Lincoln University
Te Whare Wānaka o Aoraki

Predator Free Banks Peninsula: Pipe dream or possibility?

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Parameters

Banks Peninsula

- Contains many native species and favourable geography
- Size (115,600 ha) and mixed land uses presents challenges

Target predators

- Rats (Norway and ship)
- Possums
- Ferrets
- Stoats

Defining predator free

- Eradication
  - Achieved on NZ offshore islands (e.g. Campbell Island)
- Control at zero densities
  - Requires ongoing control
  - Achieved in mainland ecosanctuaries (e.g. Zealandia)
- Control at low densities
  - Requires ongoing control
  - Accepts persistent predator population
  - Goal of mainland operations (e.g. Battle for our Birds)

Social factors

- The community will have significant impacts on the success of Predator Free Banks Peninsula (PFBP)
- Individual landowners can limit the success of PFBP
- A survey could help gauge landowner and community support for PFBP and identify acceptable methods
- PFBP success requires an adequate legislative framework

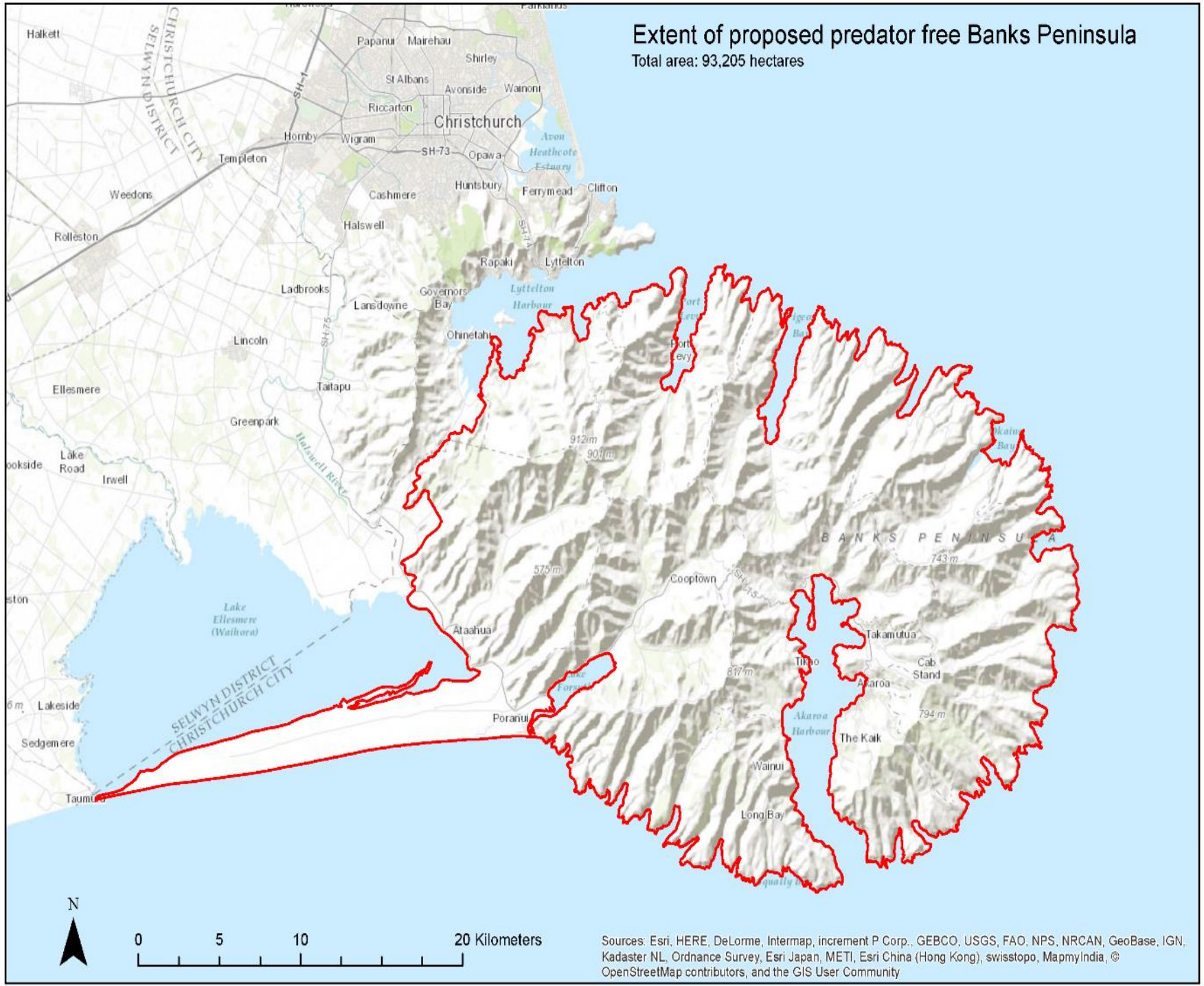
Predator removal methods

- Traps
  - Many options. High labour, low by-kill, socially acceptable
- Aerial broadcast toxins
  - Low labour, relatively high by-kill, controversial
  - Effectiveness and negative impacts are toxin-dependent
    - Brodifacoum: Proven effective at eradication but significant environmental risks
    - Sodium fluoroacetate (1080): Relatively cheap but does not achieve eradication
- Hand broadcast toxins
  - Simulates aerial broadcast, but high labour requirements
- Toxic bait stations
  - Moderate labour requirements
  - Mitigate negative effects of toxins

Trap options evaluated

Trap name	***Cost*** *(incl GST)*	***Rats***	***Stoats***	***Possums***	***Ferrets***
DOC 150	*$72*	NAWAC ✓	NAWAC ✓	*Ineffective*	*Ineffective*
DOC 200	*$78*	NAWAC ✓	NAWAC ✓	*Ineffective*	*Ineffective*
DOC 250	*$150*	NAWAC ✓	NAWAC ✓	*Ineffective*	NAWAC ✓
Sentinel	*$30*	*Ineffective*	*Ineffective*	NAWAC ✓	*Ineffective*
Victor Easy Set	*$7*	NAWAC ✓	NAWAC X	*Ineffective*	*Ineffective*
Modified Victor Easy Set	*$14*	NAWAC ✓	NAWAC ✓	*Ineffective*	*Ineffective*
Nooski Trap System	*$20*	NAWAC ✓	*Ineffective*	*Ineffective*	*Ineffective*
Warrior	*$37*	*Ineffective*	*Ineffective*	NAWAC ✓	NAWAC X
Timms	*$54*	*Ineffective*	*Ineffective*	*NAWAC X*	NAWAC X
Trapinator	*$52*	*Ineffective*	*Ineffective*	NAWAC ✓	*Ineffective*
Goodnature A12 Resetting	*$172*	*Ineffective*	*Ineffective*	NAWAC ✓	*Ineffective*
Goodnature A24 Resetting	*$172*	NAWAC ✓	NAWAC ✓	*Ineffective*	*Ineffective*

	Grid density (per ha)	Max swim distance (km)
Norway rats	4	0.5
Ship rats	4	1
Possums	1	unknown
Ferrets	0.1	<3
Stoats	0.1	3


Extent of proposed predator free Banks Peninsula
Total area: 93,205 hectares
Halkett
Papanui
Mairehau
Shirley
St Albans
Avonside
Wainoni
Riccarton
Christchurch
Hornby
Wigram
Templeton
Opawa
Avon Heathcote Estuary
Weedons
Cashmere
Huntsbury
Ferrymead
Clifton
Halswell
Rolleston
Rapaki
Lyttelton
Ladbrooks
Governors Bay
Lansdowne
Lyttelton Harbour
Lincoln
Ohinetahi
Port Levy
Ellesmere
Taitapu
Greenpark
Lake Road
Irwell
Halswell River
912m
901m
BANKS PENINSULA
743m
575m
Cooptown
Ataahua
Takamutua
Tikao
Cab Stand
817m
Akaroa
794m
Akaroa Harbour
The Kaik
Lake Ellesmere (Waihora)
SELWYN DISTRICT
CHRISTCHURCH CITY
Lakeside
Sedgemere
Poranui
Wainui
Long Bay
N
0
5
10
20 Kilometers
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Biosecurity

- Predator-proof fence (approximately 20km)
- Buffer zones
  - One or both sides of the fence?
  - Coastlines within 3km of untreated areas?
- Monitoring network
- Quarantine facilities
- Rapid response

Predator removal scenarios

Scenario	Removal Devices
1: Bait stations	OSKA bait stations, DOC 250 traps
2: Single use traps	DOC 150 & 250 traps, Trapinator traps
3: Self-resetting traps	Goodnature A12 & A24 traps, DOC 250
4: Aerial brodifacoum	Aerial brodifacoum, DOC 250
5: Aerial 1080	Aerial 1080 [does not achieve removal]

$ millions	Scenario One: bait stations	Scenario Two: single use traps	Scenario Three: self-resetting traps	Scenario Four: aerial brodifacoum	Scenario Five: aerial sodium fluoroacetate
				Significant environmental risks	Controls rats, possums, and stoats at low densities. No ferret control.
Predator removal	$87.92	$134.17	$132.41	$89.15	$2.89
Predator-proof fence construction	$6.52	$6.52	$6.52	$6.52	
Monitoring grid setup	$0.35	$0.35	$0.35	$0.35	
Total initial cost	$94.74	$140.99	$139.25	$96.02	$2.89
Predator-proof fence maintenance (annual)	$0.33	$0.33	$0.33	$0.33	
Monitoring (annual)	$1.32	$1.32	$1.32	$1.32	
Additional control (5 yearly)					$2.89
Total ongoing cost (annual)	>$1.65	>$1.65	>$1.65	>$1.65	$0.60
Estimated removal operation time	7.7 years	10.2 years	5.5 years	Not calculated	Not calculated
Present value of costs (r = 6%)	$91.2	$121.2	$136.4	$118.4	$9.5

Operation	Predator removal cost Including GST (where applicable)	Area (ha)	Cost ha^{-1} Including GST
Scenario One: bait stations	$87.9 m	93,205	$943
Scenario Two: single use traps	$134.2 m	93,205	$1,440
Scenario Three: self-resetting traps	$132.4 m	93,205	$1,421
Scenario Four: aerial brodifacoum	$78.0 m	93,205	$837
South Georgia Island	$15.4 m	108,423	$142
Maungatautari	$23 m	3,400	$6,765
Half Moon Bay: bait stations (estimate)	$10.8 m	4,800	$2,252
Half Moon Bay: traps (estimate)	$14.4 m	4,800	$2,993
All of New Zealand (estimate)	$36,800 m	26,802,100	$1,373

Summary

- Community support will be key to achieving PFBP
- Achieving PFBP using existing non-aerial methods is estimated to cost approximately $88m to $134m
- There are high labour demands
  - 100 FTE is a lot of voluntary labour
- There would be considerable ongoing costs
  - (planning, consent, administration, and ongoing predator management)
- Costs could be reduced by
  1. targeting fewer species,
  2. controlling predators at low (rather than at zero) densities, or
  3. including volunteer labour

Get the report here https://hdl.handle.net/10182/8060