Black Petrel

Procellaria parkinsoni

Puffin de Parkinson
Petrel de Parkinson

CRITICALLY ENDANGERED | ENDANGERED | **VULNERABLE** | NEAR THREATENED | LEAST CONCERN | NOT LISTED

Sometimes referred to as
Parkinson's Petrel
Taiko
Brown Petrel

Photo © New Zealand Department of Conservation

TAXONOMY

Order	Procellariiformes
Family	Procellariidae
Genus	*Procellaria*
Species	*P. parkinsoni*

The genus *Procellaria* consists of five species of medium to large petrels of which the Black Petrel, *Procellaria parkinsoni,* is the smallest [1, 2].

CONSERVATION LISTINGS AND PLANS

International

- Agreement on the Conservation of Albatrosses and Petrels – Annex 1 [3]
- 2008 IUCN Red List of Threatened Species – Vulnerable (since 2000) [4]
- Convention on Migratory Species – Appendix II [5]

Australia

- *Environment Protection and Biodiversity Conservation Act 1999 (EPBC ACT)* [6]
  - Listed Migratory Species
  - Listed Marine Species

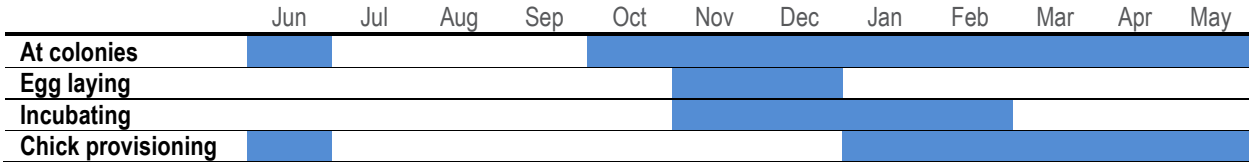
New Zealand

- *New Zealand Wildlife Act 1953* [7]
- New Zealand Threat Classification System List 2008 - Nationally Vulnerable [8]
- Action Plan for Seabird Conservation in New Zealand; Part A: Threatened Seabirds [9]

BREEDING BIOLOGY

Procellaria parkinsoni is a colonial burrow-nesting, annually-breeding species; each breeding cycle lasts about nine months. Most eggs are laid in December, hatch in February and the chicks fledge in May at about three months old [2, 10] (Table 1). The youngest bird recorded returning to the Great Barrier Island colony was three years of age and first breeding has been recorded at five years at this site [11]. The youngest bird recorded returning to the Little Barrier Island colony was five years of age with first breeding recorded there at six years [10, 12].

Table 1. *Breeding cycle of* P. parkinsoni.



BREEDING STATES

Table 2. *Distribution of the global* P. parkinsoni *population among Parties to the Agreement.*

	New Zealand
Breeding pairs	100%

BREEDING SITES

Procellaria parkinsoni is a New Zealand endemic (Table 2), breeding on Little and Great Barrier Islands in the Hauraki Gulf to the east of Auckland (Figure 1; Table 3) [2, 9, 10, 11]. The total breeding population on Great Barrier Island is estimated to be approximately 1,650 breeding pairs [11] (Table 3). In the 2004/05 season the total number of individuals at the Great Barrier Island colony was estimated at 3,551-5,021 birds [11]. The Little Barrier Island colony was originally monitored between 1971 and 1983 and the total breeding population was estimated to be between 50 and 100 pairs [10]. After the feral cat eradication, in order to supplement the colony, 249 chicks from Great Barrier Island were transferred to Little Barrier Island between 1986 and 1990 and the Little Barrier Island colony was then monitored annually until 2000 [10, 12].

Table 3. *Monitoring methods and estimates of the population size (annual breeding pairs) for each* P. parkinsoni *breeding site. Table based on unpublished Department of Conservation (DOC) data submitted to ACAP in 2005, Bell* et al. *(2007) [11] and Imber (1987) [10].*

Breeding site location	Jurisdiction	Years monitored	Monitoring method	Monitoring accuracy	Breeding pairs (last census)
Great Barrier Island 36° 11'S 175° 24'E	New Zealand	1989-1990 1996-2008 (on-going)	A, B	High	1,650 (2005) [11]
Little Barrier Island 36° 12'S 175° 05'E	New Zealand	1971-1983* 1986-2000	A, B	Medium	100 (1987) [10]

*not monitored: 1976, 1978, 1980 and 1981

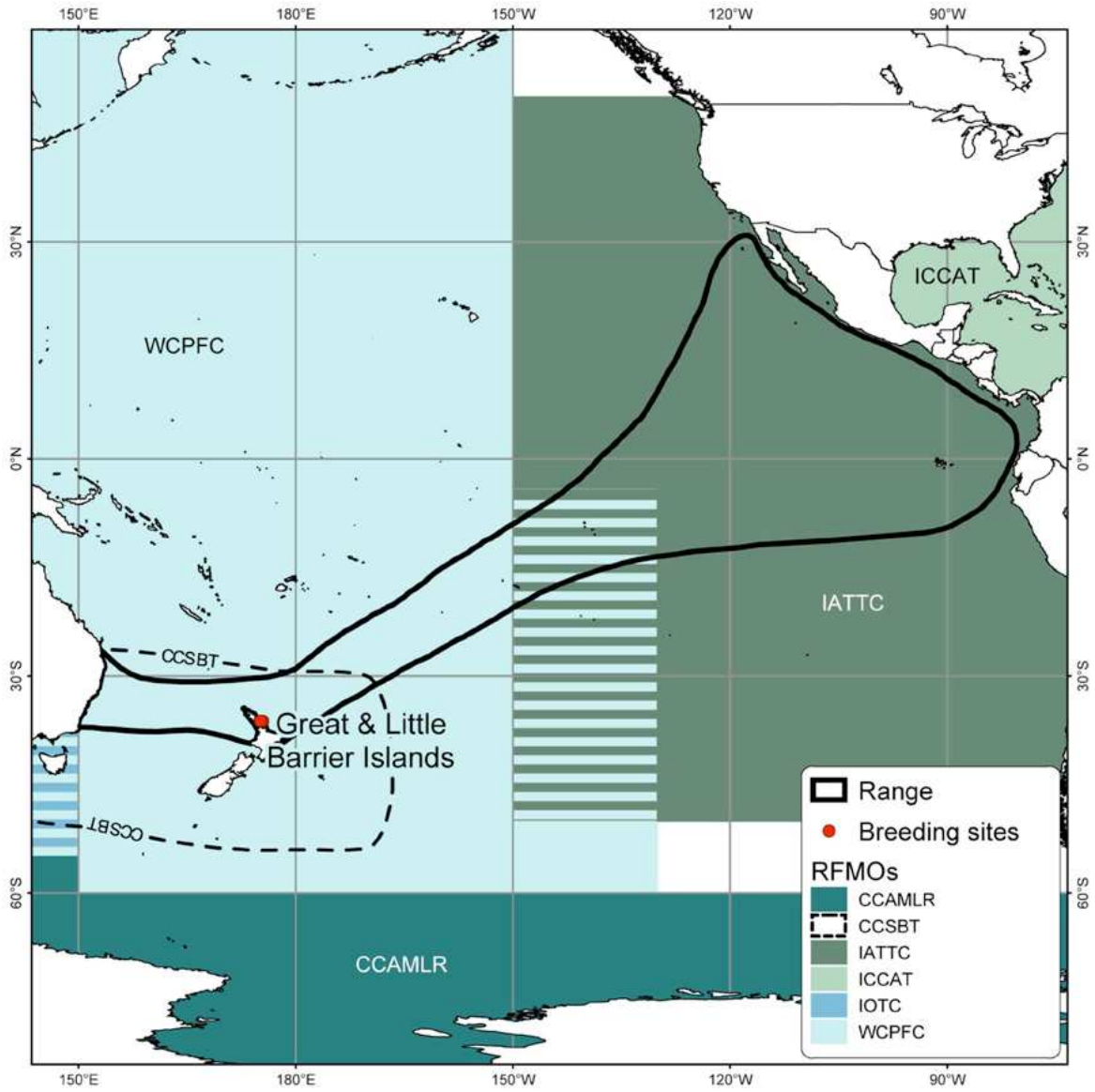


Figure 1. *Location of the two breeding sites and approximate range of* P. parkinsoni with *the boundaries of selected Regional Fisheries Management Organisations (RFMOs) also shown.*

CCAMLR – Commission for the Conservation of Antarctic Marine Living Resources
CCSBT - Convention for the Conservation of Southern Bluefin Tuna
IATTC - Inter-American Tropical Tuna Commission
ICCAT - International Commission for the Conservation of Atlantic Tunas
IOTC - Indian Ocean Tuna Commission
WCPFC - Western and Central Pacific Fisheries Commission

CONSERVATION LISTINGS AND PLANS FOR THE BREEDING SITES

International

None

New Zealand

Little Barrier Island

- Nature Reserve - *New Zealand Reserves Act 1977* [13]

Great Barrier Island

- Scenic Reserve - *New Zealand Reserves Act 1977* [[13]

POPULATION TRENDS

Formerly widespread across the North Island (Northland to Wellington) and northern South Island of New Zealand (north-west Nelson, Buller, and south Westland), *P. parkinsoni* is now restricted to Little and Great Barrier Islands in the Hauraki Gulf, in northern New Zealand [2, 9, 10, 14, 15].

Great Barrier Island

Procellaria parkinsoni was first officially recorded on Great Barrier Island in 1960, but had been observed by earlier naturalists and harvested by the local Maoris before this time [16, 17]. No census or population estimate was given at this time [16]. From surveys in the late 1970s the population was thought to be 500-1,000 breeding pairs [10], but recent surveys suggest the population is more than 1,500 breeding pairs and over 5,000 individuals [11]. However, a subsample of 100 burrows monitored for 10 years or more indicated a slight decrease in population size between 1996 and 2006 [11]. Additional extensive surveys are needed to gain a better estimate of the whole island population and to determine trends for the total population with more confidence [11].

A number of Great Barrier Island study burrows has been monitored intensively since the 1995/96 breeding season allowing for breeding success, juvenile and adult survival to be determined for this period [11]. Breeding success varies from 69% to 84% (chicks fledged from eggs laid), with an average of 76% of burrows fledging a chick (Table 5) [11]. Analyses of both juvenile and adult survival are ongoing [18]. The mean adult survival estimated to date is 77.9%, which is considerably lower than other petrels of similar size [11, 18, 19]. This contrasts with an estimate of juvenile survival (after three years of age) of 92.3%, which is very high [11]. The low adult survival could be due to low detectability of birds that move out of the study area, but this hypothesis needs to be further investigated [18].

Little Barrier Island

Historically, *P. parkinsoni* numbers at Little Barrier were noted as "very numerous" [14], but the presence of feral cats up until 1983 reduced the population to approximately 50 - 100 pairs [10]. The current trend is unknown.

Breeding success (chicks fledged from eggs laid) has only been collected between 1972 and 1983 and varied from 14.3% to 83% [10]. Juvenile survival of 87.1% was estimated from recaptures of chicks transferred from Great Barrier Island to Little Barrier Island [12].

Table 4. *Summary of population trend data for* P. parkinsoni *at the two breeding sites.*

Location	Current monitoring	Trend years	% average change per year	Trend	% of population
Great Barrier Island	Yes	1996-2005	-	Slight decrease?* [11]	<10%?
Little Barrier Island	No	-	-	Unknown	

*Trend not calculated in this assessment

Table 5. *Demographic data for the two* P. parkinsoni *breeding sites. Table based on data from Bell* et al. *(2007) [11]for Great Barrier Island, and on data from Imber (1987) [10] and Imber* et al. *(2003) [12] for Little Barrier Island.*

Location	Mean breeding success (± std dev)	Juvenile survival (± std dev)	Adult survival (± std dev)	Years
Great Barrier Island	76.1% (± 1.5%)	92.3% (± 5%)	77.9% (± 2%)	1996-2005
Little Barrier Island	45.4% (± 9.7%) [10]	87.1% (± 5%) [12]	-	1972-1983* 1991-2000

*Missing data: Little Barrier Island 1976, 1978, 1980 and 1981

BREEDING SITES: THREATS

Few threats exist at the Little Barrier Island breeding site of *P. parkinsoni*, however more occur at the Great Barrier Island breeding site. Both sites are legally protected; Little Barrier Island is a Nature Reserve and Mount Hobson on Great Barrier Island is within the Forest Reserve. A significant potential threat to this species is fire at either of the colony sites.

Table 6. *Summary of known threats at the breeding sites of* P. parkinsoni. *Table based on DOC data submitted to the ACAP Breeding Sites Working Group in 2008.*

Breeding site	Human disturbance	Human take	Natural disaster	Parasite or Pathogen	Habitat loss or degradation	Predation by alien species	Contamination
Great Barrier Island	No [a]	No [b]	No	No [c]	No [d]	No [d]	No
Little Barrier Island	No [a]	No [b]	No	No [c]	No [d]	No [d]	No

[a] Anthropogenic disturbance on Little Barrier Island is limited to the activities associated with the conservation management of the island; on Great Barrier Island the breeding site is visited by approximately 5000 visitors annually. Visitors are restricted to walking tracks and boardwalks, but public fouling and litter is common [11].

[b] There are historical records of harvesting both on Little and Great Barrier Islands, but this is unlikely to occur at present [16, 17].

[c] Disease is uncommon within this species and appears to be restricted to low levels of avian pox outbreaks (< 3 cases per year in the study area) [11].

[d] Little Barrier Island has no alien mammal species present after the recent eradication of feral cats and kiore (*Rattus exulans)*, but feral cats, rats (*Rattus rattus* and *R. exulans*), stray dogs and feral pigs are all present on Great Barrier Island and feral cats, pigs and rats are present at the breeding site [9, 11]. Predation at the breeding site varies from 1% to 6.1% annually (0.5% to 6.1% by rats and 0% to 1.5% by cats) [11]. Colonies on both islands are vulnerable to the accidental introduction of invasive species [9].

FORAGING ECOLOGY AND DIET

The feeding behaviour of *P. parkinsoni* is characterised by surface feeding and shallow diving in groups of up to 300 [2, 20, 21, 22]. They also frequently scavenge around fishing vessels and cetaceans [12, 20, 21, 23], preferentially associating with two rare dolphin species, as well as the melon-headed whale *Peponocephala electra* and false killer whale *Pseudoroca crassidens* [21].

The diet of *P. parkinsoni* during the breeding season has been examined by stomach content analysis of chicks [21, 22] and suggests that the feeding range at this time is within the subtropical zone and mainly east of northern New Zealand [20]. Diet is dominated by squid (particularly Ommastrephidae, Histioteuthidae and Cranchidae) and supplemented by fish, tunicates, crustaceans and cyclostomes [20]. These prey species (particularly those squid with bioluminescence) indicate that *P. parkinsoni* obtains most of their food at night [20].

It appears from preliminary geolocator data that *P. parkinsoni* preferentially forage on the continental shelf or seamounts, and that the foraging ranges of males and females overlap [18].

MARINE DISTRIBUTION

Little is known about the foraging range and at-sea distribution of *P. parkinsoni*, apart from banding recovery data and records from bird-watching expeditions, fishermen and government observers. It is known that *P. parkinsoni* migrate to the eastern tropical Pacific [9, 10, 11, 21] and have been recorded in USA (California), Mexico [24], Peru and Ecuador [12] waters, including the Galapagos [24].

Eleven light-loggers and 14 GPS loggers were deployed on breeding *P. parkinsoni* on Great Barrier Island during the 2005/06 breeding season but the data are yet to be published [18]. These preliminary results showed most birds foraging around the north of the North Island (Figure 2) [18]. This data also showed that *P. parkinsoni* also forage to eastern Australia, the Chatham Rise, around Puyseger Point, Fiordland and towards Fiji (Figure 2) [18].

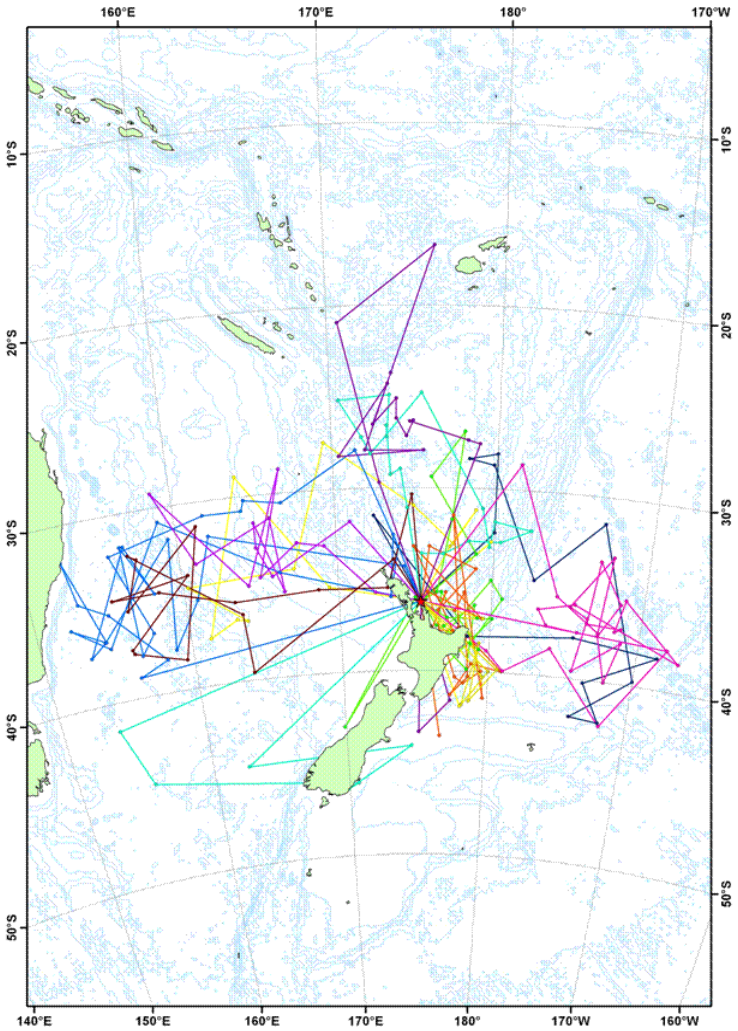


Figure 2. *Light logger data of breeding adult* P. parkinsoni *petrels (n=11). Map based on unpublished E Bell, J Sim, and P Scofield data [18], not to be used without data holders' permission.*

Procellaria parkinsoni overlap with four Regional Fisheries Management Organisations, but principally the WCPFC and the CCSBT (Figure 1; Table 7). Consultations are currently underway to establish the South Pacific Regional Fisheries Management Organisation (SPRFMO) that would cover both pelagic and demersal fisheries in the region and overlap with the foraging range of *P. parkinsoni*.

Table 7. *Summary of the known ACAP Range States, Regional Fisheries Management Organisations and Exclusive Economic Zones of non-ACAP countries that overlap with the marine distribution of* P. parkinsoni.

	Breeding and feeding range	Foraging range only	Few records - outside core foraging range
Known ACAP Range States	New Zealand	Australia Ecuador Peru	
Non-ACAP Exclusive Economic Zones		Colombia El Salvador Guatemala Mexico Panama	USA
Regional Fisheries Management Organisations [1]	CCSBT WCPFC SPRFMO[2]	IATTC	

[1] see Figure 1 and text for list of acronyms
[2] not yet in force

MARINE THREATS

There are few records of the marine threats to *P. parkinsoni*. As scavengers and known boat followers, *P. parkinsoni* are vulnerable to interactions with fishing vessels. Information from New Zealand fisheries indicates that *P. parkinsoni* interact with and are killed on pelagic long-lines in New Zealand waters [23], with 11 birds reported as bycatch between October 1996 and September 2005 [25]. There is anecdotal information from the fishing (and research) vessels off Central America that *P. parkinsoni* may be at risk of accidental bycatch in these areas [12, 23]. However, an analysis of *P. parkinsoni* interactions with fisheries in these areas has not been carried out.

Fisheries bycatch of the two rare dolphins that *P. parkinsonii* has been observed to preferentially associate with could have significant indirect impacts on the species, but these potential impacts are not considered in management decisions [26].

KEY GAPS IN SPECIES ASSESSMENT

Further and more widespread surveys at both breeding colonies need to be completed to assist in determining a better estimate of the global population. A more accurate identification of the breeding areas (and density of burrows) at the two colony sites would assist obtaining better population estimates. The long-term monitoring of the population on both Little and Great Barrier Islands should continue in order to further track the population trends and adult and juvenile survival. Ongoing monitoring of individuals will allow for refinement of other parameters such as age-structure of the population and adult and juvenile survival estimates.

Satellite and/or data logger tracking of birds of different age classes and at different stages of the annual cycle is needed to determine foraging range, overlap with fisheries and general at-sea distribution of *P. parkinsoni*. Further study of interactions with fisheries both around New Zealand and in non-breeding foraging locations is essential to assess the degree of threat posed to the species. A greater understanding of the fishing operations and incidental capture of seabirds off Central and South America is particularly needed.

Photo © Elizabeth Bell

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RECOMMENDED CITATION

Agreement on the Conservation of Albatrosses and Petrels. 2009. Species assessments: Black Petrel *Procellaria parkinsoni.* Downloaded from http://www.acap.aq on 20 August 2009.

GLOSSARY AND NOTES

(i) **Years**.
The "split-year" system is used. Any count (whether breeding pairs or fledglings) made in the austral summer (e.g. of 1993/94) is reported as the second half of this split year (i.e. 1994).

The only species which present potential problems in this respect are *Diomedea* albatrosses, which lay in December-January, but whose fledglings do not depart until the following October-December. In order to keep records of each breeding season together, breeding counts from e.g. December 1993-January 1994 and productivity counts (of chicks/fledglings) of October-December 1994 are reported as 1994.

If a range of years is presented, it should be assumed that the monitoring was continuous during that time. If the years of monitoring are discontinuous, the actual years in which monitoring occurred are indicated.

(ii) Methods Rating Matrix (based on NZ rating system)

METHOD
A Counts of nesting adults (Errors here are detection errors (the probability of not detecting a bird despite its being present during a survey), the "nest-failure error" (the probability of not counting a nesting bird because the nest had failed prior to the survey, or had not laid at the time of the survey) and sampling error).
B Counts of chicks (Errors here are detection error, sampling and nest-failure error. The latter is probably harder to estimate later in the breeding season than during the incubation period, due to the tendency for egg- and chick-failures to show high interannual variability compared with breeding frequency within a species).
C Counts of nest sites (Errors here are detection error, sampling error and "occupancy error" (probability of counting a site or burrow as active despite it's not being used for nesting by birds during the season).
D Aerial-photo (Errors here are detection errors, nest-failure error, occupancy error and sampling error (error associated with counting sites from photographs), and "visual obstruction bias" - the obstruction of nest sites from view, always underestimating numbers).
E Ship- or ground- based photo (Errors here are detection error, nest-failure error, occupancy error, sampling error and "visual obstruction bias" (the obstruction of nest sites from view from low-angle photos, always underestimating numbers)
F Unknown
G Count of eggs in subsample population
H Count of chicks in subsample population and extrapolation (chicks x breeding success - no count of eggs)

RELIABILITY
1 Census with errors estimated
2 Distance-sampling of representative portions of colonies/sites with errors estimated
3 Survey of quadrats or transects of representative portions of colonies/sites with errors estimated
4 Survey of quadrats or transects without representative sampling but with errors estimated
5 Survey of quadrats or transects without representative sampling nor errors estimated
6 Unknown

(iii) Population Survey Accuracy
High Within 10% of stated figure;
Medium Within 50% of stated figure;
Low Within 100% of stated figure (eg coarsely assessed via area of occupancy and assumed density)
Unknown

(iv) Population Trend
Trend analyses were run in TRIM software using the linear trend model with stepwise selection of change points (missing values removed) with serial correlation taken into account but not overdispersion.

(v) Productivity (Breeding Success)
Defined as proportion of eggs that survive to chicks at/near time of fledging unless indicated otherwise

(vi) Juvenile Survival
defined as:
1 Survival to first return/resight;
2 Survival to x age (x specified), or
3 Survival to recruitment into breeding population
4 Other
5 Unknown

(vii) Threats
A combination of scope (proportion of population) and severity (intensity) provide a level or magnitude of threat. Both scope and severity assess not only current threat impacts but also the anticipated threat impacts over the next decade or so, assuming the continuation of current conditions and trends.

		Scope (% population affected)			
		Very High (71-100%)	High (31-70%)	Medium (11-30%)	Low (1-10%)
Severity (likely % reduction of affected population within ten years)	Very High (71-100%)	**Very High**	**High**	**Medium**	**Low**
	High (31-70%)	**High**	**High**	**Medium**	**Low**
	Medium (11-30%)	**Medium**	**Medium**	**Medium**	**Low**
	Low (1-10%)	**Low**	**Low**	**Low**	**Low**