to make a real impact.

6 Monitoring

As the adage goes, you can only manage what you can measure. The intent of PMLA's geese monitoring activities is to base decisions on monitoring data and scientific understanding. Canada geese-related monitoring activities fall into three categories.

6.1 Pathogen Indicator Monitoring

PMLA implements a pathogen indicator monitoring program, consisting of these key tasks:

- ⇨ Sample weekly from May to October at the Marina and Lake Lodge swimming areas.
- ⇨ Analyze samples for total coliform, fecal coliform, and E. Coli per SM 9221.

PMLA follows a Standard Operating Procedures "Lake Water Sampling & Analyses for Pathogen Indicators" that identifies who samples for what, where and how. A progressive response protocol identifies thresholds that, if exceeded, trigger enhanced monitoring, notices and, if warranted, beach closures.

6.2 Pathogen Monitoring

PMLA samples geese feces on two occasions during the summer period and tests *qualitatively* to screen for the presence of Escherichia coli O157:H7 and Shiga Toxin Producing E. coli (STEC; also known as Shigella spp). Pathogens using an FDA-approved immune-assay. Samples are collected from one beach (Marina or Dunn Ct.) and the golf course (such as the pond by the corp yard), as demonstrated in **Figure 6**.

Figure 6. Geese feces sampling with protective gloves into a sealed plastic bag for delivery.

Samples are analyzed at a commercial lab[2], which performs such analyses for about $110 per sample (plus shipping). Presence of pathogens would trigger a community-wide notice, enhanced deterrent activities, and more hunting effort.

6.3 Monitoring Geese Control Activities

PMLA implements a geese tracking program with the following components:

- ⇨ Visually survey the PMLA community monthly and record the actual number of Canada geese by location (i.e., each swimming area, golf course, etc.).
- ⇨ Track frequency of non-lethal methods implemented weekly (i.e., effort for each method used such as number of worker-hours spent to cleanup and harass, number of nests/eggs located and oiled, number of lasers operated, number of decoys placed, length of shoreline maintained, number and dates of articles published, number and locations of signs posted).
- ⇨ Estimate monthly PMLA costs incurred to manage geese over-population.

[2] FSNS (http://www.fsns.com/services/microbiology-testing) or similar.

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Appendix A

Frequently Asked Questions about

Resident Canada Geese Management in PMLA

This set of Frequently Asked Questions (& Answers) addresses the more common questions about geese and their management in the PMLA community.

We have goose poop all over our dock and yard. Can I just sweep and wash it into the lake?

Please DO NOT sweep and/or wash goose poop off of docks and into the lake. The primary health hazard associated with geese is their large quantity of poop (around 1 lb./day/bird). We recommend that you scoop up poop into bags and dispose of it in your garbage or in compost. Please be careful in handling the poop, which may contain pathogens.

My dog likes to eat goose poop. Will eating goose poop hurt my dog?

Goose poop may contain pathogens harmful to your pets. You should consult a veterinarian should your dog become ill after eating goose poop.

How do we know the beach closures are caused by geese?

Geese feces have been found elsewhere to contain harmful strains of *E. Coli* (STEC 0157; Shigella spp) which can cause a variety of illnesses (such as stomach flu, ear/nose/throat infections, skin rashes) and diseases (such as typhoid, cholera and hepatitis). Although our limited monitoring of feces has not detected these pathogens, large quantities of feces remains a health risk.

We test swimming area waters weekly throughout the summer season for pathogen indicators (total coliform, fecal coliform, and *E. coli*). Beach closers were implemented in summer 2020 due to high concentrations of these indicators about county health department guidelines for swimming exposure. We will continue to monitor indicator bacteria concentrations at the beaches to confirm that they decline since we have begun to control the geese population.

Why can't you just oil the eggs of the geese and use other non-lethal means such as dogs, hazing, lasers, and noisemakers instead of shooting them?

Oiling eggs alone has not been an effective control measure. Around year 2010, some nests were found near the lake and eggs oiled, but the geese subsequently moved their nests elsewhere. In spring 2020 no geese nests were found along the lake shoreline yet goslings appeared.

Numerous other non-lethal control techniques have been tried over the years and will continue to be implemented, but have not proven sufficient. These methods include: installing "no feeding" rules and signage for waterfowl and deer, our "goosinator" drone, a coyote effigy. Of course, we also diligently clean the beach areas at great expense in staff time.

These birds are so beautiful and their babies are so cute. Is hazing and hunting them really necessary?

Yes, this is very necessary. We need to control the resident Canada geese population in our community as a matter of public health.

Why can't we leave these beautiful birds alone and just continue to clean up the goose poop on our beaches?

The sheer quantity of poop has become overwhelming. A single goose produces about one pound of poop each day. A conservative estimate of 300 geese equals 300 pounds *each day* on our docks, beaches, golf course and other common areas. We need to consider the risk to our children, visitors, volunteers and maintenance workers.

We expect that by continuing to "pressure" these birds year-round, the many remaining geese will go elsewhere and will no longer be such a problem as we continue non-lethal control efforts. We expect that after two years of hunting we will see a significant reduction in the goose population.

Why can't we trap and take the geese elsewhere?

Trapping is not an authorized "method of take" for Migratory Game Birds such as Canada geese.

Has the Board of Directors approved this activity?

Yes. The Board recognizes this ongoing health hazard to our community and approved the current version of the management plan at their board meeting on September 17, 2022.

As we are carrying out this depredation activity during the waterfowl hunting season, does this mean you will be taking other waterfowl as well?

No, we will only carry out depredation for resident Canada geese. There will be no other waterfowl taken under this program.

When will you be carrying out depredation activities and how will we know?

We will be sensitive to our community and conduct activities when we anticipate they will be least impactful to our community. Hunting will likely be performed during the morning hours and completed within a few days. On days when we are carrying out depredation efforts, the hunting areas (golf course, possibly areas around the lake) will be closed as a matter of public safety.

Is hunting now allowed in our community common areas and on our lake?

No. We are not allowing hunting by anyone. We are conducting depredation during hunting season to control the Canada geese population for the safety of our community. This is a depredation effort during hunting season, not hunting. The regulations for control of these birds are different during hunting season than during a separate permitted depredation effort. Nonetheless, the goal is the same—to reduce the geese population in as expeditiously and practically as possible for the safety of our community. We will follow all regulatory requirements.

The use of firearms is very disturbing. Can you use silencers or pellet guns or smaller shotgun shells or some other method that doesn't make so much noise?

We are very sensitive to the disturbance to our community during these necessary control activities. We will make every effort to limit gunfire to the most effective situations and fewest number of days. We use the smallest shotgun shells and shot sizes that are effective and available for our efforts. The Department of Fish and Wildlife requires that we use shotguns, and shot shells loaded with steel pellets. Silencers on any firearm are illegal in California. Pellet guns are illegal for the take of waterfowl.

What happens to the geese shot? Can you give the geese to someone who can use the meat?

Unfortunately, the terms of a depredation permit require that all birds harvested be disposed intact and specifically states that no part of the animal can be utilized. These requirements specifically

preclude us from processing the meat for use. We will have to contract a service to dispose of the harvested animals to comply with these terms.

Conversely, the applicable regulations for our depredation efforts during hunting season ***require*** that all game be processed and utilized. The hunters will process all the birds harvested during our depredation efforts during hunting seasons. The product is classified as wild game and therefore by law is "Not For Sale".

Are you allowing shooting close to houses?

Hunters will use laser rangefinders (accuracy of about 3 yards at 1000 yards) to accurately determine distances from all residences at all times during all operations. The hunters will comply with all applicable state and county hunting regulations such as shooting certain distances of any residence without homeowner approval, hunting during daytime, using decoys, using vehicles, and more.

Could this hunting activity negatively affect community property values?

Closing our recreational swimming areas because of concerns for pathogens have negatively impacted those valuable use areas. The potential for swimmers in our community to get sick from swimming in the lake exceeds our concern about property values. In addition, **NOT** undertaking depredation efforts to control the geese population would be irresponsible.

This depredation is a situation in which we are following the recommendations and permitting of wildlife and public health officials.

If I have questions regarding these efforts, where and to whom do I direct my questions?

We are striving to conduct our efforts with complete transparency. Please direct questions to the main administration office.

Can I help hunt the geese?

No. PMLA will coordinate with a professional waterfowl hunting guide who will organize, lead and supervise a small group of hunters. PMLA members with valid hunting licenses may volunteer to participate, but the selection of hunters is the guide's decision.

89.15

RESOLUTION 89.15
September 18, 1989

PRIVATE REFUGE

Whereas, the Board of Directors, after careful consideration for the health and safety of its property owners hereby resolves that:

All Pine Mountain Lake Association properties shall be a "Private Refuge" with NO HUNTING allowed.

Authority for this resolution is found in the California Fish & Game Statue, Section 2016 and 2017.

Respectfully submitted,

Frank A. Miller - Secty/Treasurer

/mc

Appendix C
Depredation Permit Application Process

This appendix provides a starting point of guidance on how PMLA can obtain a depredation permit for hunting Canada geese outside of the normal hunting season.

Information Needed

The depredation permit application must include specific information about the depredation or injuries being experienced (i.e., which the permitted hunting would mitigate). In this case, such information would include the following, by category.

Depredation experienced:

- Weekly-monthly geese counts by area (lake, golf course, elsewhere)
- Number and surface area of docks around the lake littered with geese feces; area of entire lake (180 acres) and the 18-hole golf course (72 acres) impacted
- Beach pathogen indicator data, particularly days that each swimming area exceeds recreational standards (i.e., presenting a risk to human health); indicate the area of each swimming area and the typical numbers of swimmers at risk
- Economic losses from geese elsewhere, such as on the golf course.
- Years, and months in those years, during which the depredation and controls have been occurring
- Time requested for conducting depredation activities (likely two years)

Methods to control:

- Describe hunting activity (i.e., use shotguns with laser sighting; no traps)

Deterrents used:

- For each method used, note periods used, areas conducted, and work effort applied
- Costs of current control activities (principally staff time and any hauling costs for feather and feces removal);
- Put in categories of harassment, habitat management, and cultural practices (i.e., “no feeding” signage, outreach)
- Explain plans for continuing deterrent methods

Depredation Permit Conditions

Conditions to expect in a depredation permit include the following.

- The permit applies to a specific location (i.e., the PMLA community).
- Use the following method(s) of take: Canada Geese may be shot only with a shotgun using non-toxic shot shells (e.g., steel), shot with an air rifle with non-toxic pellets (non-lead), or captured and euthanized by carbon dioxide inhalation. Use of paintball guns is prohibited.

- Follow the American Veterinary Medical Association Guidelines on Euthanasia (https://www.avma.org/KB/Policies/Pages/Euthanasia-Guidelines.aspx).
- Maintain on file records of (1) numbers and locations of geese shot; (2) copies of letters provided to subpermittees authorizing them to conduct the permitted activities on your behalf
- A subpermittee (i.e., any individual to whom you have provided written authorization to conduct some or all of the permitted activities in your absence) must be at least 18 years of age, be in compliance with the terms and conditions of this permit, and qualified to perform the authorized activities and adhere to the terms of the permit.
- The following subpermittees are authorized: designated employees of USDA/APHIS/Wildlife Services and any other person who is (1) employed by or under contract to you for the activities specified in this permit, or (2) otherwise designated a subpermittee by you in writing.
- Standard Conditions for Migratory Bird Depredation Permits (50 CFR 21.41) also apply.
- PMLA must submit an annual report (www.fws.gov/forms/3-202-9.pdf) to the Regional Migratory Bird Permit Office each year even if there is no activity. The Annual Report must be submitted with a Renewal Application (if applying to renew) AND within 10 days after the permit expires to cover the rest of the permit year.

Permit Process

New permit applications may now be submitted using the federal Online Permit System, found at <epermits.fws.gov>. Applying for a permit online is a step-wise process.

1. Obtain "Form 37 Permit Review Form" from the CA Dept. of Fish and Wildlife. Provide relevant information for this individual to complete the form: Brian Popper, Central District Supervisor, USDA/APHIS-Wildlife Services, 209-579-2891, Brian.J.Popper@usda.gov.
2. Send Form 37 to this individual to request a permit: Dan Skalos, Environmental Scientist - Waterfowl Program CA Dept. of Fish and Wildlife 916-445-3763 dan.skalos@wildlife.ca.gov
3. Go the site, establish an account, record the user name and password, and download permit application form (https://www.fws.gov/forms/3-200-13.pdf). Then complete the application off-line.
4. When the application is completed and signed (scanned or digital signatures are both acceptable) and you have your Form 37, log-on to <epermits.fws.gov> again, follow the steps for applying for a permit. Pay the fee using <PAY.gov> first, then upload the application form. Record the preliminary permit number assigned.

From the main page of <PAY.gov>, click the menu item "Find an Agency", then select "Interior (DOI): United States Fish and Wildlife Service". The online system will accept payment with a credit card or debit card or withdrawal from a checking account.

After the work is completed, complete a short wildlife incident report (https://apps.wildlife.ca.gov/wir/incident/create) designed to track human-wildlife conflicts.

The permit program seems to change periodically associated with federal budget cycles, federal government administrations and appointed leaders. This option is less desirable because:

- The time required to obtain a permit is highly uncertain.
- PMLA would need to contract and pay for hunters, and be responsible for their actions.
- PMLA would be responsible for rendering the shot geese and reporting results.