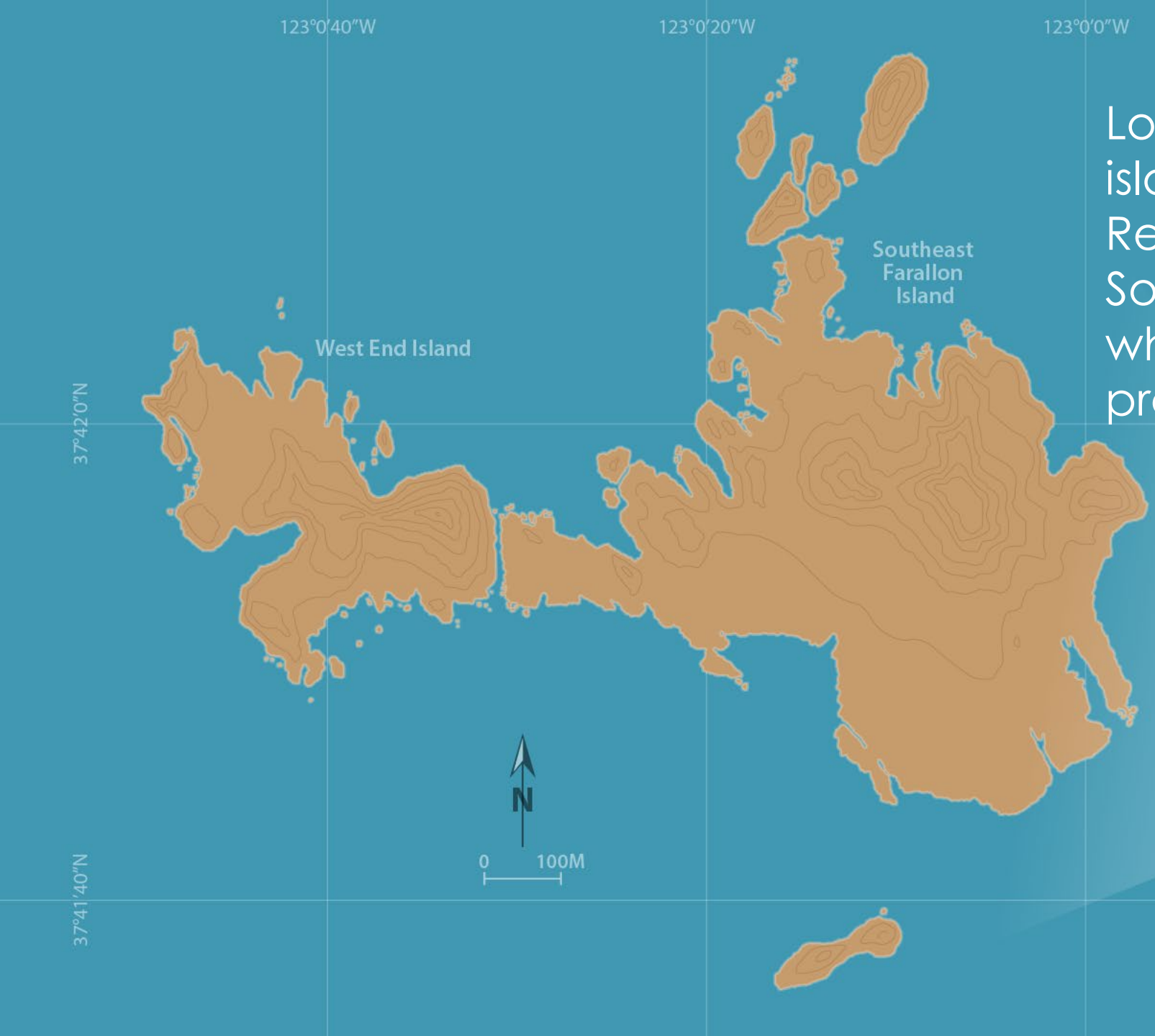
South Farallon Islands

House Mice Eradication Project



Location of the Farallon islands National Wildlife Refuge and specifically the South Farallon Islands where mouse eradication project will occur

Approx. 30 miles west of San Francisco

About Farallon Islands

- 120 acres (49 ha)
- 350 feet high (113 m)
- Rugged
- Some islands are designated Wilderness

Seabirds

- Largest seabird colony in the contiguous U.S., with nearly 300,000 breeding birds of 13 species;
- World's largest colonies of Ashy Storm-Petrel, Brandt's Cormorant, and Western Gull.
- Numbers of breeding seabirds are only ~1/3 of what they were before human impacts
- One of the foremost natural laboratories for monitoring changes in the North Pacific Ocean ecosystem.

300,000 Breeding Seabirds
13 Species

Brandt's Cormorant

Ashy Storm-Petrel

Western Gull

Tufted Puffin

Common Murre

Pigeon Guillemot

Rhinoceros Auklet

Cassin's Auklet

Five Species of Pinnipeds
~3,000 – 6,000 Animals

California Sea Lion

Harbor Seal

Steller Sea Lion (threatened)

Northern Elephant Seal

Northern Fur Seal

Wildlife

- Islands provide important breeding and resting habitat.
- Pinnipeds were formerly decimated by seal hunters.
- Though recovery has occurred for some species such as the now abundant California sea lion, threatened Stellar sea lions are declining and Northern Fur Seals are just a fraction of historic numbers.

Extensive Human History

Early 19th century:

- Marine mammal hunting

Late 19th century:

- Commercial egging
- Construction of lighthouse and houses, lighthouse keepers

Early to mid-20th century:

- Lighthouse keepers
- U.S. Navy Radio Station

1969 – present:

- Farallon Islands National Wildlife Refuge

- Productivity, population demography and foraging of western gulls
- Productivity, demography, population dynamics and food habits of common murres
- Productivity, demography, population dynamics and food habits of Brandt's cormorants
- Productivity, demography, population dynamics, foraging ecology and diet of pigeon guillemots
- Productivity, demography, population dynamics and diet of rhinoceros auklets
- Productivity, demography, population dynamics, and food habits of Cassin's auklets
- Colony formation of Cassin's auklets
- Population status, productivity, and survivorship of ashy storm-petrel
- Ashy storm-petrel predation monitoring
- Burrowing owl abundance
- Burrowing owl fall and winter attendance patterns
- Migrant bird monitoring
- Aerial census of murre and cormorant colonies
- Pinniped and cetacean monitoring
- Reproductive ecology and survival of northern elephant seal
- Biology of the white shark
- Arboreal salamander surveys
- Migratory bat monitoring
- Monitoring of intertidal communities within GFNMS
- Vegetation monitoring
- Cricket surveys

Too much text on one slide. Please advise as to what can be pulled out or shortened

Research and monitoring on the island for 50+ years

Today, our long-term data sets form **Baseline Knowledge**

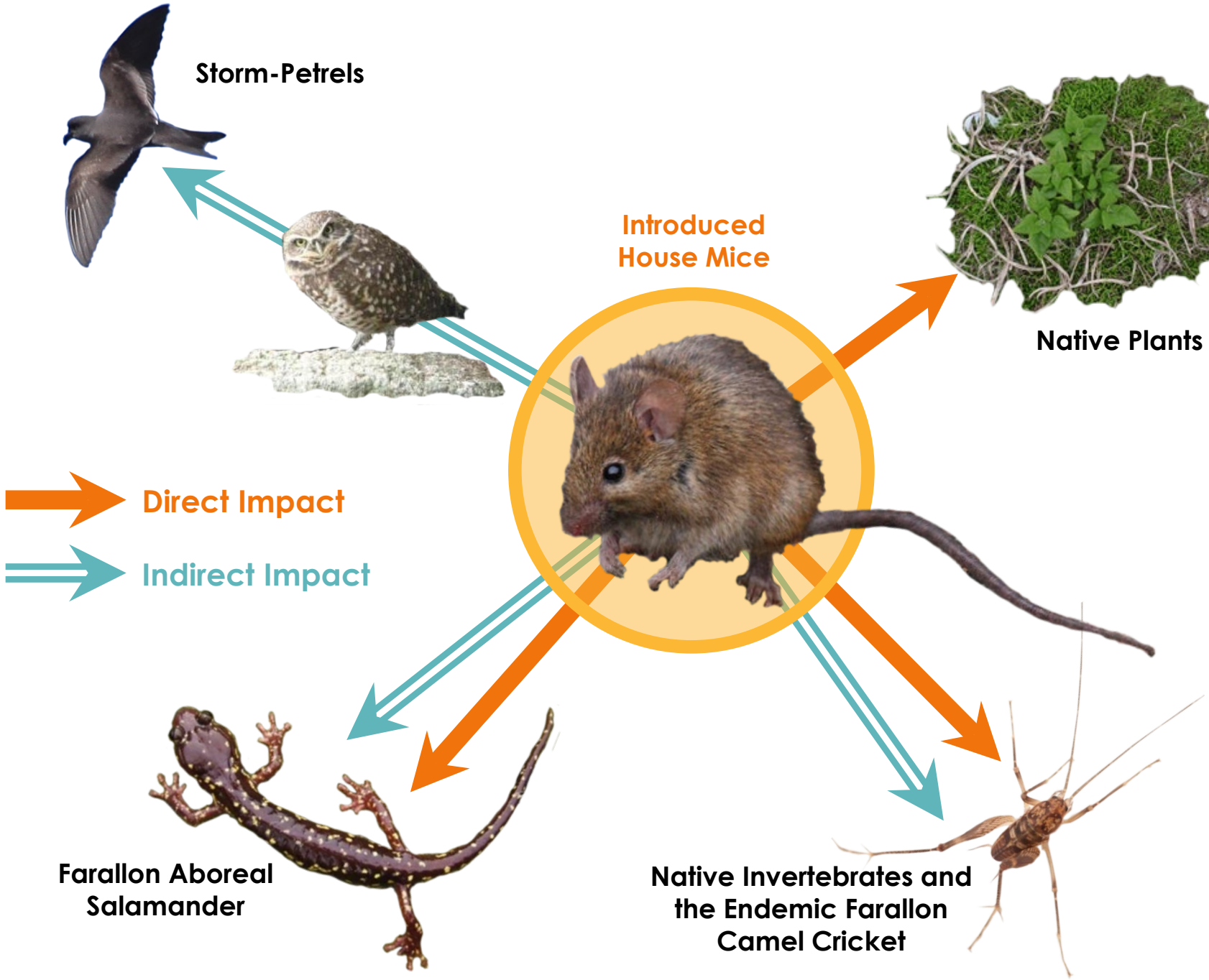
Pre-eradication Studies

Studies conducted on the Farallons specifically to inform the eradication project

- Farallon mouse eradication trial studies
- House mouse density estimate study
- Bait palatability and preference trials
- Bait exposure rates (efficacy)
- Bait availability
- Bait station field test
- Mapping of accessible and sensitive wildlife areas
- Commensal habitat assessment
- Collection of mouse samples and genetic analysis
- Bait degradation trials
- Bird mitigation trials (gull hazing)
- Salamander toxicity study

Impact of Introduced House Mice on Southeast Farallon Island

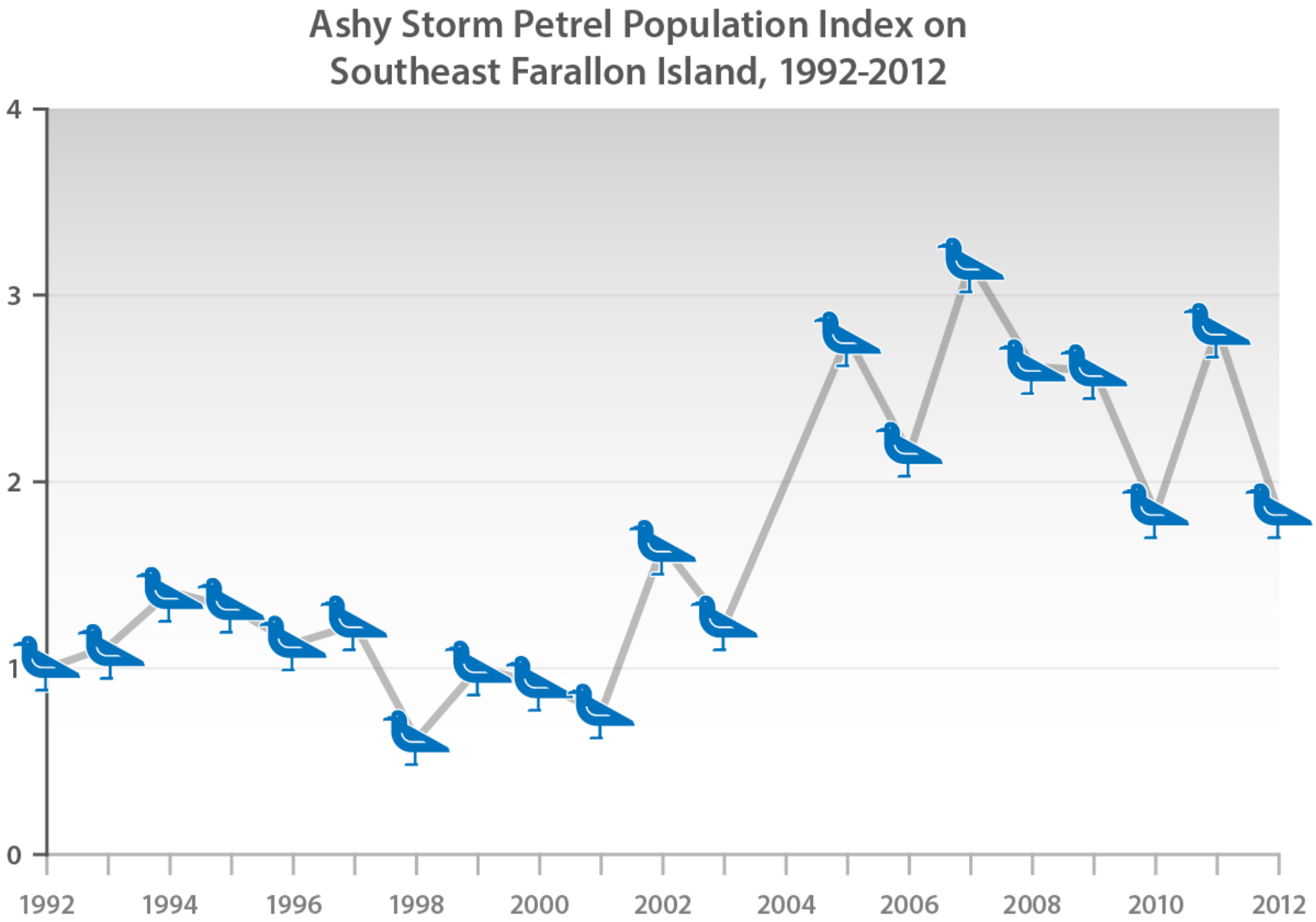
Mouse on Farallon Islands (Matt Brady)



Density of Introduced House Mice on Southeast Farallon Island

- Density estimate of approximately **1,300** mice per hectare.
- House mouse densities commonly range from **10 to 50** per hectare.

Distribution of Ashy Storm Petrel

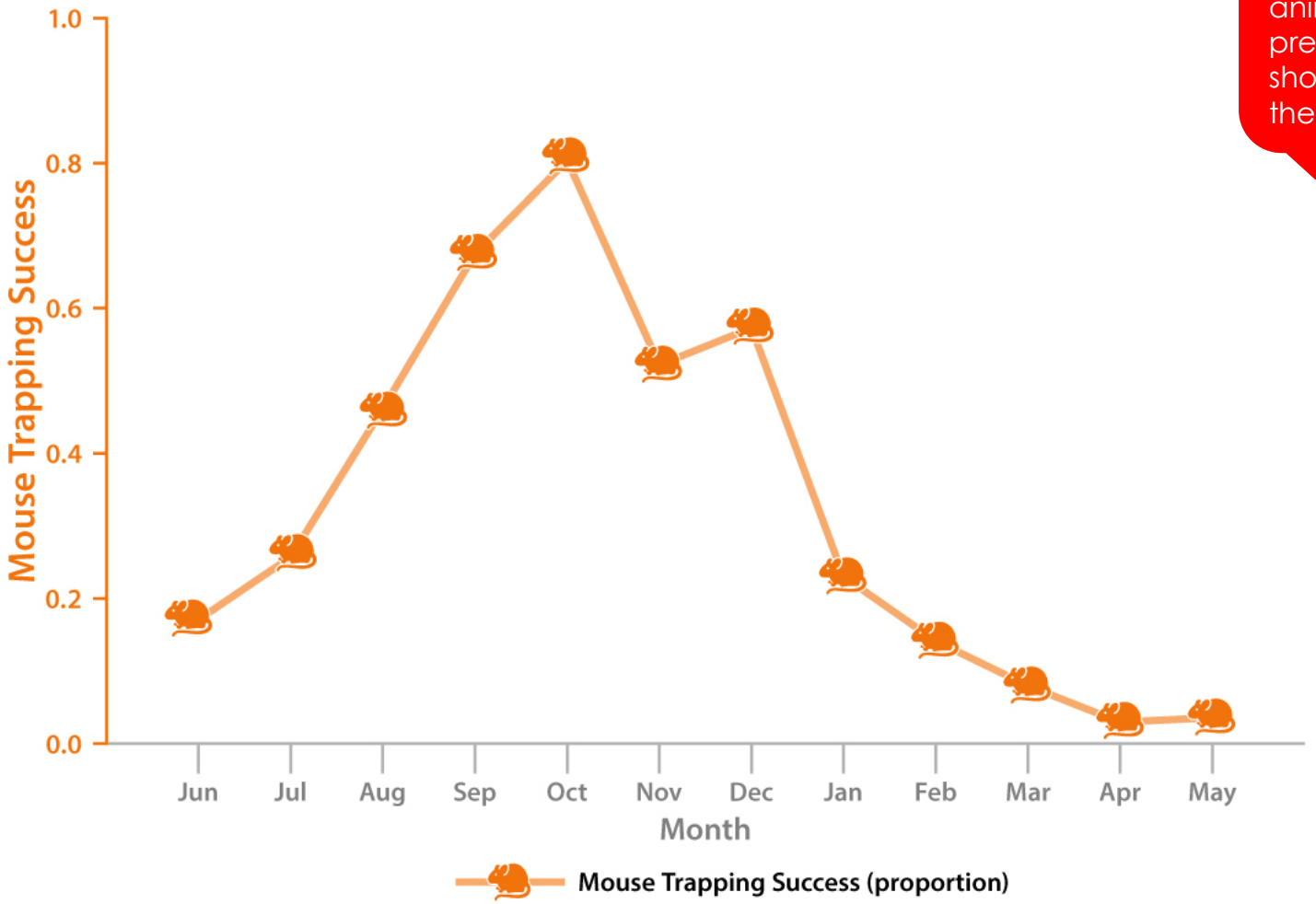


Distribution of Ashy Storm Petrel

Relationship of Mouse and Owl Abundance with Storm-Petrel Predation

Mouse Trapping Success

Mouse on Farallon Islands (Matt Brady)



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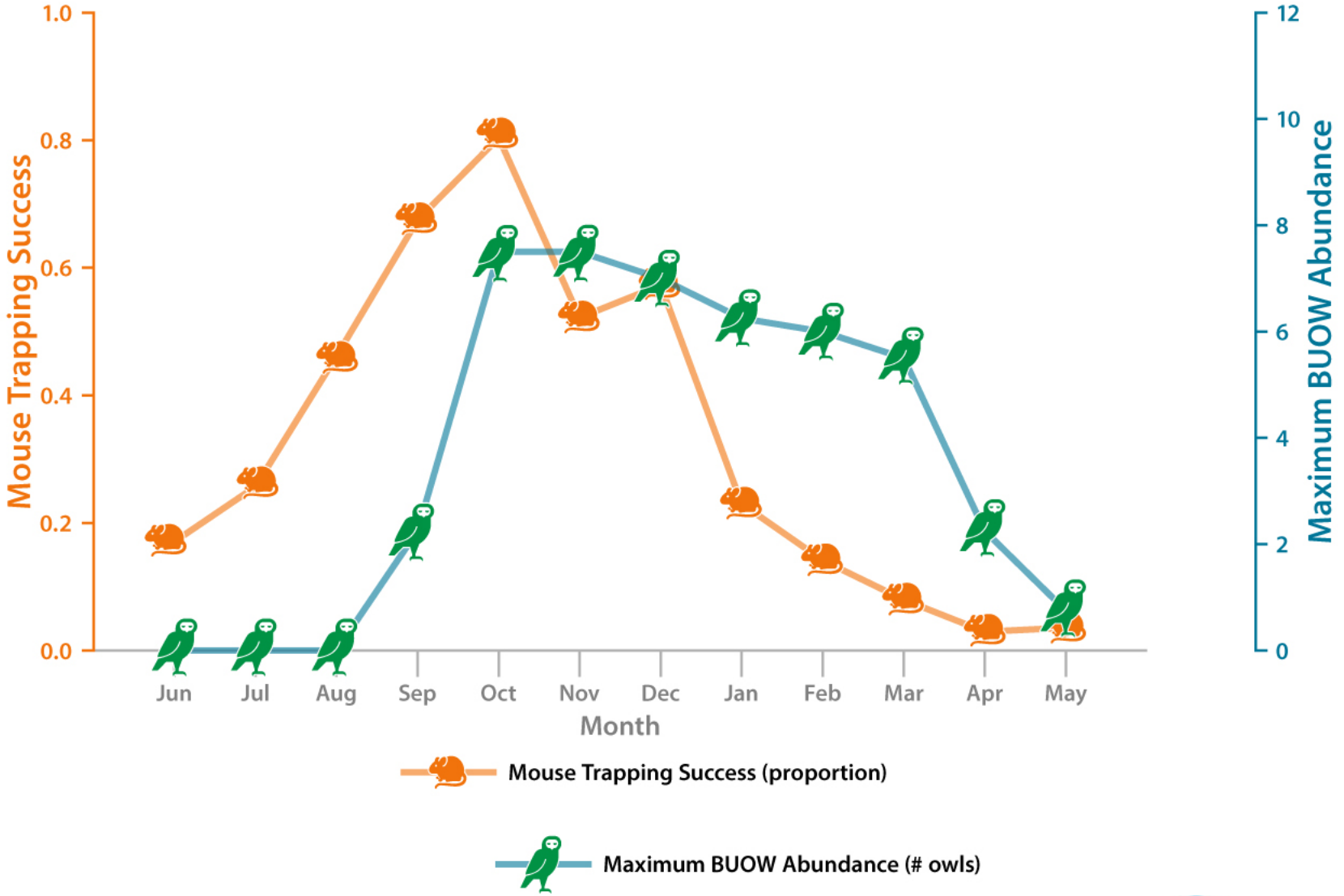
Point Blue Conservation Science

Relationship of Mouse and Owl Abundance with Storm-Petrel Predation

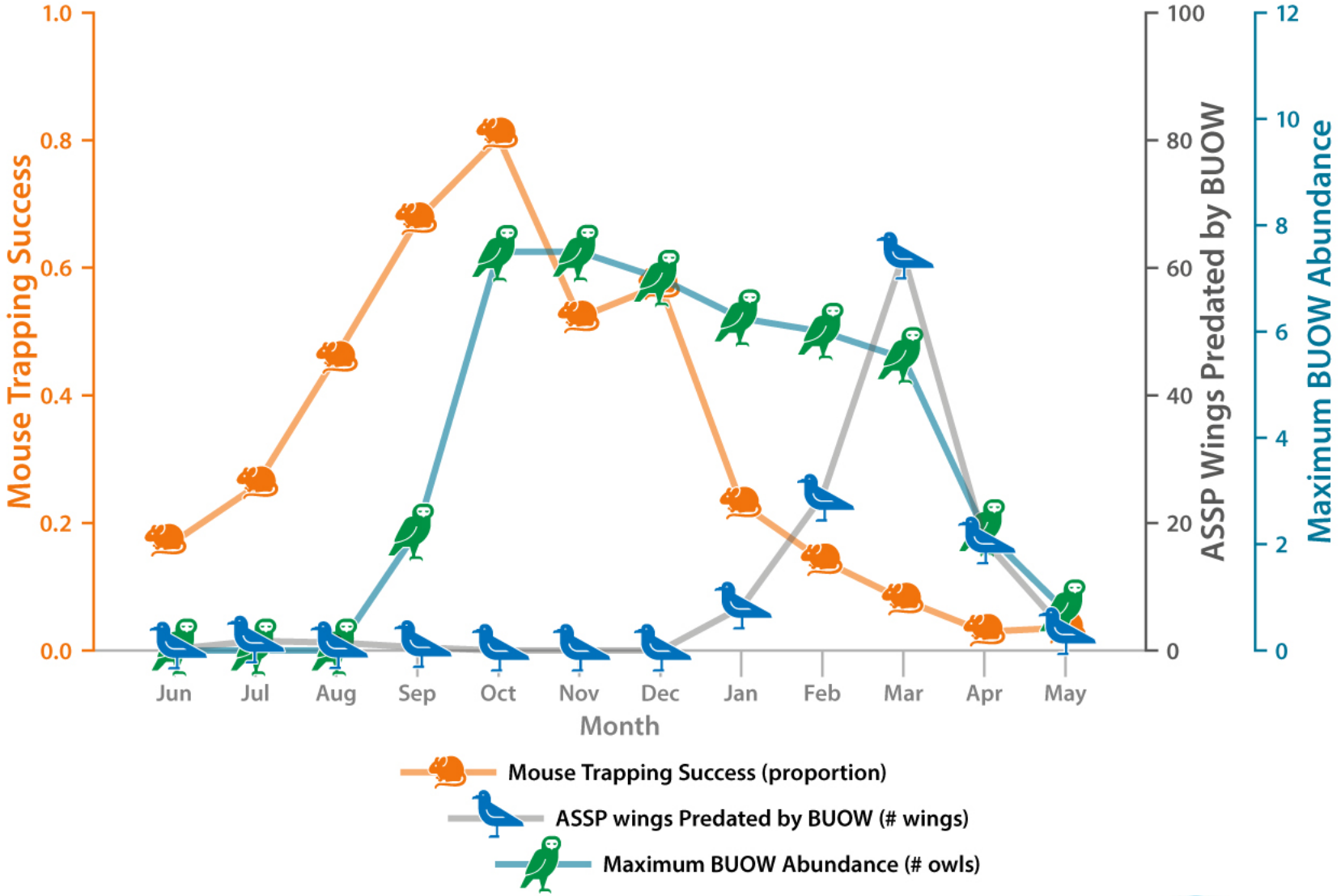
Maximum Burrowing Owl Abundance



Point Blue Conservation Science

Relationship of Mouse and Owl Abundance with Storm-Petrel Predation

Storm-Petrel Wings predated by Burrowing Owls

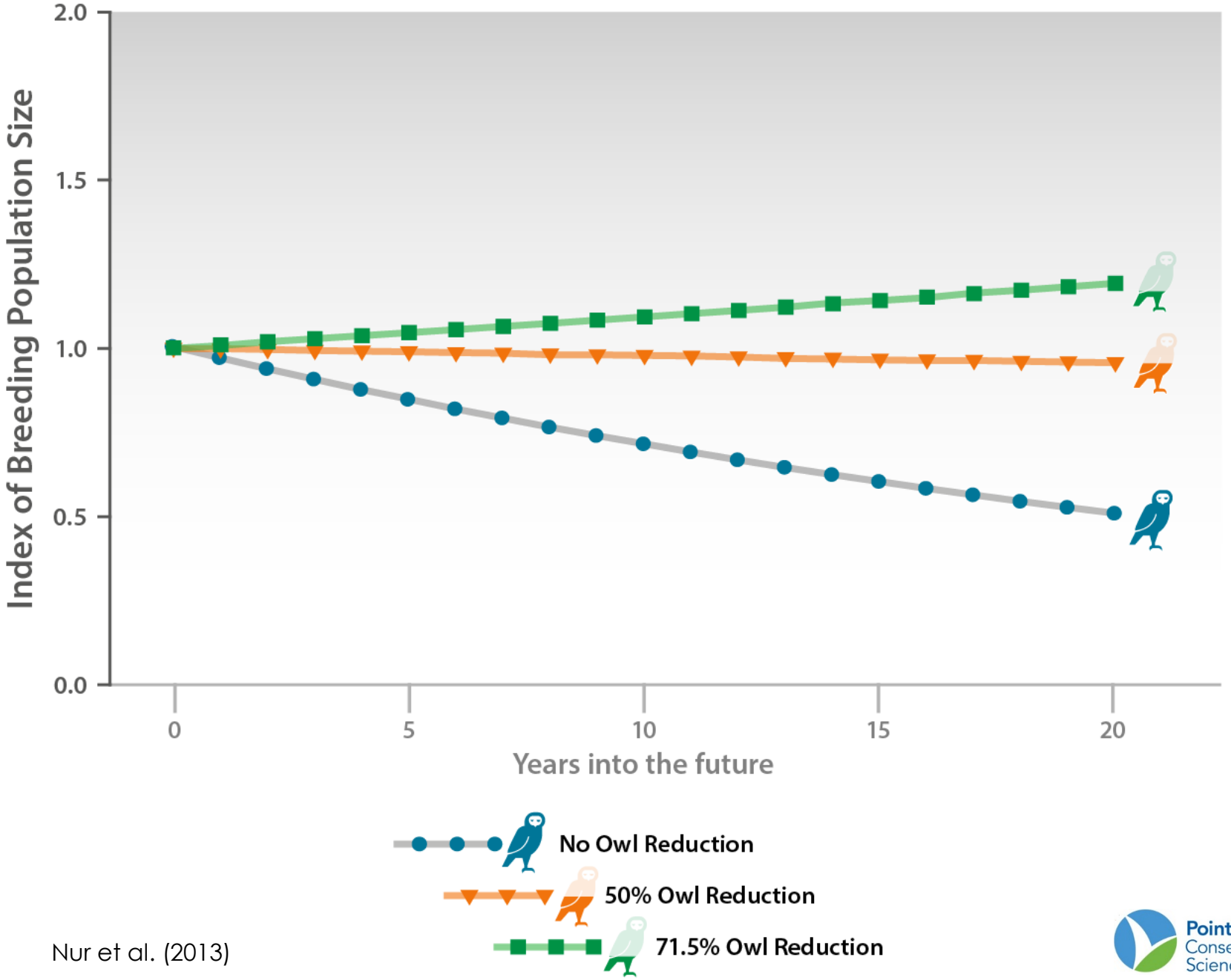


Point Blue Conservation Science

Ashy Storm-Petrel Trends With and Without Owl Reduction

"Moderate Decline" scenario

Ashy storm-petrel remains beneath burrowing owl roost. Photo by P. Pyle.



Nur et al. (2013)

Point Blue Conservation Science

Farallon Project Expected Benefits

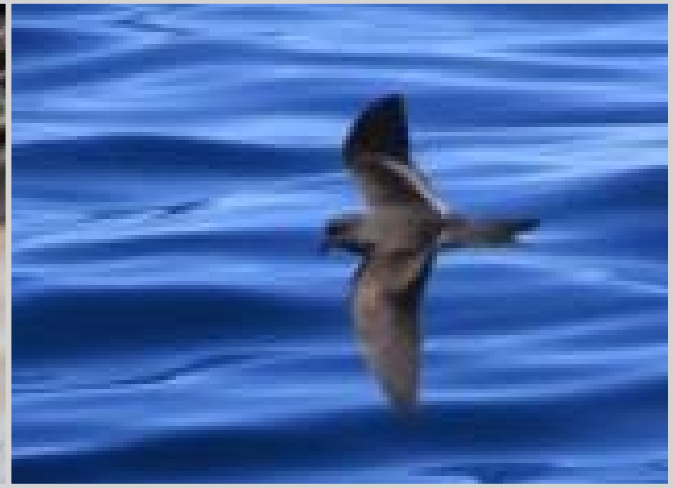
Decreases in:

- Predation on storm-petrels
- Predation on invertebrates
- Competition with salamanders
- Spread of invasive weeds

Increases in:

- Ashy Storm-Petrels
- Native plants
- Endemic Salamanders
- Endemic Camel Crickets
- Other Invertebrates






Lessons learned that we are incorporating based on the recommendations from the Ornithological Council review of non-target mortality with the Rat (Hawadak) island, AK project

a) The Service has prepared a detailed plan (EIS) that assesses the expected impacts and allows for adaptive manage
that the Service can respond in real-time to unexpected outcomes without violating permits or jeopardizing success;
b) The Service will prepare contingency plans as part of the operational planning phase (Section 2.10.11);
c) The Service will seek to obtain permits that would allow operators to successfully eradicate the target species while
to non-target resources;
d) The Service, working with the USDA/APHIS in consultation with EPA, will obtain a supplemental bait label if deemed
the target species will be receive a lethal dose of rodent bait without violating the conditions of the label. (Section 2.1
e) Pre-eradication trials to help determine appropriate application rates were conducted on the South Farallon Island
station methods All structures and caves have been documented for determining the best baiting method for each. (S
f) Secondary bait consumers like the gulls found on the South Farallon Islands can impact bait availability or suffer from sublet lethal impacts from consuming bait or toxic mice. Mitigation measures, including gull hazing, have been evaluated and included in in action alternatives to minimize impacts to gulls and assure that adequate bait is available
to mice for uptake. (Section 2.10.5).
g) Bait availability will be monitored during implementation to ensure that bait is available at sufficient quantities for the required timeframe to ensure eradication success. Details will be provided in the Operational Plan (Section 2.10.10).
h) The Service has committed to ensuring that the eradication operation is fully staffed for the duration of the implementation. The detailed Operational Plan would determine the exact number of personnel needed for each position type, a description of the responsibilities for that position, and the duration of time that position will need to be
staffed.
i) The Service has committed to allow the operational team the opportunity to fully review the operational plan, ask questions, and suggest revisions prior to initiation. Additionally, key personnel would be given the opportunity to approve the operational details and make minor modifications, if necessary and permissible, prior to implementation.
j) The Service will develop a detailed and clearly laid out command structure to be utilized during the operation. Each position's job description would be outlined and included in the command structure conceptual model that would be included in the operational plan. As much information as possible regarding who to contact during an incident would be included in the operational plan and outlined in relevant contingency plans. This will streamline on the ground decision-making, allow for real-time adaptive management, and reduce confusion and "on-the-fly" decision-making during the operations. It is critical to work through any unresolved planning details prior to initiating operations.

This is too much information on one slide. On the next slide we attempted to pick out main points however, we will need guidance as to exactly what information is important and what can be left out.

Lessons Learned

Recommendations implemented from the Ornithological Council review of non-target mortality with the Rat (Hawadak) island, AK project

This slide is just an example of how one might reduce content. Previous slide is the "before"—this is the "after". This is the kind of kind of streamlining we would request of the client since they know what needs to be kept and what can be omitted

a) Developed a detailed plan (EIS) to assess the expected impacts and allow for adaptive management during implementation.

b) Prepare contingency plans as part of the operational planning phase

c) Seek to obtain permits.

d) Working with the USDA/ APHIS in consultation with EPA, obtain a supplemental bait label if deemed necessary.

e) Conduct pre-eradication trials to determine appropriate application rates.

f) Mitigation measures, including gull hazing, evaluated and included in in action alternatives to minimize impacts to gulls .

g) Monitor bait availability during implementation.

h) Ensure that the eradication operation is fully staffed for the duration of the implementation.

i) Allow the operational team the opportunity to fully review the operational plan.

j) Develop a detailed and clearly laid out command structure to be utilized during the operation.

Comparison of Rodent Control on Mainland vs Eradication on Islands

	Eradication on Islands	Control on Mainland
Location	Rodent eradications are primarily conducted on islands where an invasive species is impacting the native species and natural ecological processes, as well as where rodents cannot easily recolonize after the eradication.	Rodent control efforts are primarily attempted on the mainland in urban, residential, or agricultural areas where rodents impact people or commercial endeavors. Rodent control is also undertaken to benefit native species, agriculture, and human health.
Goal	Restoration of an island ecosystem by complete removal of the target species. One hundred percent removal of all individuals is required, as failure to remove an individual from an island could result in repopulation.	Reduction of the rodent population in a confined management area for economic, human health or conservation benefit. Generally, eradication is impossible because rodents can recolonize from adjacent areas.
Successful Methods	On all but the very smallest of islets, the only technique that has been used successfully to remove rodents from islands has been the distribution of bait containing a rodenticide.	A variety of toxic, non-toxic, mechanical and biological methods are available to control rodents. It is not necessary for control operations to remove every individual.
History of Success	Rodent eradications have been successfully conducted on more than 692 islands world-wide. Without exception, successful eradications have resulted in the recovery of native biota.	Control operations are often successful at reducing rodent populations with demonstrated economic benefit and benefits to biodiversity. However, unless active control is sustained, rodent populations will return to pre-control levels within a short period of time.
Length of Operation	Rodent eradications are typically one-time operations that usually take a few days or weeks to conduct.	Depending on the nature of the infestation, control efforts must be sustained for long periods or revisited periodically in perpetuity.
Extent of Positive Impact	The positive impacts to ecosystems and native species are measurable and permanent.	Positive impacts are limited in extent, degree, and duration; however, some benefits to native species can occur.
Extent of Negative Impact	While eradications have been known to have non-target effects, these unintentional impacts have largely been short-term and have not impacted native species at the population level. The majority of impacts can be avoided, minimized or mitigated. Most have a limited extent and are confined to a relatively closed island ecosystem.	Negative impacts of rodent control efforts have occasionally resulted in direct and indirect impacts to non-target species, primarily predatory birds and mammals. Because of the open ecological system on the mainland, a toxicant can be distributed widely through a variety of pathways by a range of scavengers and predators. Repeated use of toxicants in urban and agricultural settings extends the period of time in which exposure can occur.
Risk of Failed Operation	Because of the high cost and logistical complexity of conducting a rodent eradication, there is a reduced likelihood of implementing follow-up eradication attempts. A failed operation would not generate the anticipated ecological benefits to native species and resources.	Because of their relatively low short-term cost and low logistical complexity, unsuccessful rodent control efforts can be followed up with additional techniques to increase the chance of success.
Extent of Regulatory Oversight	In the U.S., island eradications are permitted after extensive planning and a review of potential impacts are assessed under NEPA, in addition to the federal, state, and local permits that are required.	For some compounds, pesticide applicator licenses and permits are not required for purchase and use. Often their use is allowed without the need for a NEPA a

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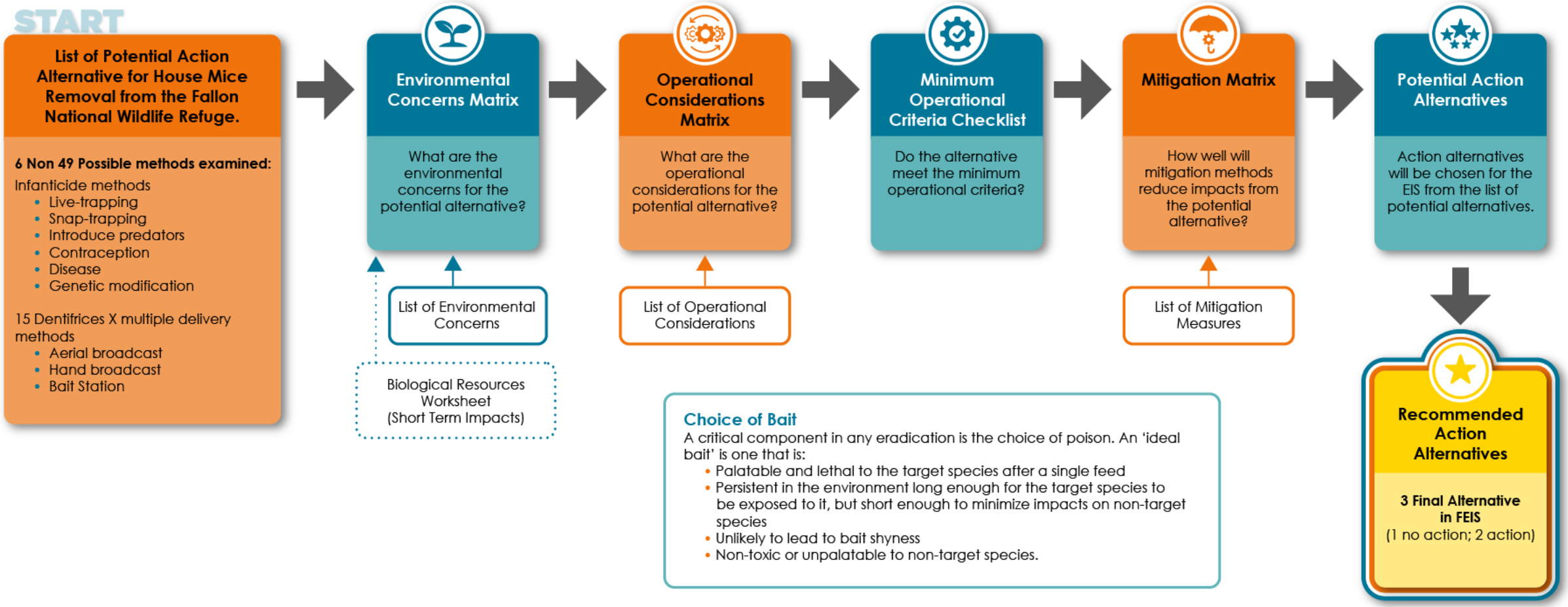
Alternative Selection



Operational Attributes

Comparison of Important Operational Attributes for each of the 2 Final Action Alternatives

Action Attribute	Alternative B (Preferred)	Alternative C
Toxicant Type/Product	Brodifacoun-25D Conservation (Bell Labs)	Diaphacinone-50 Conservation (Hacco, Inc.)
Primary bait delivery method (~90%)	Aerial Broadcast	Aerial Broadcast
Supplementary bait delivery method (~10%)	Hand Broadcast, Bait Station	Hand Broadcast, Bait Station
Timing: Start of application	Fall	Fall
Number of aerial application	2	3
Time between applications	10-21 days	~7 days
Minimum length of exposure required to ensure eradication	4 days following each application	At least 21 days of continuous exposure
Anticipated bait pellet application rates	24 lb/acre (16 lb/acre +8lb/acre) 27 kg/ha (18 kg/ha +9 kg/ha)	37.5 lb/acre (12.5 lb/acre x3) 42 kg/ha (14 kg/ha x3)
Anticipated total amount of rodent bait that would be applied	2,917 lb (1,323 kg)	4,482 lb (2,032 kg)
Concentration of rodenticide within rodent bait	0.0025%	0.005
Anticipated total amount of rodenticide to be applied	33g	102
Anticipated hours of flight time required for aerial bait application actions	About 11 hours (~5.5 hours x 2)	Abo
Total helicopter time over island for bait application	About 6 hours (~3 hours x 2)	Abo
Bait application duration	Up to 21 days (2 drops 10-21 days apart)	At l
Projected bait availability and palatability to gulls	Up to 5 weeks	Up
Anticipated hours of flight time required for gull hazing	Up to 70 hours (2 hours daily for 5 weeks)	Up to 2
Actions to minimize risk to non-target species	Timing of operation, gull hazing, raptor capture, calamander capture, carcass removal, use of bait stations	Timing of operation, gull hazing, raptor capture, calamander capture, carcass removal, use of bait stations
Actions to minimize bait drift	Baiting of areas above MHWS only, flying only in wind speeds of less than 30 kts, use of deflector and dribble buckets.	Baiting of areas above MHWS only, flying only in wind speeds of less than 30 kts, use of deflector and dribble buckets.

This table has too much information for a PPT slide. Furthermore the font is tiny for a PPT. Best practice is to not go below 14pt for a presentation PowerPoint. Is there any way to reduce the amount of info for the slide – we can place the full table in a handout?

OPERATIONS

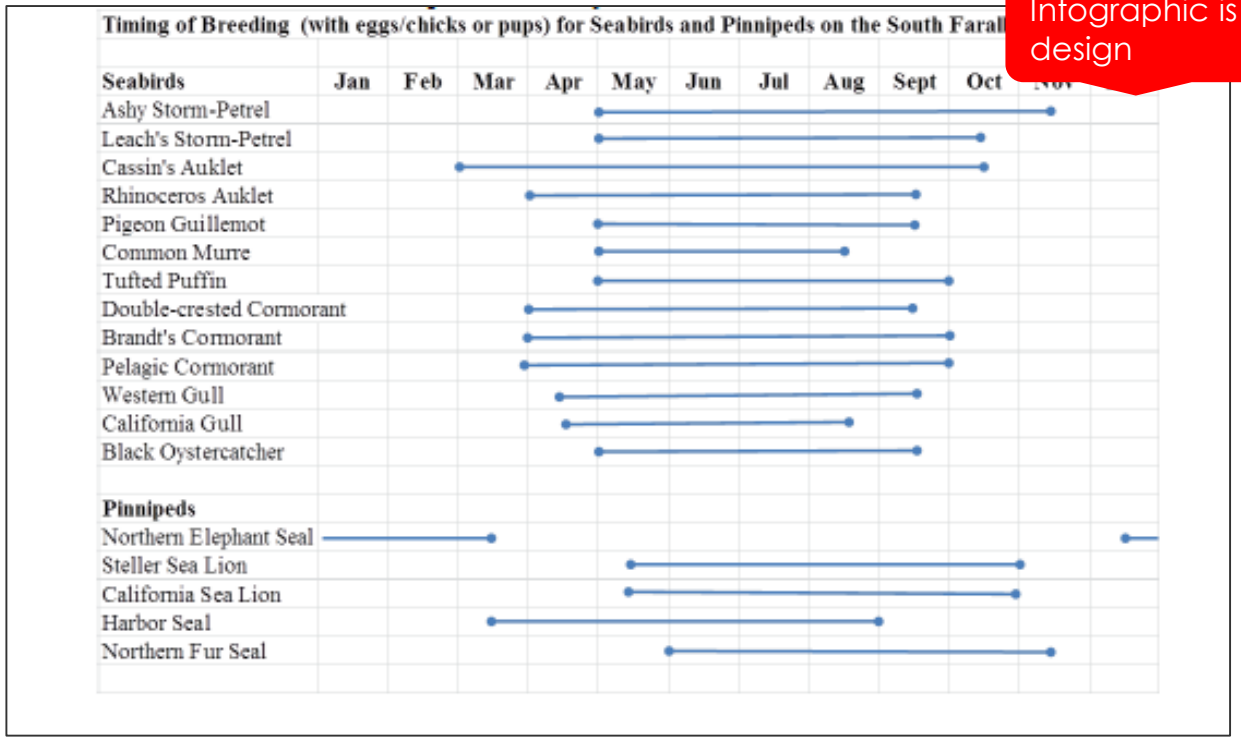
Baseline data informs project timing

Table 2.4: Overall Project Timing Considerations.

Issue or Constraint	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Mouse numbers increasing		X	X	X	X	X	X					
Increased likelihood of mouse breeding	X	X	X	X	X	X	X					
Seabirds breeding	X	X	X	X	X	X	X[1]	X[1]			X	X
More than 5,000 Gulls present (avg)	X	X	X	X	X	X			X	X	X	X
Pinnipeds breeding	X	X	X	X	X	X			X	X	X	X
Average rainfall >2"							X	X	X	X	X	X
Proposed Timing for Implementation								X				

[1]In October and November the only seabird species still breeding on the Farallon Islands is the ashy storm-petrel. Because ashy storm-petrels nest underground in small rock crevices and are nocturnal, they would be nearly unaffected by proposed eradication activities.

Create infographic that combines these 2 tables to delineate proposed timing for implementation vs wildlife presence on the island



Infographic is currently in design

Pre-operational activities

A number of pre-operational activities need to be completed prior to bait distribution

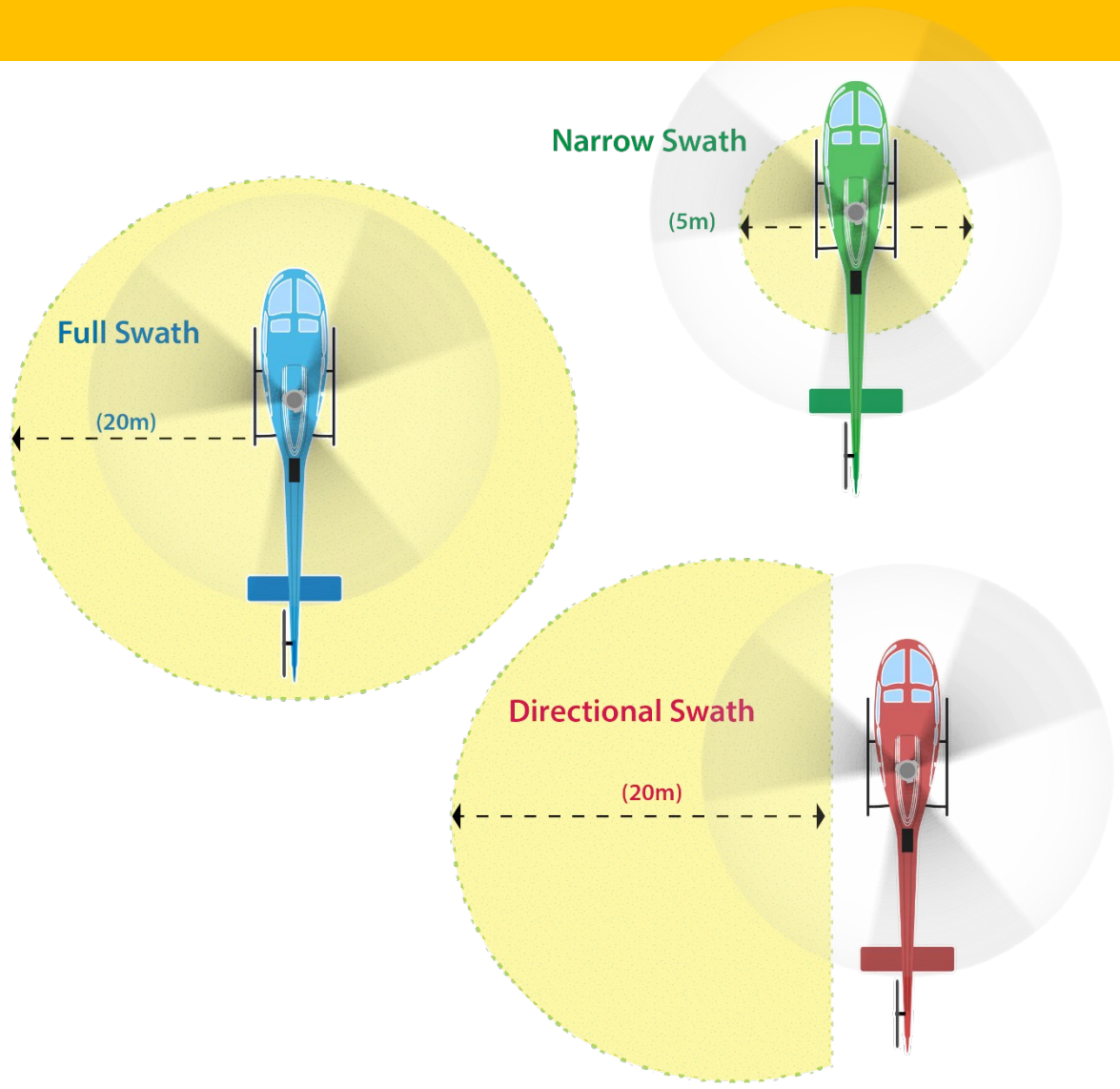
- Purchasing bait and materials
- Contracting appropriate helicopter support, aviculturist and veterinarian
- Constructing aviaries (e.g. PEFA) and on-island captive trials
- Mapping of flight lines
- Improving quarantine procedures
- Preparing contracts/agreements for all aspects of the eradication including the removal of stock
- Establishing all monitoring programs.

Operations

Go-No-Go Checklist

- A final decision to proceed with bait drop will be made the morning of the day of bait application.
- A decision to proceed will be reliant on a long-term weather forecast that predicts less than 25 knots of wind and five fine days (four fine nights) with no significant rainfall (less than 6mm).
- Long range weather forecasts will be obtained from more than one proven source.

Operations

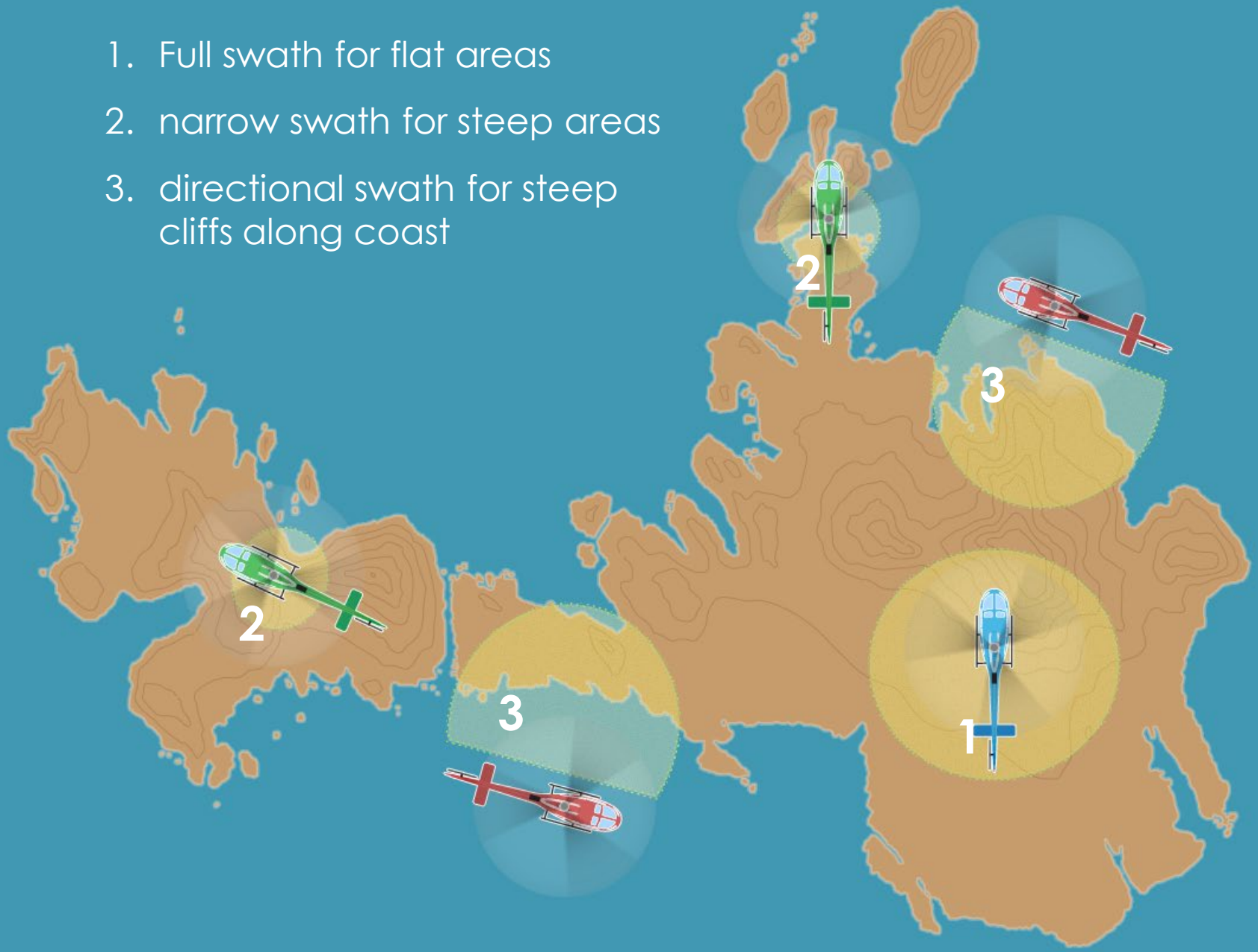


- Bait dispersed using a spreader bucket slung below a helicopter.
- Dose rate, bait direction and swath width can all be controlled within set limits.
- Differential GPS to guide the helicopter along a set of pre-determined paths.
- Plots of the actual path flown will be inspected and any identified gaps will be re-flown.
- Additional precautions will be taken to ensure that spillage of bait into the marine environment is minimized.

Operations

Helicopter with GPS can target direction of bait drop depending on terrain

1. Full swath for flat areas
2. narrow swath for steep areas
3. directional swath for steep cliffs along coast

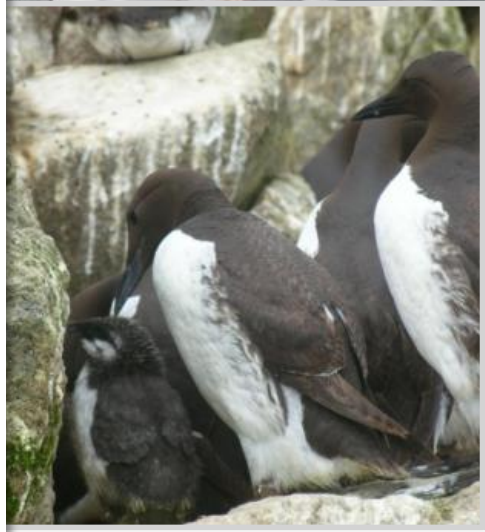


Operations

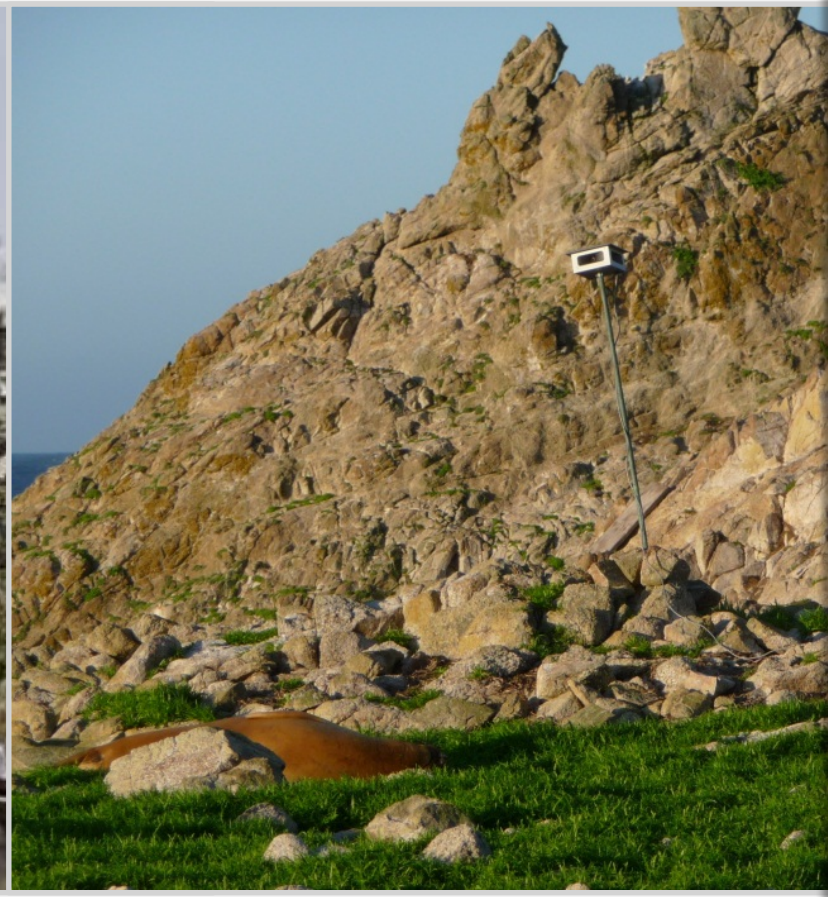
- Gulls
- Raptors
- Salamanders
- Invertebrates
- Fish
- Pinnipeds
- Habitats
- Water
- Soil
- Wilderness
- People

Protecting wildlife and habitats during operations



Protection Measures during bait drop



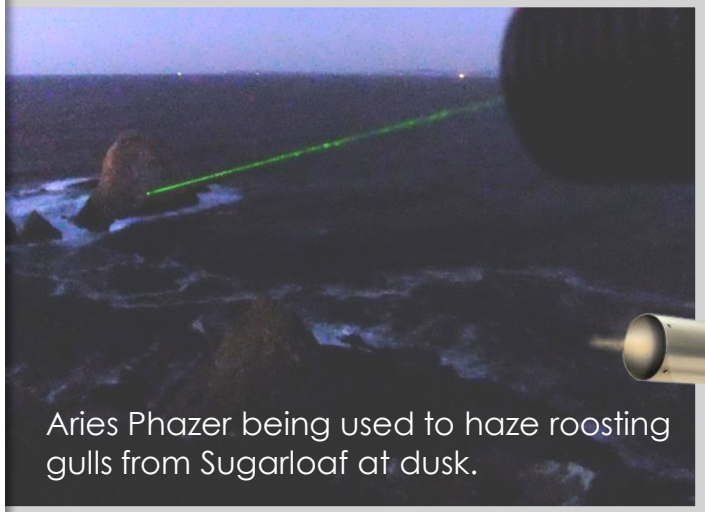
Operations

- Operations
- Timing
- Gull hazing
- Capture birds of prey
- Capture salamanders
- Carcass removal
- Monitoring and adaptive management

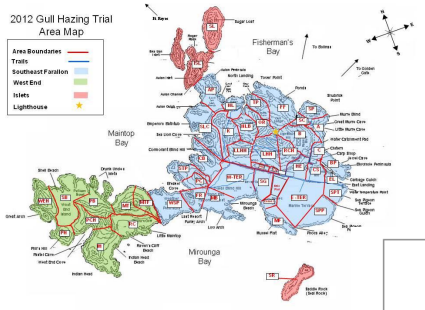
OPERATIONS

Gull Hazing will use various bird deterrent techniques

Treatment Type	Product Examples
Biosonic	bird distress calls; varying sound patterns
Pyrotechnic	cracker shell, screamer rocket, cannon
Laser	penlight laser, avian dissuader laser
Mechanical	human, helicopter
Passive visual cues	gull effigy, kites, owl decoy, mylar tape



Aries Phazer being used to haze roosting gulls from Sugarloaf at dusk.



Sectors used for monitoring gull numbers and behavior during the hazing trial on the South Farallon Islands.

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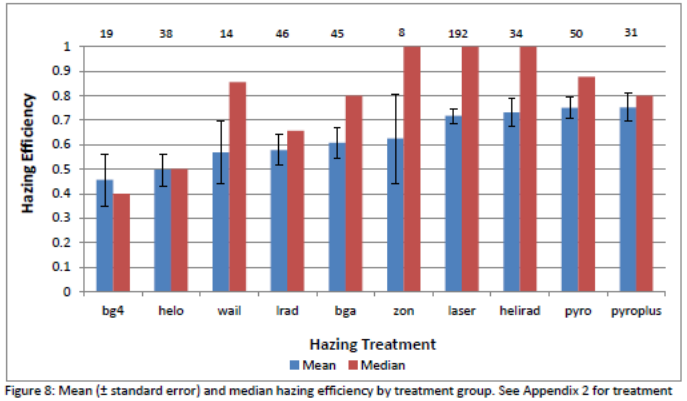


Figure 8: Mean (± standard error) and median hazing efficiency by treatment group. See Appendix 2 for treatment legend and description of treatment groups. Values along the top x axis indicate sample size.

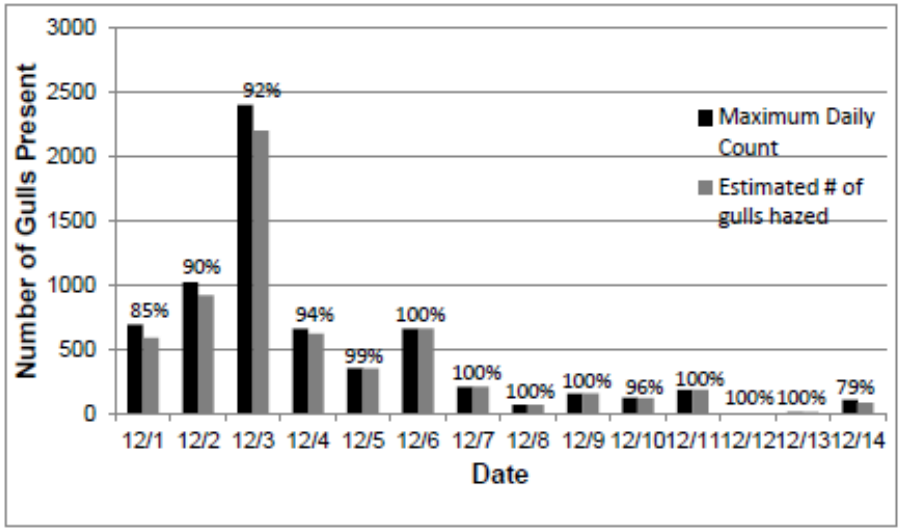


Fig. 6. The maximum number of gulls present on the South Farallon Islands at any given time (based on 1/2 hourly gull counts) and the estimated number that were successfully hazed during a gull hazing trial completed in December 2012. Percentages represent the daily hazing effectiveness. Hazing efforts were reduced on December 14 due to departure of staff.

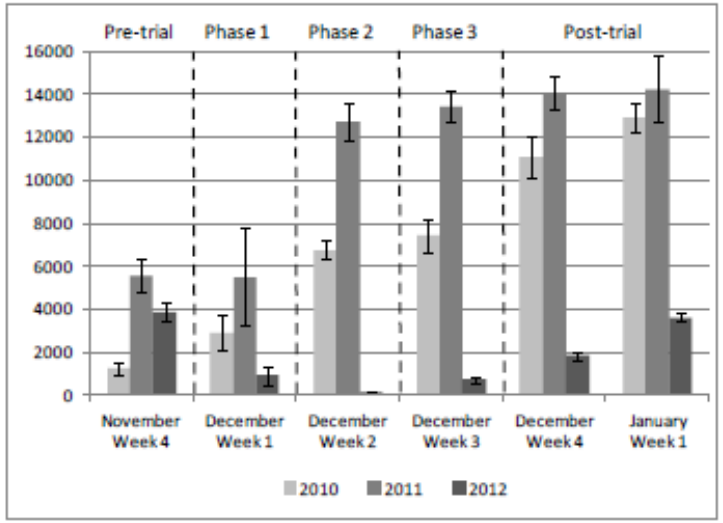


Fig. 4. Mean number of gulls present on the South Farallon Islands during the 2010, 2011 and fall/winter seasons. Active gull hazing was conducted during the first two weeks of December

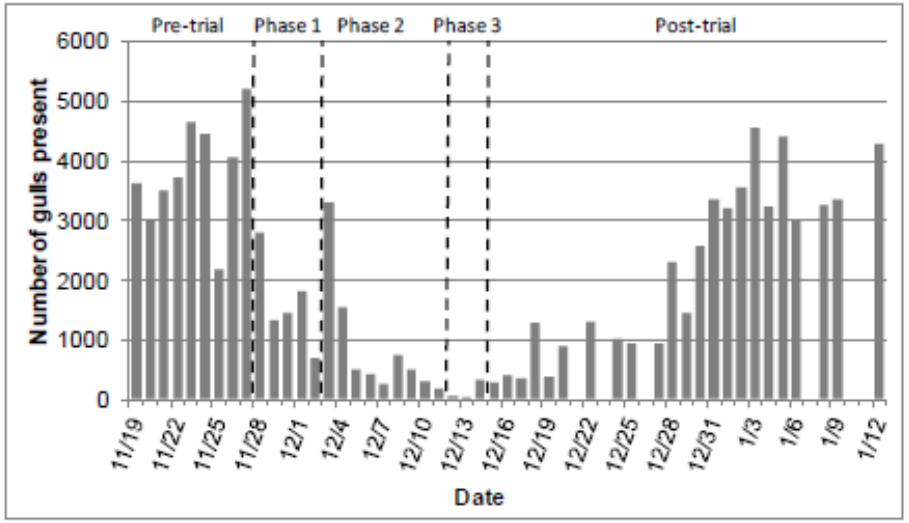
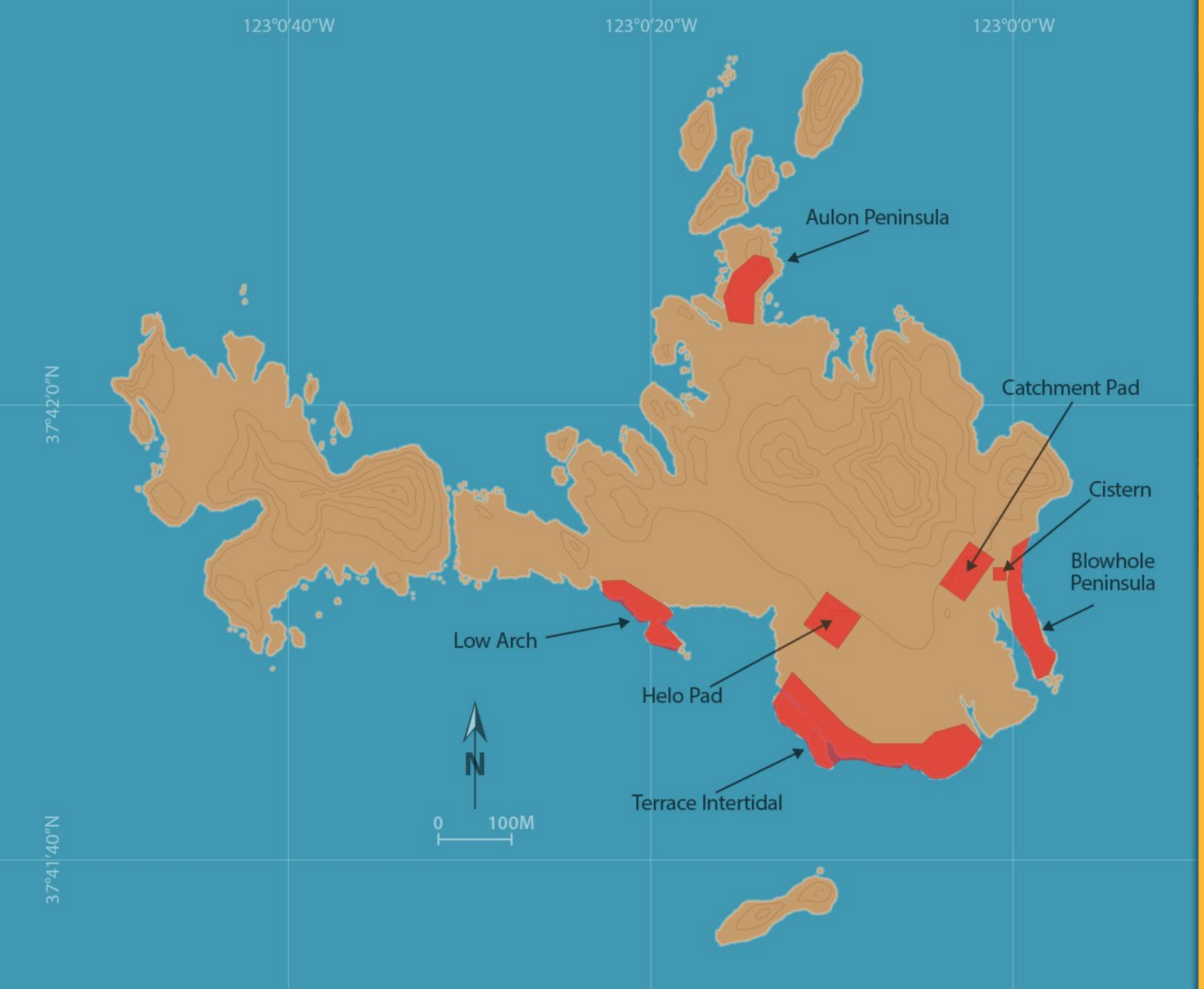


Fig. 5. The maximum number of gulls present at dawn throughout the course of the gull hazing trial. The dashed vertical lines delineate the different phases of the trial (see Table 1). Full island active hazing efforts occurred during Phase 2.

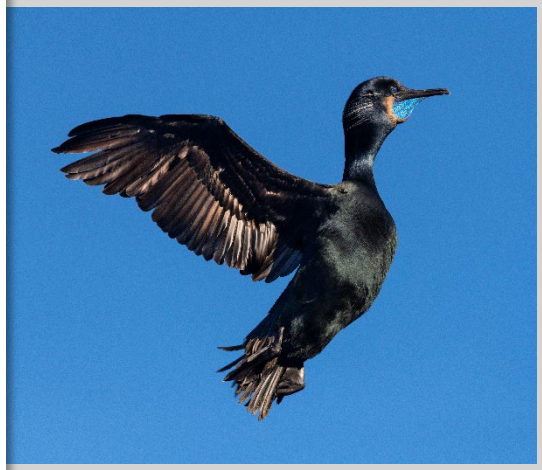


Late Fall / Early Winter major gull roosting areas on Southeast Farallon Island

Operations

Monitoring before, during and after baiting will include:

- Birds
- Salamander and camel cricket
- Vegetation
- Intertidal (Water? Fish? Other?)
- Soil?
- Ponded water?




OPERATIONS

Contingency Plans –

1

Bait spill scenarios

- A shipping accident or incident during the transfer of bait by helicopter from ship to shore results in bait entering the marine environment;
- A bait spreading bucket with a partial or full load of bait is lost into the marine environment; and
- A bait spreading bucket with a partial or full load of bait or container of bait being stored on Southeast Farallon Island is spilled into the terrestrial environment.

OPERATIONS

Contingency Plans –

2 **Non-target impacts to terrestrial or marine biota –** outline the triggers the Service will use to identify the need for response action and the contingency responses that will be put in place to minimize the consequences of eradication activities to non-target biota.

- Potential failures or deficiencies of the hazing program to reduce risk of western gulls and other congregating bird species at risk of exposure to rodenticide; and
- Monitoring results indicate that significant impacts to a species' population or exceedance of allowable take by permit appear likely to occur under current conditions.

OPERATIONS

Contingency Plans – Bait Spill

SCENARIO	PRECAUTIONS	RESPONSE
Bait Enters Marine Environment	• Bait in secure water-resistant containers • Shipping only when sea conditions are suitable • Helo off-loading only when conditions are suitable • Only one bait container airlifted at a time • Container attached by at least 2 straps that individually exceed limits of load • Aviation, maritime and shipping regulations followed • Flight log maintained	• National Response Center and other federal and state authorities notified immediately • All attempts to determine a safe and feasible way to recover the bait container(s) • USFWS staff document the coordinates of spill and support response authorities to recover lost container(s) • Spill kits carried on-board vessels transporting bait
Bait Spreading Bucket Lost Into Marine Environment	• Spreader bucket not loaded over capacity • Helo not loaded over capacity • Aerial bait spread only when conditions are suitable • Experienced pilot • Helo remains within 200m of land • Bucket attached by at least 2 straps that individually exceed limits of load • Aviation regulations followed • Flight log maintained	• National Response Center and other federal and state authorities notified immediately • USFWS staff document the coordinates of spill and support response authorities to recover lost bucket and any uncontained bait • Spill kits carried on-board vessels transporting bait
Bait Spreading Bucket Spilled Into Terrestrial Environment	• Spreader bucket not loaded over capacity • Helo not loaded over capacity • Containers placed on stable, flat surfaces • Sufficient number of personnel used • Aerial bait spread only when conditions are suitable • Experienced pilot • Bucket attached by at least 2 straps that individually exceed limits of load • Aviation regulations followed • Flight log maintained	• USFWS staff document spill location and initiate bait recovery • Spill kit available on Southeast Farallon Island

Contingency Plans – Non-Target Impacts

Scenario 1: Hazing not effective prior to broadcasting bait	
Potential triggers: ● Daily hazing effectiveness less than XX %... ● Greater than XX # of gulls present on the island for a significant period of time e.g. more than 30 minutes	Potential Response Increase hazing effort or modify methods . Delay broadcast until sufficient hazing success is achieved. Last resort action: Cancel rodenticide bait application and re-evaluate project.
Scenario 2: Hazing effectiveness declines after bait application (either 1rst or 2nd application)	
Potential triggers: ● XX # of gulls observed consuming bait pellets or roosting in baited areas ● Discovery of XX # fresh gull carcasses showing signs of rodenticide poisoning…	Potential Response Increase hazing effort or modify methods (i.e. more pyros, deploy more effigies, more human presence) . Reduce bait exposure by manually collecting or destroying pellets in difficult to haze areas. Last resort action: manually collect or destroy pellets across all accessible areas. Cancel second bait drop if Scenario 2 occur between 1st and 2nd bait application.
Scenario 3: Sick, dying, or deal gulls suspect of being poisoned, observed in tourist areas	
Potential triggers: ● Greater than five dead or dying gulls are reported within a five day period from one location within the City of San Francisco other than a beach. ● Greater than ten dead or dying gulls are reported within a five day period from one location within the City of San Francisco other than a beach. ● Greater than 25 dead or dying gulls are reported within a five day period from one location within the City of San Francisco other than a beach. ● Dead or dying gulls are being reported in several areas.	**Potential Response** · Staff or trained volunteer(s) is dispatched to collect the birds (if possible) and conduct a survey of the area for additional bird would be collected. Birds would be taken to a previously identified facility for necropsy and collection of tissue samples for analysi anticoagulant rodenticide. Carcasses would then be incinerated. · Surveys of other nearby tourist areas are conducted for the presence of dead or dying gulls suspected of anticoagulant roden · Facility is notified to report any other dead or dying birds suspected of anticoagulant rodenticide poisoning. · Standardized surveys are designed and conducted within popular tourist areas for the presence of dead or dying gulls suspec anticoagulant rodenticide poisoning. · Press release that dead or dying gulls have been observed at certain tourist areas. Include information about what to do if a gull is found, including keeping pets away from potentially poisoned wildlife.
Scenario 4: Hazing results in pinniped take that is likely to exceed allowable numbers.	
Potential Triggers: ● Pinniped take (especially flushing) is significantly higher than expected. ● Stampeding behavior is observed. ● Pinniped take limits for one or more of the five species may be met. ANY pinniped mortality observed.	**Potential Response** · Modify hazing methods (i.e. use fewer pyros). · Reduce hazing in the areas that are most sensitive to pinniped take. · Consult with NOAA and the Marine Mammal Laboratory to increase take limits. · Eliminate hazing near major pinniped haul-outs areas. · Last resort action: cease all hazing activity. Note: this may be required if any pinniped mortality is observed.
Scenario 5: Bait application operations results in high pinniped take that is likely to exceed allowable numbers.	
Potential Triggers: ● Pinniped take (especially flushing) is significantly higher than expected. ● Stampeding behavior is observed. ● ANY pinniped mortality observed.	**Potential Response** · Modify rodenticide bait application methods. · Increase altitude of helicopter for aerial applications. · Restrict helicopter activity to areas without high concentrations of pinnipeds. Hand bait those areas if accessible. · Reduce hazing in the areas that are most sensitive to pinniped take. · Consult with NOAA and the Marine Mammal Laboratory to increase take limits. · Eliminate baiting near major pinniped haul-out areas. · Last resort action: cease all bait application activity. Note: this may be required if any pinniped mortality is observed.
Scenario 6: Sick, dying or dead marine fish suspected of being poisoned…	
Potential Triggers: ● An individual crab or fish sample tests positive for anticoagulant rodenticide between first and second bait applications, or following the second bait application. ● Five or more crabs or fish test positive for anticoagulant rodenticide between first and second bait applications, or following the second bait application	**Potential Response** · Immediate notification of USFWS, CDFW, and NOAA personnel. · Consider implementing protocol to collect additional samples for immediate analysis of anticoagulant rodenticide; and · Eradication team meets to discuss improved baiting strategy to further minimize bait drift. · Consult with CDFW and NOAA to determine communication with fishing community. · If warranted, meet with federal, state, and local agencies and fishing community to discuss potential fishery action. · Consider implementing protocol to collect additional samples for immediate analysis of anticoagulant rodenticide; consider expanding geographic scope or diversity of marine species within sampling program. · Consider cancelling second bait drop.

The only way to simplify this is to reduce content – pick out only the most important points and word it as succinctly as possible. Unfortunately, we can only guess at what is important. It would be best if the client could provide reduced content. Also, most likely, this table would need to be divided into 6 different slides with 1 scenario on each slide.

Anacapa island

Howald et al

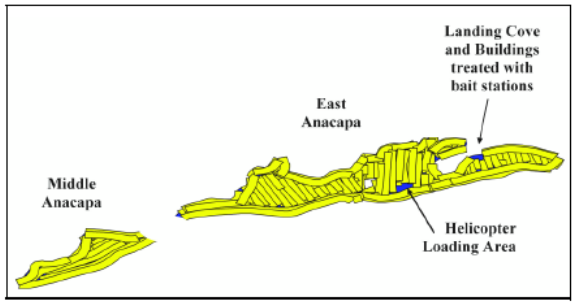


Figure 1. Final Differential GPS/computer link printout of the bait spread by helicopter on East Anacapa Island, 2001. The rectangular shapes represent the flight lines of the helicopter while broadcasting bait. The width of the flight lines represents how far and wide bait was spread onto the island. Note that the flight lines follow along the shoreline.

TABLE 1 Brodifacoum residue decline in degrading bait pellets. The initial concentration of toxin in bait pellets was 25 ppm. Mean ppm (±SD) is shown for samples in the natural environment. Each replicate was 10 bait pellets homogenized into one sample.

Time (n)	Mean ppm ± SD	% decline
1 week (3)	16.3 ± 3.4	35
6 weeks (2)	11.3 ± 1.2	55
6 months (1)	1.9	92

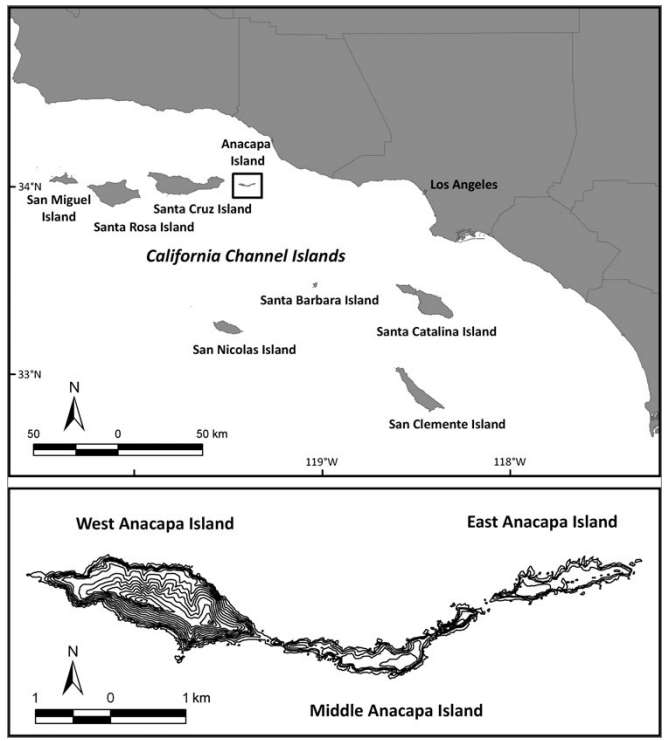


Figure A19. The upper island plateau between Keyhole Cave and the Eucalyptus Grove on Middle Anacapa Island, 18 October 2009.

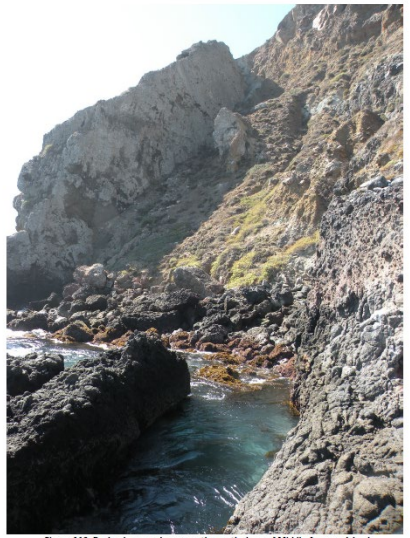


Figure A13. Rocky slopes and scree on the south shore of Middle Anacapa Island near the East Fish Camp Anchorage, 15 October 2009.

\# acres?

Table 14. Attraction of marine fishes to placebo baits, Anacapa Island, Spring 2000

Common Name [a]	Species Name	Event: No action	Inspected Bait	Touched Bait	Chewed Bait	Consumed Bait	Grand Total [b]
Blacksmith (391)	*Chromis punctipinnis*	22%	0%	0%	0%	0%	22% (11)
Garibaldi (19)	*Hypsypops rubicundus*	6%	6%	6%	0%	0%	18% (9)
Kelp bass (11)	*Paralabrax clathratus*	6%	2%	2%	0%	0%	10% (5)
Opaleye (100)	*Girella nigricans*	16%	4%	4%	0%	0%	24% (12)
Senorita (7)	*Oxyjulis californica*	2%	2%	2%	0%	0%	6% (3)
Sheephead (7)	*Pimelometopon pulchrum*	6%	0%	2%	2%	0%	10% (5)
Unidentified (14)	*Unidentified*	2%	2%	2%	0%	0%	6% (3)
Zebra perch (1)	*Hermosilla azurea*	0%	0%	2%	0%	0%	2% (1)
None (1)	*none*	2%	0%	0%	0%	0%	2% (1)
Grand Total		62% (31)	16% (8)	20% (10)	2% (1)	0% (0)	100% (50)

[a] Total number of individuals of a species during study in brackets.
[b] Number of events in brackets.

Carter et al)

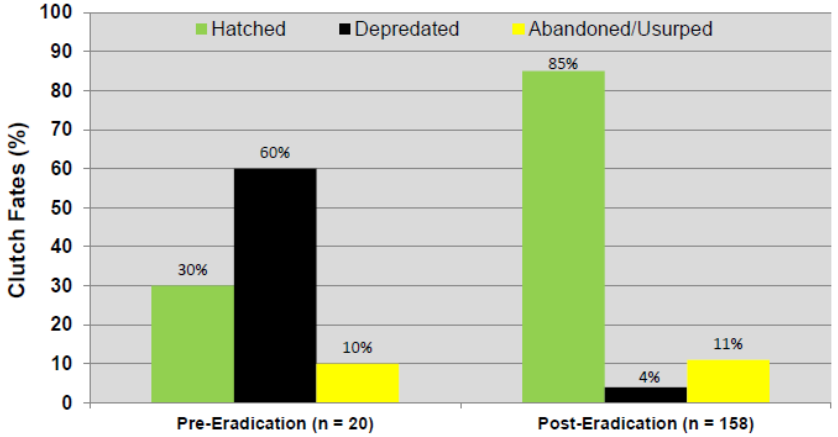
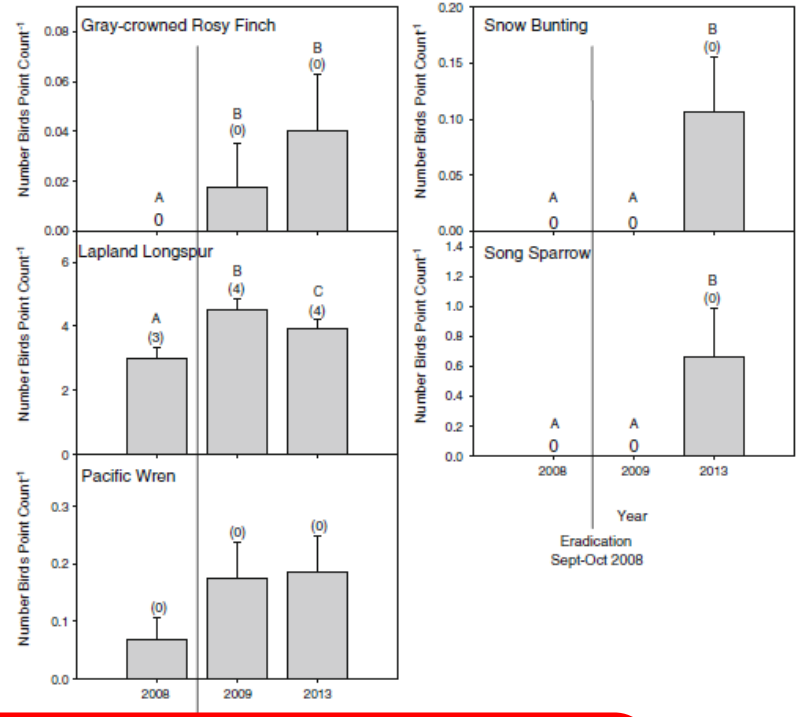


Figure 11. Comparison of Xa... ...003-10).

This slide is still in design. However to fit all this content we would need to place it on 3 to 4 slides. Please advise if all information in this slide needs to be included or if there is a way to reduce content.

Rat/Hawadak Island

Croll et al



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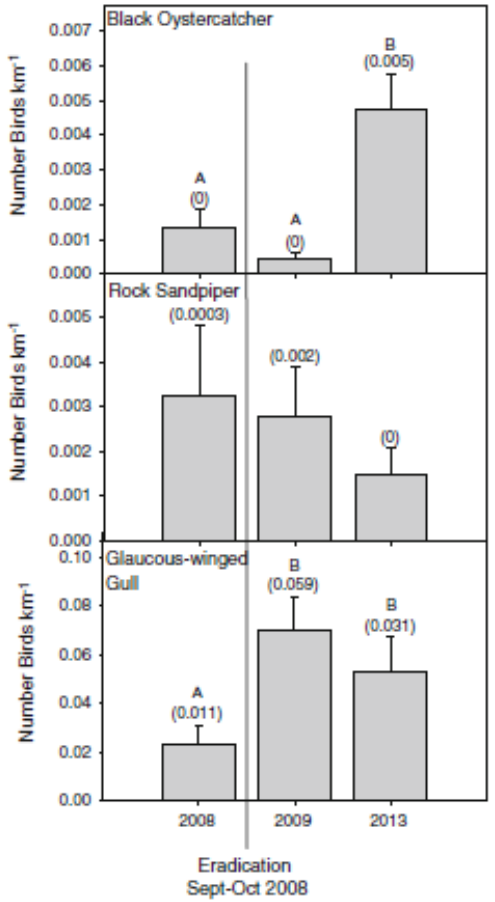

Fig. 4 Annual changes in shorebird and seabird abundance (mean ± SE) on Hawadax Island pre- versus post-eradication (2008 vs. 2009 and 2013) from beach surveys; median values are shown in parentheses. Comparisons conducted using Van der Waerden test. *A*, *B* indicate significantly different data, $p < 0.05$

Table 4 Extant species observed (X) on land or on beaches (not over water) on Hawadax Island during surveys or as incidental observations including the total number of nests recorded

Order	Scientific name	Common name	Breeding status	Presence		Nests (2013)
				2008	2013	
Anseriformes	*Branta hutchinsii leucopareia*	Aleutian Cackling Goose	B	X	X	5
	Chen caerulescens	Snow Goose			X	
	Somateria mollissima	Common Eider	B	X	X	1
	Anas crecca	Green-winged Teal	B	X	X	0
	Anas penelope	Eurasian Wigeon			X	
	Histrionicus histrionicus	Harlequin Duck		X	X	
	Aythya marila	Greater Scaup			X	
	Mergus serrator	Red-breasted Merganser			X	
Charadriiformes	*Larus glaucescens*	Glaucous-winged Gull	B	X	X	30
	Haematopus palliates	Black Oystercatcher	B	X	X	6
	Stercorarius parasiticus	Parasitic Jaeger		X	X	
	Cepphus columba	Pigeon Guillemot		X	X	
	Phalaropus lobatus	Red-necked Phalarope		X	X	
	Calidris ptilocnemis	Rock Sandpiper	B	X	X	5
	Fratercula cirrhata	Tufted Puffin	B		X	6
	Charadrius semipalmatus	Semipalmated Plover		X		
	Pluvialis fulva	Pacific Golden Plover			X	
	Tringa incana	Wandering Tattler			X	
Falconiformes	*Haliaeetus leucocephalus*	Bald Eagle	B	X	X	5
	Falco peregrinus	Peregrine Falcon	B	X	X	2
Passeriformes	*Leucosticte tephrocotis*	Gray-crowned Rosy Finch	B	X	X	0
	Calcarius lapponicus	Lapland Longspur	B	X	X	1
	Fringilla montfringilla	Brambling		X		
	Troglodytes troglodytes	Pacific Wren	B	X	X	0
	Melospiza melodia	Song Sparrow	B		X	2
	Plectrophenax nivalis	Snow Bunting	B	X	X	0
	Corvus corax	Common Raven	B		X	0
Pelicaniformes	*Phalacrocorax pelagicus*	Pelagic Cormorant	B		X	0
Galliformes	*Lagopus muta*	Rock Ptarmigan	B	X	X	0
	Grus canadensis	Sandhill Crane		X		
Total # observed			17	20	27	63

Not all species reported to be breeding (B) on Hawadax Island were observed with nests during the 2013 survey

Table 1 The number of active nests, eggs, and chicks, found at two Glaucous-winged Gull colonies before (2008), 1 year (2009), and 5 years (2013) post rat eradication on Hawadax Island, Alaska

	Pre	Post	
	2008	2009	2013
# Active nests	5	13	27
Total eggs (mean ± SE nest^{-1})	5 (1 ± 0.63)	27 (2.08 ± 0.7)	22 (0.81 ± 0.18)
Total chicks (mean ± SE nest^{-1})	0	4 (0.31 ± 0.21)	0

Conclusions

- Introduced, invasive house mice are impacting Farallon Islands ecosystem.
- Eradicating mice will remove their negative impacts.
- Conservation rodenticides are only proven method.
  - One time event.
  - Distinct from ongoing control.
- Project benefits must outweigh risks.