Action Plan for the southern rockhopper penguin *Eudyptes chrysocome chrysocome* at the Falkland Islands: Review of potential threats, progress of work and prioritised action for 2014 – 2020. Prepared by Falklands Conservation on behalf of FIG.

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Southern rockhopper penguin background

- Falklands hold 320,000 pairs in 2010 representing 36 % of the South Atlantic population
- An estimated 1.5 million pairs in the 1930's declined to fewer than 300,000 pairs in 1995. The associated cause/s remain unknown.
- IUCN listed as 'Vulnerable' due to population declines throughout their global ranges averaging a 34 % decline over the last 37 years (as of 2010).
- Recent global declines attributed to oceanographic changes that affect prey availability.
- Large decline of 90,000 pairs at FI between 2000 and 2005 caused by a HAB event.
- Between 2005 and 2010 high survival rates are attributed to favourable environmental conditions (a 51 % breeding population increase was observed in this period).
- Population has been relatively stable since 1995 (i.e. ~300,000 pairs).
- Steeple Jason Island and Beauchêne Island remain the two largest breeding populations at the Falkland Islands at 38 % and 31 % respectively.

Point to highlight in this document:

- Seven year implementation plan for the Falkland Islands.

- Species action plans are typically formulated in order to understand the driving factors of population declines, identify the threatening processes and the specific measures needed to remedy threats or reverse declines.

- For the southern rockhopper penguin at the Falkland Islands, it is not yet sufficiently understood how environmental variation will affect population dynamics.

- **The main focus for this action plan is to emphasise the need for on-going monitoring and research of a long-term nature**.

- Measurable targets set at a national level (eventually to be incorporated into the Darwin Biodiversity Action Planning Project).

- The document does not cover generics biodiversity issues, e.g. biosecurity – this should fall into overarching policies (e.g. ACAP sites overlaps 90 % of rockhopper breeding sites and 86 % percent at 11 of the 12 black-browed albatross sites at FI). Therefore International Agreements (e.g. ACAP) benefits the rockhopper penguins.

Overview of potential threats at the Falkland Islands

Human disturbance	Tourism	Low/easily mitigated	Low
	Research	NI, SJI and BS	Low
	Egging	None	None
	Management	7 site plans (76 % of pop)	Low- mod
Avian	Threshold size (i.e. smaller colonies more prone)		Low-mod
Grazing/farming	No clear affects (colonies often at inaccessible cliffs)		Low
Invasive species	No clear impacts with rats/mices/cats		Low
Natural / fire	No long term impacts known		Low
Weather	Increasing storms, extreme rain & heat may negatively affect breeding success		Low- moderate May increase

Infectious disease	Starvation 1985/86	Results inconclusive,	Moderate Low exposure to disease at the FI suggests that any disease outbreaks could have significant impacts.
	Disease screening	Low exposure to disease at FI	
	Avian Pox	Occasional outbreaks / spreads	
	Unknown	e.g. disease at SJ killing adult birds	

Harmful Algal Bloom	Paralytic shellfish poisoning causing high adult mortalities (e.g. 2002)	Moderate

Pollution	Known	2 notable spill events (20 minor >1994)	Moderate
	Unknown	Low numbers of oiled rockhoppers reported	
	Offshore hydrocarbon	Penguins most vulnerable taxon to spills	
	Chemical	Very low levels, no pathological significance	Low
	Marine debris	Breakdown of chemicals into food chains	Low

Fisheries	Competition	No direct overlap prey size / age classes	Low
	Management	Some management zones / low effort inshore	Moderate
	Overfishing	Modifications of food webs and trophic levels	Moderate
	Market / Fleet	Targeting alternate lower trophic species	Moderate
	Incidental by-catch	Negligible reports	Low

Climate change	Change in Sea Surface Temperatures (SST) and wind patterns affecting prey availability and foraging success	Adult survival rates reduced in colder or warmer conditions to normal periods (found for below SSTA -1.1 °C or above +0.4 °C)	Unknown
		Declines expected to be gradual and widespread in top predators	
		Increase in wind speeds at atypical directions shown to negatively reduce foraging ability in rockhopper penguins	

Overview of potential threats 2014 – 2020

Few single threats more significant at an overall population level; several threats have unknown elements of risk. Likely that a variety of threats are acting in combination, to varying degrees, across the different breeding sites and foraging ranges.

Important threats recognised for the immediate future are:

- Hydrocarbon development through the risk of large oil spills at sea and low level chronic pollution;
- Fishery-associated impacts that may act to modify the foodweb that rockhopper penguins exploit;
- Changes in sea surface temperatures linked to climatic variation altering prey availability, reducing foraging success or causing detrimental oceanographic events, such as Harmful Algal Blooms (HABs);
- Disease outbreak spread through seabird or human vectors.

Regional action plans: Falkland Islands, International Workshop Proceedings 2008.

2008 Action	Importance	2008-2013 Progress	
Annual monitoring	Critical	Complete	
Island population censuses	Critical	Complete 2010	
Demographics	Very high	Significant advancement at New Island	
Diet	High – winter Moderate - summer	Significant advancement at New Is, Steeple Jason Is and Beauchêne Is	
Tracking	High – winter Moderate- summer	Significant advancement at New Is, Steeple Jason Is, Beauchêne Is & Berkeley Sound	
Oil contingency	High	Review and updated 2008	
Health monitoring	Moderate	Progress on-going	
Disease contingency plan	Moderate	Adapt an FAO plan and implement.	Progress on-going

Overall approximate funding for period 2008 -13 = c. **£ 480,000** through FC, NICT, ART, BAS (FIG – significant (£160K) contribution in terms of annual monitoring).

Action plan aims:

Critical	**Population monitoring** is required to estimate rates of population change and for analysis in relation to known (and potential) environmental change.
High	**Demographic studies** Improving knowledge of demography (data on adult and juvenile survival, age of first breeding and reproductive rate) to provide a long-term data set for the Falkland Islands for analyses in relation to climate and environmental change, particularly in SST.
High	**Hydrocarbon development / oil spill modelling, EIA & data gap analysis.** Periods most critical to survival of the birds i.e. winter, incubation and pre-moult periods of breeding adult birds being the highest priority.
High-Moderate	**Diet monitoring –** assess environmental change through natural and anthropogenic pressures at low intensity monitoring.
High-Moderate	**Health monitoring:** bio-physiological processes / accumulations of toxins and disease screening
Moderate	**Management plans** (to complete for priority sites)
Moderate	**Central data storage** of tracking data (Falklands & Internationally)
Low	**Terrestrial impacts –** pressures at breeding sites (weather, predation, disturbance)

Theme		Importance	Time frame	Action	Responsible organisation	Cost & responsibility	Likelihood of success	Review period
1.1	Monitoring	**Critical**	**2014-2020**	A. Continue annual monitoring at current sites.	FC, JLU/UA via NICT FIG-FC review 2014	*Moderate-high* FIG annual commitment of funding	*High*	2014 2020
			2014-2015	B. Increase percentage of population monitored in FISMP to 5 % to reflect geographic importance of population (i.e. northwest region, east and south regions)	FC	*Low-moderate,* FIG	*Moderate* Long-term landowner permission?	2015
1.2	Population surveys	**Critical**	**2014**	C. Review Island Wide Census methodologies and timings specific to rockhopper penguins	FC	*Low*, FC	*High*	2014
			2014	D. Dedicated Island Wide Census to occur no later than 2020 (if action 1.1 B. has been achieved) or 2015/16 (if action 1.1.B has not been achieved)	FIG-FC review 2014	FIG-FC *Moderate*	*High*	2014
		High	**2014-2020**	E. Investigate aerial/remote sensing techniques - in particular at larger remote sites	FC, NICT, FIG	*Moderate*	*Moderate*	2015 2020
2.1	Demographics	**High**	**2014-2020**	F. Continuation of demography site at New Island	JLU, UA via NICT	*Moderate*	*Moderate* Dependent on funding	2017
			2015-2020	G. Investigate cheaper and less intensive demographic study systems with aim to implement a second study site on East Falkland	Various but likely: ART (FC, FIG)	*Moderate*	*Moderate* Long-term landowner permission?	2017
2.2	Oil spill modelling with tracking data	**High**	**2014-2017**	H. Comprehensive oil spill foraging models and Marine Spatial Planning for protected areas designation (in conjunction with 4.4) (Priority for winter, pre-moult & incubation periods of adult birds)	FIG, FIPLA SAERI, FC	Approved (200K) for tracking & analysis	*High*	2017
	Marine spatial planning				SAERI, FC, JLU, NICT, others	MSP led by SAERI	*High*	2017

3.1	Diet sampling/ stable isotope analysis	**High-moderate**	**2014-2020**	I. Collection of material (feathers, blood, eggshells) for long-term monitoring through stable isotopes analyses (SIA) for winter, pre-moult and breeding period	JLU, UA, NICT, FC, ART	*Low – data collection Moderate – SIA analysis*	*High-moderate*	2017
3.2	Health monitoring/ bioaccumulation rates in birds	**High-moderate**	**2014-2020**	J. Continue monitoring health/ bioaccumulations and assess transmission paths into and exiting Falklands	UA via NICT Others	*Low- data collection Moderate - analysis*	*Moderate -High*	2017

4.1	Disease contingency plans	**Moderate**	**2014-2017**	K. Prepare a contingency plan (join up with other FIG biosecurity policies e.g. ACAP sites)	FIG	*Low*	*Moderate* (time to develop plans)	2017
4.2	Management plans	**Moderate**	**2014-2017**	L. Prepare/complete management plans for important sites in ownership by FIG or NGOs (link with relevant ACAP recommendations)	FIG /site owners	*Low*	*Moderat*e (time to develop plans)	2017
4.3	Data storage global/national	**Moderate**	**2014-2017**	M. Develop a Falkland Islands tracking database (in conjunction with action 2.2) within national and global repositories	BirdLife SAERI Data holders	*Moderate* BirdLife SAERI	*High- moderate* Long term funding at national level?	2017

5.1	Extreme weather events at breeding sites	**High-moderate**	**2014-2020**	N. Data collection on impacts of extreme weather events in conjunction with weather stations / recorders	Various MET office	*Low*	*Moderate-high*	2017
5.2	Predation impacts / colony size thresholds	**Low**	**2014-2020**	O. Increase knowledge of natural and anthropogenic pressures at breeding sites in conjunction with existing programmes	JLU,UA,NICT, FC, SAERI	*Low*	*Moderate*	2017
5.3	Disturbance - tourism / research	**Low**	**2014-2020**					