South Farallon Islands Invasive House Mouse Eradication Project

Public Comment

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Photo Description: Aulon Island, Aulon Arch, Arch Rock, Sugarloaf, off the Farallon Islands, California.
Author: Duncan Wright, 6 August 2004

DEFEND THEM ALL FOUNDATION

The Defend Them All Foundation (DTA) submits the following comments on the U.S. Fish & Wildlife Service's proposed house mouse eradication project. DTA is an Oregon based 501(c)(3) nonprofit organization dedicated to securing a better future for animals and their habitats. As an organization focused on issues at the intersection of animal and environmental law and policy, DTA is part of the growing movement to reduce the harm caused to animals and the environment as a result of rodenticides. Given this mission, DTA is concerned about the ecological impacts of the proposed widespread use of rodenticide on complex island ecosystems. We encourage the Coastal Commission to reject the Fish and Wildlife Service's (FWS) proposed plan given the magnitude of risk—known and unknown—to nontarget species and humans, and the availability of alternative methods to restore balance on the Farallones.

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SIGNIFICANT ADVERSE EFFECTS ON NONTARGET SPECIES ARE CERTAIN TO OCCUR. THE TRUE MAGNITUDE AND DURATION OF THESE IMPACTS ARE UNKNOWN AND UNDERSTATED.

Chemicals classified as rodenticides vary in their active ingredients, but generally aim to kill rodent pests by preventing normal blood clotting, causing internal hemorrhaging, or disturbing nervous system functions. The most toxic of these poisons are designed to deliver a lethal dose to the target animal in a single feeding. However, these poisons take days or even weeks to kill. This means that animals can continue to feed on the baits, thus accumulating a significant level of rodenticides, many times the lethal dose, in their livers before they finally die. High levels of these poisons can remain in the livers of carcasses for months. Therefore, any predators or scavengers that feed on these poisoned animals face secondary rodenticide poisoning.

Brodifacoum, the rodenticide proposed for the Farallon Islands eradication project, is so dangerous to non-target wildlife, domestic pets, and humans alike that California placed a moratorium on nearly all uses of the product on the mainland in 2020. The US EPA recognized in its review of rodenticide products in 2008 that brodifacoum is among the four rodenticides that pose the greatest risk to wildlife, and has implemented restrictions on the sale and use of this product, including that it must be contained in clearly labeled tamper-resistant bait stations. As previously mentioned during testimony in front of the California Coastal Commission and included on the Coastal Consistency Determination (April 2021), the product is still permitted, legally, for use on island eradication projects due to the complexity of island habitation. However, this exception of use does not hinder the product's danger. The FWS plans to smother the Farallon Islands with approximately 3,500 lbs (1.45 tons) of cereal-like grain bait with two aerial applications. Additionally, Brodifacoum-infused bait will be hand-baited within caves, areas of human habitation, and other hard to reach places, to ensure that the project is "a success."

ISLAND ERADICATION PROJECTS: WHAT "SUCCESS" REALLY LOOKS LIKE

In the context of island eradication projects, efficacy and the magnitude of adverse effects of aerial broadcast rodenticide applications are difficult to predict, and remains subject to ongoing scientific debate. But mass animal casualties in the aftermath of these projects have been reported around the globe (Video: Brodifacoum drops on Rangitoto and Motutapu Islands, 2009). In 2009, a similar project on Alaska's Rat Island led to the reported deaths of more than 420 birds, including 46 bald eagles (Ornithological Council Report, 2009). During the Alaska Rat Island project, Island Conservation—the same organization involved in the proposed Farallon Island project at issue—dropped an amount of poison that was "in excess of that recommended by an advisory panel and probably above the legal limit approved by the US Environmental Protection Agency (EPA)," according to a 2011 *Nature* article. Impacts on non-target species were similarly underestimated on Lehua Island, Hawaii, where invasive rodents were not eradicated after an initial aerial application necessitating "mop-up" efforts of additional poison to effectively complete the project, resulting in the death of over 400 birds. Despite the unintended deaths, both projects were declared to be "success" stories, since rodent eradication and rebounded population of the

targeted island birds was accomplished. Therefore, “success” of a project is ambiguous and subjective.

While research regarding the accumulation and impact of rodenticides on marine species are limited, exposure through aquatic pathways is known to occur, and residues have been detected in fish, mussels, and limpets up to three years after application. Such accumulation poses risks to species across the food web as well as to human health. Impacts on terrestrial species including birds, mammals, and even invertebrates are well documented and must be understood by this Commission as collateral damage that is anticipated and, in fact, *expected* to occur even if the project goes exactly as planned.

FWS, Point Blue, and proponents of the Farallon Island Project refer to these consequences as “not significant,” since mass mortality will not, in most cases, destroy these species' global and/or regional population. We respectfully disagree with this analysis. The project poses significant risks to many species on and around the Farallon Islands, as well as extreme and unnecessary pain and suffering. While aerial application of rodenticides may have at one time been the best available method of removing invasive species from an island, it is no longer the only option and this standard of measure is no longer acceptable. In addition to being dangerous and inhumane, the method is outdated and has proven to be ineffective. The Fish and Wildlife Service, Point Blue, and proponents should not consider the use of toxic, long-lasting rodenticide as a means of rodent eradication without first attempting less invasive methods. A standard of “success” that permits/accepts the death of hundreds of individuals within multiple species targeted for protection must be reconsidered.

THE FARALLON ISLANDS ECOSYSTEM

The Farallon Islands are located in the Gulf of the Farallon Islands Sanctuary—a complex mega diversity hotspot nationally recognized as important breeding and feeding areas and home for at least 25 endangered or threatened species, 36 marine mammal species, including blue, gray, and humpback whales, harbor seals, elephant seals, Pacific white-sided dolphins, over a quarter-million breeding seabirds, and one of the most significant white shark populations on the planet. Positioned within the California Current, along the western edge of the continental shelf where ocean depths drop to around 6,000 feet, the area is one of the world’s four major upwelling regions known to host uniquely productive marine ecosystems driven by a combination of geological features, cold ocean currents, and surface winds. Thus, these distinct features add to the complexity of rodent eradication via a poison drop, which is expected to create secondary harm to a multitude of species.

Nutrients driven to the surface by this process promote growth of organisms at all levels of the ocean food web, including dense phytoplankton forests which support and attract marine broad biota from zooplankton to krill, fish, marine mammals, and other aquatic and semi-aquatic species. These resources sustain an abundance of life from butterflies to bats to a quarter million birds, including many migratory species that flock from as far as Alaska to enjoy the Farallones

feast. As such, the danger and potential widespread effects of rodenticide are even more concerning.

The Farallon Island Arboreal Salamander

Aneides Lugubris

The Farallon Island Arboreal Salamander (*Aneides Lugubris Farallonensis)* is a rare subspecies known only to occur on the Farallon Islands. As a lungless amphibian, salamanders breathe through their permeable skin and membranes making them particularly sensitive to chemical contaminants (USGS). The well-being of the Farallon Island Arboreal Salamander is of particular concern considering the essential role amphibians play in the ecosystem, their susceptibility to chemicals and disease, and its indemnity to this single, isolated location (Bralower, T. and Brice, D., n.d.) (Amphibia Web).

Point Blue, in partnership with FWS, has been cataloging and monitoring the Farallon Island Arboreal Salamander since 2006, yet specific data regarding current population size and trends are not found within the FEIS, nor any other published source. Furthermore, no other organization is capable of conducting independent studies, nor confirming Point Blue's data, on the Farallones. Additionally, in an attempt to reduce rodenticide exposure for resident seabirds (FEIS App. D, pg 3) the project is proposed to take place during the season when this species is considered most active at the surface, and when young, presumably more vulnerable individuals, are known to emerge (FEIS 1.2.2.2, pg 13).

(Witmer, G., 2018)

Citing a recent USDA/APHIS/WS study conducted as a part of the current project proposal, FWS has acknowledged that both dermal and secondary risks of exposure do exist for salamanders. Indeed, many of the salamanders subjected to these experiments experienced sloughing skin, sores, and/or death within 14 days of exposure (FEIS 2.8.12 pg 150) (Witmer, G., 2018). Suggesting that high exposure rates in the laboratory setting were not representative of what salamanders would encounter during an aerial broadcast in the natural environment, FWS insists that the potential for impact to the Farallon Arboreal Salamander population is "not significant" and that no long-term adverse impacts from the eradication operation or the capture/hold program are anticipated (FEIS 4.5.6.1.4, pg. 191, and pg.257).

However, results of these trials (summarized in tables 1 and 2) suggest that risks to salamanders are substantial. While it may be the case that the subjects of this study were exposed to larger concentrations of brodifacoum and diphacinone to illustrate a worst case scenario, we are not convinced that multiple exposures during—and after—project execution will not result in greater suffering and mortality. Even if this is the case, salamanders present for the project will be subject to increased foot traffic by personnel during application as well as ongoing monitoring. Additional contaminants, habitat modification, and increase presence of humans also increase the risk of *Batrachochytrium dendrobatidis,* a fungal pathogen responsible for extinctions or declines in more than 200 amphibian species globally, but not yet observed on the Farallon Islands perhaps due to its isolation.

Trial 1: Aneides and Ensatina

Oral & Dermal Exposure		# Treated	Sloughing Skin	Sores	Mortality
Brodifacoum	Oral & Dermal	7	4	3	2
Diphacinone	Oral & Dermal	8	3	2	1
Total			**46.66%**	**33.33%**	**20%**
Control Group		6	0	0	0

Trial 2: Batrachoseps

Oral Exposure		**# Treated**	**Sloughing Skin**	**Sores**	**Mortality**
Brodifacoum	Oral	7	0	0	0
Diphacinone	Oral	8	0	0	6
Total			**0%**	**0%**	**40%**

Dermal Exposure		**# Treated**	**Sloughing Skin**	**Sores**	**Mortality**
Brodifacoum	Dermal	8	0	0	4
Diphacinone	Dermal	8	4	0	0

Total		25%	0%	40%
Control Group	5	1	1	1

Source: Adapted from FEIS 2.8.12 pg 150

To mitigate admitted uncertainty, FWS plans to capture and house "about 40" individuals to be reintroduced at project completion. The unspecified remainder of the population will be left on the island to be subjected to dermal, as well as secondary, brodifacoum exposure.

Perhaps the availability of population data and trends would shed light on the rationale for such a relaxed approach to protecting this rare, endemic subspecies. Considering their restricted area of distribution due to physiological constraints, known sensitivity to climate change and contaminants, and presumed small population size, one would expect a more specific assessment of this subspecies and the potential impacts of such a hazardous event proposed to take place in its only habitat. To reiterate, the total population size of the species is, apparently, unknown by the only two organizations capable of estimating and protecting it. Therefore, the protection of "about 40" of the rare salamander would risk extinction of the endemic species.

Finally, the FWS insists that the project will *benefit* the Farallon Islands Arboreal Salamander by removing predation pressure from mice, and by reducing competition for invertebrate prey (FEIS Section 1.3.4). If this is the case, it is hard to understand why House Mouse management efforts by Point Blue, the sole Farallon partner of FWS, have been so minimal. According to Point Blue's 2019 Farallon Islands Ecosystem Report (pg.16), trapping sessions have only been conducted in monthly 3-6 day sessions from August until trapping success is less than 10% for two consecutive sessions. Mitigative and/or preventative measures beyond these efforts are never mentioned and appear to be considered unnecessary as further demonstrated by suspension of trapping after March 2019. This was justified by a lack of need for further monitoring since data from previous years was "sufficient to characterize the annual cycle and interannual differences in overall abundance."

Nonetheless, preserving the integrity of the salamander study on the Farallones seems to be of particular interest;

> *"If possible, individual salamanders will not be collected from under existing research "coverboards" so that this long-term monitoring area can be used to examine potential impacts from the eradication operation and to not impact long-term population studies"*

Draft Operations Plan, pg 15 (2021).

Statements such as these, taken together with a failure to effectively reduce, manage, and prevent a rodent infestation on the Farallon Islands over Point Blue's 50-year tenure suggest that protecting these species, and this ecosystem, are not the primary priority of this organization. While it appears that Point Blue has conducted meaningful observations and analyses over these

years, an unwillingness to share its data, including basic population statistics, is concerning. The current organization and protection of the Farallones by Point Blue is ineffective due to the apparent lack of transparency with the public. This lack of transparency and willingness to support rare species on the Farallones through increased scientific knowledge and understanding will overshadow the aftermath of the possible rodenticide drop.

The Farallon Island Arboreal Salamander is just one example of many species that will certainly be impacted by the project. Marine mammals, birds, invertebrates, and even kelp and algae are susceptible to the detrimental effects of rodenticides on the islands.

MARINE MAMMALS

Steller Sea Lions (*Eumetopias jubatus*) are known to live on the Farallon Islands year round. While the overall abundance of the species has increased as a result of take prohibitions in the U.S. and Canada, the status of the Steller Sea Lion is the subject of great concern, as environmental variability, competition with commercial fisheries, and Killer Whale predation continue to challenge the species' well-being (IUCN). In addition to these threats, increased frequency of domoic acid poisoning—a condition caused by an algae that produces a natural neurotoxin—and chemical contamination are raising greater concerns for sea lions in California (Moss 2001).

Northern Fur Seals (*Callorhinus ursinus)* are also present and have increased on the Farallon Islands in recent years. However, the global population has declined by approximately 30.1% over the last three generations (1972–2014) (IUCN). While entanglement in fishing gear and changes in the foraging pattern of its key predator, the Killer Whale, are believed to be playing a role, the causes of the species' continuing decline are not entirely understood. Because this trend does not appear to have ceased and may not be reversible, the species has been categorized as vulnerable by the IUCN since 2008. Colonies at San Miguel Island in the California Channel Islands and on the Farallon Island are believed to be further challenged by their proximity to major harbors, shipping lanes, and offshore oil extraction facilities given their vulnerability to oil pollution.

Approximately 145 to 300 Steller Sea Lions, 34 to 125 Northern Fur Seals, 70 to 140 Pacific Harbor Seals, and 11,000 to 21,500 California Sea Lions are expected to be present on the Islands during the implementation of the proposed project. FWS suggests that risk of harm to these species will be sufficiently mitigated by completing its aerial rodenticide drop outside of their breeding season (FEIS section 4.5.6.2.2.1). According to the Final Environmental Impact

Statement (FEIS), toxicant sensitivity and exposure risks are medium and low respectively since consumption of poisoned bait by their preferred prey—pelagic fish and invertebrates—is thought to be unlikely. However, recent studies have confirmed exposure through aquatic pathways is known to occur, as detectable levels of brodifacoum can remain in some marine species including fish, mussels, and limpets for, in some cases, up to three years after exposure. Considering the persistence of brodifacoum in the environment and in the livers of animals that consume it, it is difficult to imagine that the introduction of 3,500 lbs of brodifacoum-laced cereal would not have detrimental effects on these creatures.

The FWS suggests that "the overall toxicant risk is low since pinnipeds would need to consume a very large amount of rodent bait to reach a toxic level due to their large size." However, the sublethal effects of such exposure (i.e., the consequences of such exposure and its effects on the health and survival of pinaped and other aquatic species) have not been adequately considered. Symptoms of rodenticide poisoning, such as pain and suffering, lethargy, and behavioral changes, are likely to increase vulnerability to predation and other deadly hazards, as this correlation has been well documented in other mammals as well as avian species (NPIC Rodenticides Fact Sheet). Similar effects in marine mammals are not far fetched, as demonstrated by recent reports of symptoms observed in sea lions experiencing domoic acid poisoning. The potential impacts—both short and long term, lethal and non-lethal—of this project should not be so quickly dismissed.

Numerous cetacean species regularly inhabit the waters around the Farallon Islands, including gray (*Eschrichtius robustus*), blue (*Balaenoptera musculus*), and humpback (*Megaptera novaeangliae*) whales, as well as several dolphin and porpoise species (FEIS Section 4.3.2). According to the FEIS, these species are unlikely to be affected by this project since activities will take place on the islands, not the surrounding marine environment. We find their opinion hopeful, but unrealistic.

BIRDS

The Greater Farallon National Marine Sanctuary hosts a quarter-million breeding seabirds and is a popular stop for migrating birds traveling along the Pacific Flyway from Central and South America to as far north as Alaska. Sustained by lush marine biota, the Farallones are home to the largest breeding colony of seabirds in the Continental US. While the duration and pathway of exposure to the poisoned bait varies by each species' feeding habits, *all* birds present during and after the drop will be at a high risk of exposure for at least 30 days (FEIS pg.167). The posion's harmful effects are likely through both direct and indirect methods of exposure, and only reduced by the passing days. However, chronic exposure to brodifacoum may occur over the long term, as this product is known to persist for approximately 101 days (FEIS Section 2.8.10). Brodifacoum research showed a plasma elimination half-life of 91.7 days and liver elimination half-life of 307.4 days, indicating the longevity of indirect harm. As the poison circulates through the food chain, long-term risk of exposure will remain for raptors, scavengers and other birds that consume rodents, small birds, reptiles, insects, and amphibians that have been inadvertently exposed to the poison.

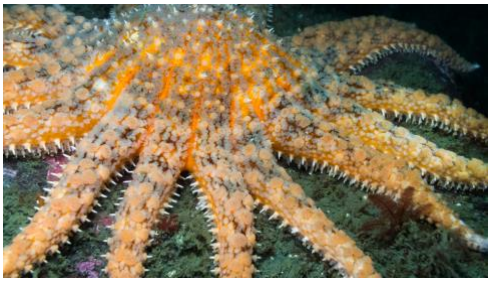
According to the FEIS, up to 255,963 birds are expected to be present during the implementation of the proposed project. It is notable, however, that several species were left out of the FWS's impacts analysis in the section it describes as "direct and indirect toxicant and disturbance impacts to each bird species that has at least a moderate likelihood of occurring on the South Farallon Islands" (Section 4.5.6.1). These species include the Olive-sided Flycatcher (*Contopus cooperi*), short-billed dowitcher *(Limnodromus griseus*), willow flycatcher (*Empidonax traillii*), loggerhead shrike (*Lanius ludovicianus*), sage thrasher (*Oreoscoptes montanus*), yellow warbler (*Setophaga petechia brewsteri* and *S.p. sonorana*), and Brewer's sparrow (*Spizella breweri*).

FWS plans to mitigate impacts on birds known to consume rodenticide baits and/or carrion by hazing, i.e., disturbing birds to encourage them to leave the island (FEIS Section 2.10.7.1.2). To do so, a variety of techniques including lasers, spotlights, pyrotechnics, biosonics, predator calls, air cannons, effigies and kites by hazing personnel will be deployed. A two-week hazing trial conducted on the Farallon Islands in 2012 reported an average of 98% effectiveness at keeping Western Gulls away from the areas that would be baited during an aerial bait spill. However, long-term effectiveness of these tools on the Farallon Islands is uncertain (Risk Assessment, pg. 28). To successfully avoid mass poisoning of Western Gulls and other susceptible species during implementation, hazing activities would need to occur on a daily basis for approximately 90 days or for as long as baits remain available and palatable - approximately five weeks for Brodifacoum-25D Conservation assuming average rainfall levels (FEIS Appendix D).

Even if hazing is effective at preventing gulls and other birds from consuming the bait directly, risks of secondary exposure through the food chain will remain far longer. Brodifacoum is known to persist in soils and has been detected at measurable levels following similar eradication projects (see FEIS Section 4.4.2.3).

INVERTEBRATES

The rocky intertidal regions of the Greater Farallones Marine Sanctuary host over 320 invertebrate species (SIMON). According to the FEIS, species with higher densities around the south and middle Farallon Islands include the California sea cucumber (*Parastichopus californicus*), fish eating urticina (*Urticina piscivora*), red sea star (*Mediaster aequalis*), sunflower sea star (*Pycnopodia helianthoides*) and white plumed anemone (*Metridium giganteum)* (FEIS pg. 174). Red abalone (*Haliotis rufescens*), and red sea urchin (*Strongylocentrotus franciscanus*) were historically abundant in the area but have suffered significant population declines due to historical overfishing.



The Farallon Islands are also considered Critical Habitat for the Black Abalone, a "cultural keystone species," that holds a high value for both human consumption and the sacred connotations it carries for Native Peoples of California. While the commercial fishing of Black Abalone has been prohibited since 1993, their high value as a delicacy has rendered the species a top target for poachers. In addition to continued unsustainable harvest, withering syndrome has decimated the species across nearly all of its range by more than 80% over a period of three generations (from approximately 1975 to 2015). As such, Black Abalone has been categorized as Critically Endangered by the IUCN and is listed as Endangered under the Endangered Species Act (76 FR 66806).

A recent 5-year review by NMFS concluded that elevated sea surface temperatures, contaminant spills, and other diseases are further compounding the species' risk of extinction (Black Abalone Recovery Plan, 2020). While the FWS suggests that the Project is not likely to adversely affect this species or its critical habitat since it occurs below the Mean High Water Spring, and on the basis of an unsuccessful survey conducted in 2015 (Responses to substantive comments, 2019), evidence that mollusks may be affected by rodenticides, and Brodificoum in particular, does exist (Gerlach, 2005, Regnery et al., 2019) and should not be dismissed.

While planned mitigation measures have been designed to minimize baits entering the aquatic ecosystem (FEIS Section 2.10.7.7), FWS has acknowledged that incidental bait drift into water bodies on and around the Farallon Islands *will* occur (App. 1 Responses to Comments pg. 11). Stating that habitats around the islands are of "poor quality" for crabs and that bait pellets will disintegrate quickly in the rough ocean waters due to chemical and physical composition, the FWS suggests that exposure of fishery species would be limited to a few individuals. Citing an accidental brodifacoum spill in a Kaikoura, New Zealand aquatic environment as an example of low contamination risks in water, it further suggests that detectable levels of contamination are unlikely (App. 1 Responses to Comments pg. 12). However, measurable concentrations of brodifacoum were detectable for 9 days where this spill occured (Section 4.4.1.3). Following the same incident, brodifacoum residues were detected in Limpets for 80 days, Mussels for 353 days, and Paua Gut (Abalone) for 353 days (Primus et. Al, 2004).

Furthermore, the fact that a listed species' designated Critical Habitat is currently unoccupied does not justify degradation in its absence. Such designations ensure that the species recovery—not just survival—is prioritized. *See* Gifford Pinchot Task Force v. U.S. Fish & Wildlife Serv., 378 F.3d 1059, 1070 (9th Cir. 2004) (holding that the adverse modification regulations "singular focus" on survival violated the Endangered Species Act). That is, failure to adequately conserve unoccupied areas that have the necessary resources and conditions to support a species, or could in the future through restoration efforts or other changes, would significantly restrict a species ability to recover and survive. In many cases, subsequent generations would not have sufficient protected habitat in which to disperse and thereby render conservation efforts futile.

In its recent proposal to rescind a Trump Administration Rule addressing the same issue, FWS itself has recognized the importance of protecting currently uninhabited critical habitat;

> "*Congress required the Services to identify unoccupied areas that are "essential for the conservation" of the species when designating critical habitat. Identifying and protecting those areas when we determine they are essential, rather than delaying until an arbitrary point in time when conditions that are not required under the Act's definition are realized, better fulfills the conservation purposes of the Act and ensures that important areas of habitat are protected in section 7 consultations from destruction or adverse modification.*"

(FWS & NOAA Proposal to rescind a Trump Administration final rule titled "*Regulations for Listing Endangered and Threatened Species and Designating Critical Habitat*" 85 Fed. Reg. 81411 (December 16, 2020) in furtherance of a Biden Administration's January, 2021 directive.

STRIPED SHORE CRAB

The FEIS notes that some land crabs are known to consume large amounts of rodenticide bait pellets, and that while direct effects are uncertain, they may be secondary sources of exposure for other species. The FEIS wrongly concludes that there are no land crabs or similar species on the South Farallon Islands (FEIS pg.155). Point Blue's Los Farallones blog (February, 2021) provides a photo of the Striped Shore Crab (*Pachygrapsus crassipes*), which suggests that the FEIS may be outdated or inaccurate. This is extremely concerning, yet unsurprising as a large portion of data serving as a basis for the FEIS appears to rely upon unpublished, or severely outdated data.

Striped Shore Crabs main diet consists of various algaes and seaweed. However, they are also known to consume diatoms, worms, muscles, small dead fish, limpets, snails, hermit crabs, and isopods. (Stahl, J. 2001). This is particularly alarming because of the crab's role in the food chain, as predators of the Striped Shore Crab are seagulls, rats, raccoons, and humans. Thus, the Striped Shore Crab's exclusion from the EIS, despite crabs being known to consume large amounts of rodenticide bait pellets, is concerning—especially due to the capability of creating widespread and harmful indirect exposure.

UNPUBLISHED DATA

The use of unpublished data in a project of this magnitude, and potentially devastating, is concerning. Although unpublished data minimizes publication bias and possible unflattering critiques, it is essential that sound science is used and relied upon. The unpublished data referenced throughout the Environmental Impact Report by Point Blue is of extreme importance and should be available to not just the decision makers, the California Coastal Commission, but also the public. The problem here, though, is that the data is not just unpublished, but also undiscoverable—missing in all entirety.

Taryn Young and Sally Hopewell studied methods for obtaining unpublished data, concluding that contacting authors is the best way to receive missing data. Young Hopewell examined that e-mail correspondence with authors achieved the greatest response rate with the fewest attempts and shortest time to respond, that a well-known signatory had no significant effect on the likelihood of authors responding to a request for unpublished information, and that the number of attempts made did not influence the probability of response.

Point Blue, however, seems unwilling to release their missing data, despite multiple attempts at contacting them. Point Blue's reluctance to publish these studies, or make them accessible, could be the result of many reasons—none of which are for Defend Them All to evaluate.

Naruemon Tantipisanuh and George Gale studied the importance of unpublished data for increasing knowledge regarding species localities, especially for less studied groups like amphibians and reptiles. Concluding, they argue the importance of scientists, as well as amateur naturalists, to regularly publish their observations or photos in peer-reviewed journals at either a national or an international level, or through an archived website. The study argues that responsible government agencies encourage the publication of scientific research, especially in relatively poorly studied areas, which would increase the overall biodiversity coverage.

The Fish and Wildlife Service's reliance on unpublished data to support their recommendation of a $1,185,000.00 eradication project on such culturally significant, ecologically important lands is staggering and irresponsible. The use of thirty unpublished, inaccessible studies to support their assertions is most alarming and should be of great concern to the public as the research data's inaccessibility does not support an open and transparent evaluation. Its use, coupled with the

extremely restrictive access to the Farallones, leaves far too much room for erroneous data, and lack of oversight of the project and its outcomes, if the airdrop is permitted to proceed.

As such, Defend Them All recommends that an independent third-party examine the proposed project, possible alternatives, and the current population status of native and endemic species. If it is determined that the eradication project is the most appropriate response, then a post-project investigation should also be required. The Service, and Point Blue, who control the accessibility of documents regarding the Islands, cannot also be responsible for the evaluation of its success. Without independent review of the island and the project, public trust will not be achieved.

RECOMMENDATIONS

Considering the ecological value of the Farallon Islands and their surrounding waters, a more cautious approach to removing invasive species must be taken for the benefit of current and future generations. In light of a clear bias towards poison products by those involved in this project we recommend:

- A full, third-party review of native and endemic species that inhabit the island including their current population status.
- Development of a rodenticide-free plan to remove the invasive house mouse population by Humane Solutions, an organization with a proven track record of success in sustainable, ethical pest control.
- Implementation of a long-term observation program dedicated to native species and ecosystem protection through proactive management and monitoring of invasive species to be led by Humane Solutions.

**DTA is not affiliated with, and receives no compensation for recommendations and referrals to Humane Solutions.*

CONCLUSION

As an organization concerned with the health and well-being of all living things, we stand behind the biodiversity in danger at the Farallon Islands and implore the Coastal Commission to reject the proposed eradication project so that more humane, effective solutions can be explored and implemented. The known and unknown risks of this project are substantial and should not be ignored given the regional importance of this ecosystem and its surrounding waters.

Furthermore, the Defend Them All Foundation implores the California Coastal Commission to ensure the public is able to reasonably examine all relevant research studies in regards to scientific research and the outcomes of any action taken on the island, in an effort to improve transparency and accountability. Our organization understands the need to protect the Farallons and the beauty and life it beholds, however, to execute a project with implications of this magnitude is irresponsible and must be rejected until reasonable alternatives, research, and transparency are achieved.

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