



Boffa Miskell

Falcon Monitoring WHITE HILL WINDFARM

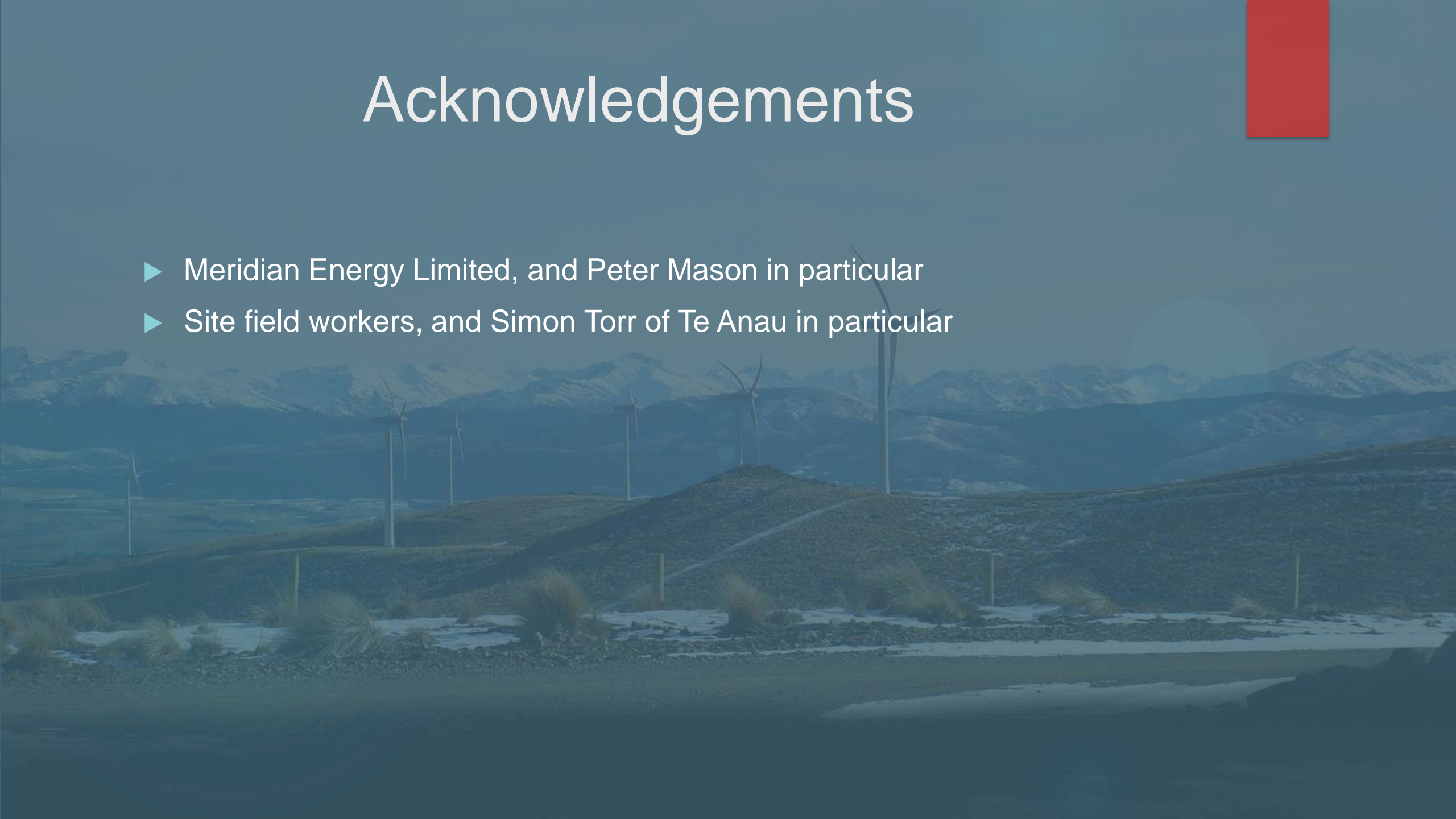


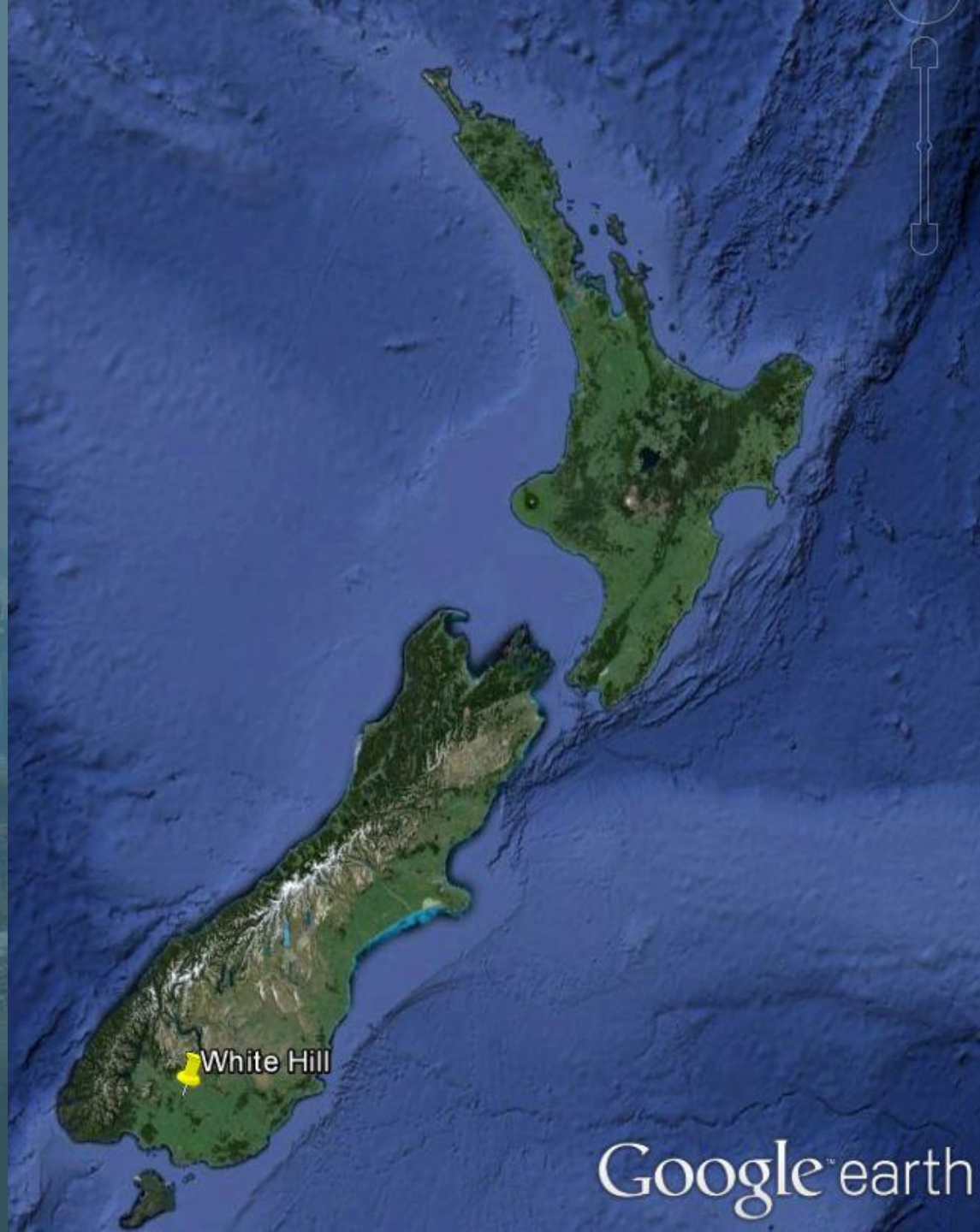
Presentation overview

- ▶ New Zealand Falcon presence and potential effects
- ▶ White Hill wind farm and its ecological values
- ▶ Relevant consent conditions and work undertaken
- ▶ Summarise results of 8 years monitoring
- ▶ Use of motion triggered cameras
- ▶ Predator control
- ▶ Other potential monitoring methods

Acknowledgements

- ▶ Meridian Energy Limited, and Peter Mason in particular
- ▶ Site field workers, and Simon Torr of Te Anau in particular





Queenstown

White Hill

Dunedin

Invercargill

Image Landsat
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

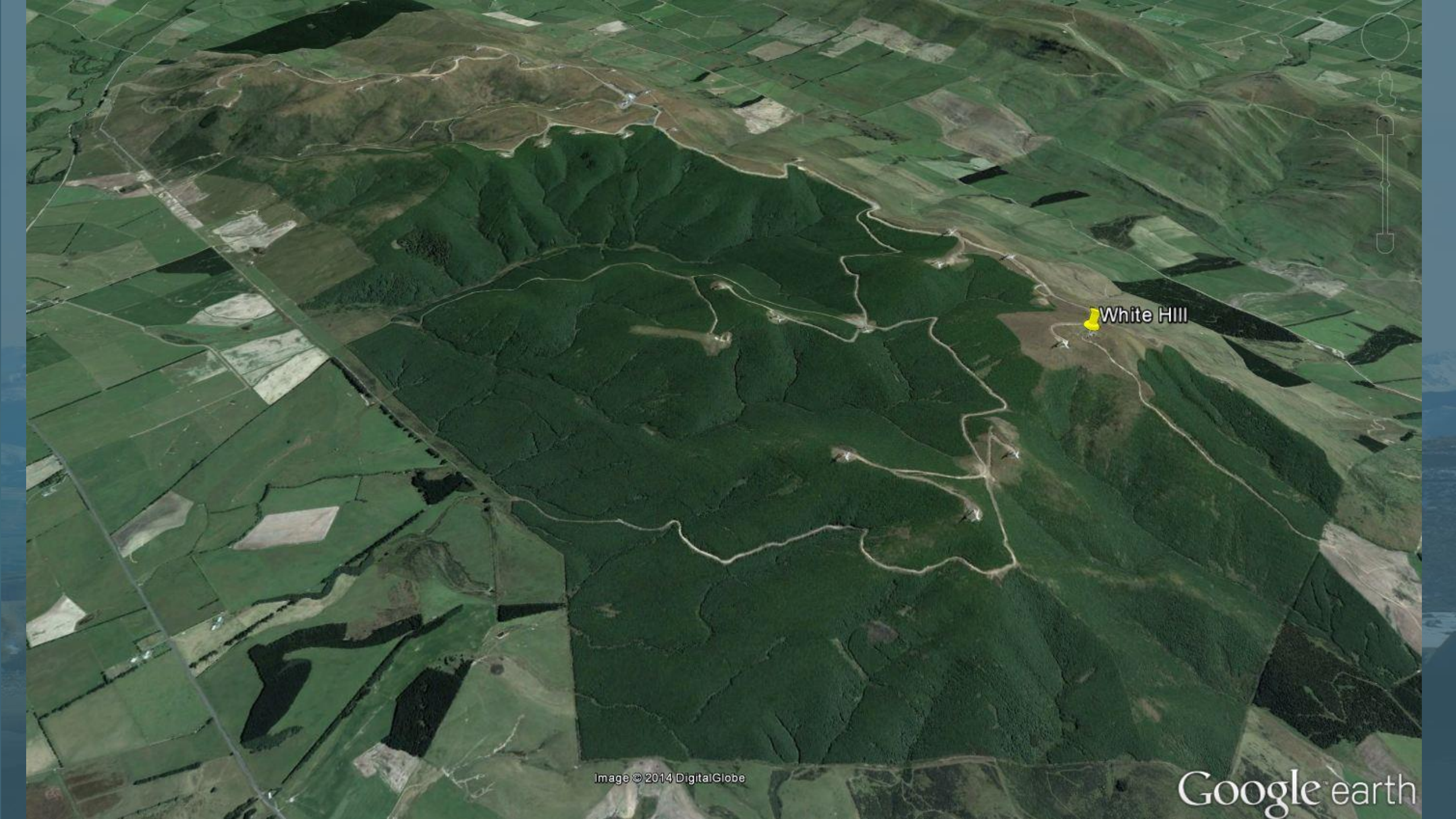
Google earth

White Hill Wind Farm

- ▶ Meridian owned wind farm
- ▶ Consented December 2004, Council hearing, operational June 2007
- ▶ 29 turbines, 107 m (including blade) high, potential 58 megawatts generation

Ecological Values

- ▶ Cool montane climate
- ▶ Vegetation:
 - ▶ beech forest prior to human arrival
 - ▶ until recently largely indigenous red tussock (*Chionochloa rubra*) grassland and grey shrubland, small silver beech forest (*Lophozonia menziesii*) remnants, exotic grassland at lower altitudes
 - ▶ Douglas fir forest over much of site now (land owned by forestry company)
- ▶ Birds: typical of forest and open grassland



White Hill

New Zealand Falcon



Source: NZ Bird Online, Craig McKenzie

- ▶ *Falco novaeseelandiae* (Eastern form) / kārearea
- ▶ 45 cm, ~ 500 g
- ▶ Feed on live prey – mainly small birds
- ▶ Breed October – February. 2-4 eggs. Young disperse 2 months after fledging
- ▶ Only two diurnal raptor species in New Zealand
- ▶ Threat status “At Risk Recovering” (Data Poor, Increasing) was Nationally Vulnerable 2008
- ▶ Threats overall predation, habitat

Falcon at White Hill

- ▶ 2 pairs monitored since 2006, also anecdotal records
- ▶ Feed across wind farm and across adjacent landscape
- ▶ Nest in beech forest remnants
- ▶ Potential wind farm effects

Consent and methods

- ▶ Condition of consent – based on international concerns of raptors and wind farms and lack of local knowledge.
- ▶ Pre and post construction monitoring 3 years to determine if turbines having an effect.
- ▶ Fixed point flight observations
- ▶ Nest searches and regular surveillance, followed by observation of fledgling flights
- ▶ 2012-2014 motion triggered cameras at nest site.

New Zealand Falcon



Source: NZ Bird Online, Richmond Atkinson



What we found

- ▶ 2 pair continued to use wind farm site for nesting and feeding
- ▶ Fledglings have been observed flying around site and feeding on wing with parents
- ▶ 2 pairs attempted nesting almost every year
- ▶ No apparent change in small bird prey post wind farm construction
- ▶ No apparent impact of the turbines on falcon persistence or survival at the site

Nest sites

Nest sites

Nest Sites

Nest Sites



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Nest Sites



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11/21/2012 13:34



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11/26/2012 19:21



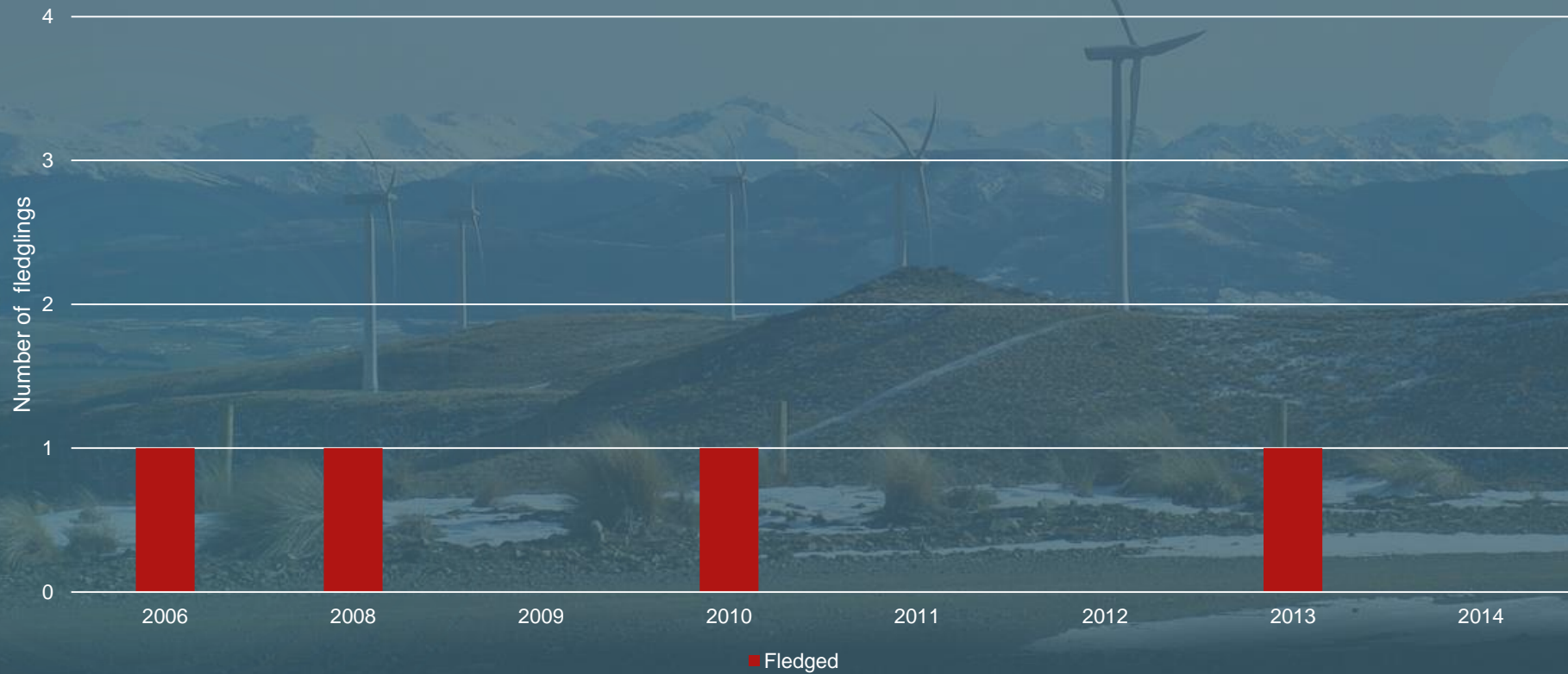
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Nesting Success

Successfully fledged young each year from 2 pairs of falcon



Nesting success comparisons

Location	Reference	Number of nesting attempts**	Mean fledglings per nest	% of nests unsuccessful
White Hill	BML 2014	14	0.29	78%
Kaingarooa	Seaton et al 2009	87	1.81	29 %
Hill country South Island (eastern falcon)	Fox 1977 (in Seaton)	-	1.88	28 %
Various South Island (eastern falcon)*	Lawrence 2002	13	2.2	8 %

Predation



- ▶ Predation of eggs and chicks caused most, if not all, nest failures
- ▶ Predators on site usual suspects for indigenous NZ birds, including possums, stoats, ferrets, rats, cats, hedgehogs
- ▶ DNA testing of egg fragments unsuccessful
- ▶ Motion triggered cameras useful and cheap tool

Predation Images



Ferret predation event



Where to next

Predator control

- ▶ Improve nesting success of falcons
- ▶ Source for wider area
- ▶ Improve success of other indigenous birds, lizards and invertebrates
- ▶ Meridian working with Southland Regional Council and forestry company
- ▶ Possums
- ▶ Ferrets and other mustelids and cats

Where to next

Wind Farm Assessment

- ▶ Potential to track NZ falcon flights at an operational wind farm
 - ▶ Inform other sites with falcon. Transmitters used in other consent assessments.
 - ▶ Mortality transmitters (proposed 2014 but ferret got there first!)

Concluding Comments

- ▶ No apparent adverse effect of habitat displacement, food reduction or direct disturbance as result of wind farms construction and operation
- ▶ Improved understanding of predation threat and impact (appears independent of wind farm presence)
- ▶ Meridian and Council input to improve nesting success
- ▶ Potential for further studies on falcon flying in vicinity of turbines

