

3. Selected species

Antipodean (wandering) albatross

Diomedea antipodensis

Status: Vulnerable.

Population

Endemic to New Zealand, breeding on Antipodes Island and Campbell Island (a few pairs), biennial breeder with annual counts of nesting pairs between 4600 and 5700 annually during mid 1990s (estimated total 9600 breeding pairs), possibly stable.

Breeding and survival

Biennial, January to December.

Productivity: c. 75% fledglings from eggs laid.

Age of first return and first breeding: 5 years: Unknown 7+ years.

Adult mortality: 3–4%.

Survival from fledging to recruitment: Unknown.

Foraging range

Breeding: Principally east of New Zealand to Central Pacific and possibly Chile.

Fledglings: Eastern New Zealand and South Pacific to Chile.

Adolescents (pre-return to breeding site): From eastern Australia and Bass Strait to Chile.

Non-breeding: From western Bass Strait to Chile.

Known incidental capture in fisheries

New Zealand: From 1987 to 1998 principally caught on pelagic longlines catching mostly adults. One caught in squid trawl fishery.

Overseas: Banded birds caught by both longline and trawl fisheries in Australian waters. Banded birds also caught on longline fisheries in Central Pacific and Chile (near Easter Island and Juan Fernandez Islands).

Current research

Annual monitoring of Antipodes Island population. Satellite tracking.

Assessment of potential risk

Species listed as vulnerable. Use of mitigation measures has significantly reduced incidental catch by pelagic longlines in New Zealand, but there is a lack of knowledge of interactions in other New Zealand fisheries and those in South America.

Deficiencies in knowledge

- Distribution of juvenile and pre-breeding age classes at sea.
- Information on incidental catch and fishing practice in Chile.

Map

Range assessed from band recoveries and early published satellite tracking. Data on significant amount of satellite tracking over last five years not available.

Principal references: 28, 40, 62, 78, 92, 124, 139, 199, 218, 230, 233, 252, 269, 273, 274, 278, 320, 327, 340–344, 347, 348.

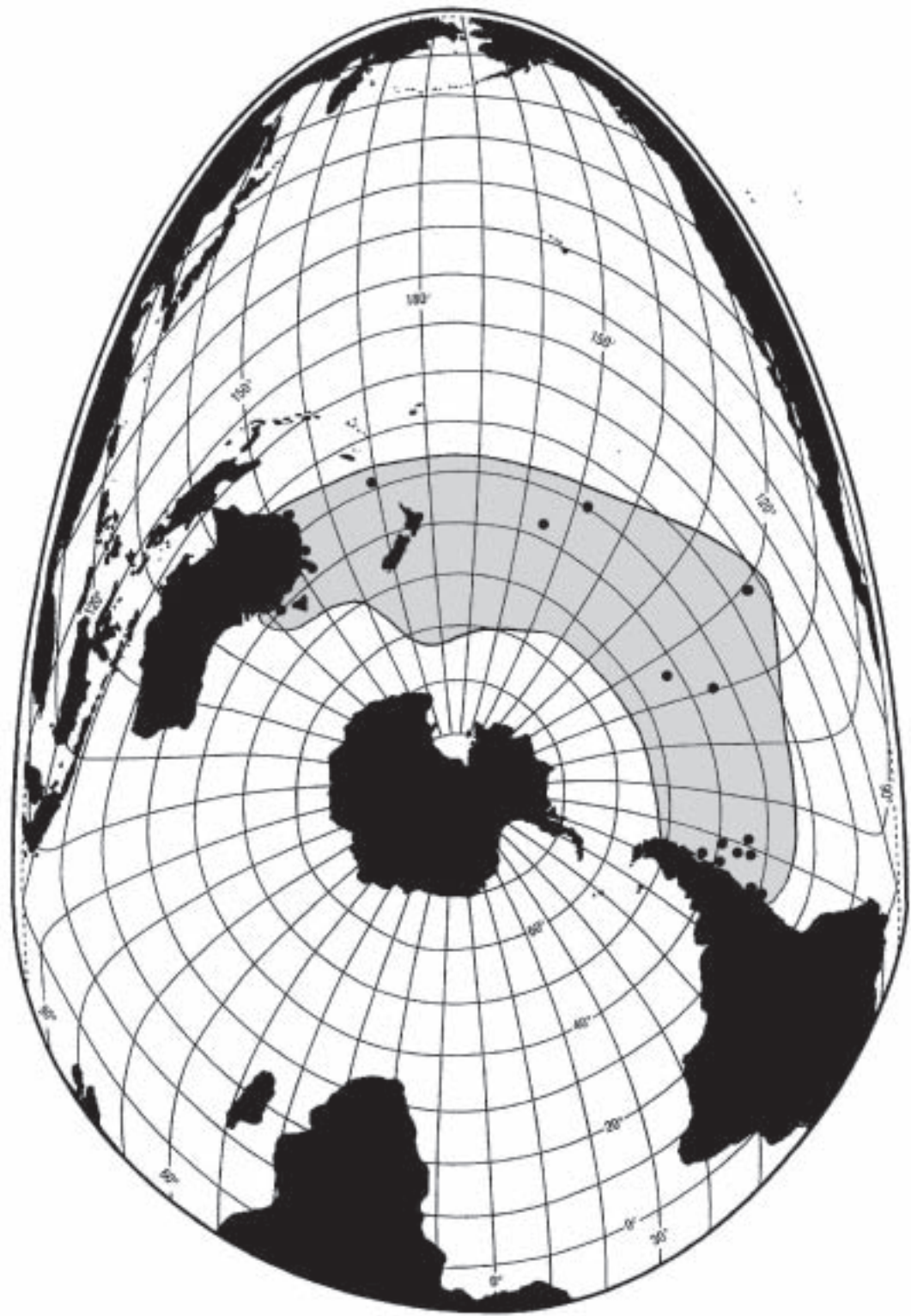


Figure 2. Antipodean (wandering) albatross. Grey shaded areas are an assessment of the general distribution range for the bulk of the population. Dots represent known band recoveries outside New Zealand waters. See text.

Black petrel

Procellaria parkinsoni

Status: Vulnerable.

Population

Endemic to New Zealand, breeds on Little and Great Barrier Islands, estimated 2750–5000 breeding pairs, possibly stable. This is remaining remnant of an extensive mainland population.

Breeding and survival

Annual, November to June.

Productivity: 70–86% fledglings from eggs laid.

Age of first return and first breeding: 3 years; 5 years.

Adult mortality: Unknown.

Survival from fledging to recruitment: Unknown.

Foraging range

Breeding: Northern New Zealand to north-central Tasman Sea.

Fledglings: Northern New Zealand and possibly towards Equatorial America.

Adolescents (pre-return to breeding site): Possibly from eastern Australia and Bass Strait across Central Pacific to Central America from Peru to Mexico.

Non-breeding: Probably from eastern Australia and Bass Strait across Central Pacific to Central America from Peru to Mexico (14°N to 5°S).

Known incidental capture in fisheries

New Zealand: Caught on domestic pelagic longlines catching mostly adults and one confirmed pre-breeder (4 years old).

Overseas: One banded bird caught in Peru (fishing type unspecified).

Current research

Annual monitoring of Great Barrier Island population. Trial of dummy transmitter packs.

Assessment of potential risk

Species listed as vulnerable. Has shown a propensity for scavenging offal and chasing baits in New Zealand. Also vulnerable ashore to land-based predators.

Deficiencies in knowledge

- Distribution of all age classes at sea.
- Information on incidental catch and fishing practice in Central and South America.

Map

Range assessed principally from collected observations at sea and band recoveries.

Principal references: 28, 35, 36, 37, 40, 92, 155, 165, 199, 247, 269, 274, 275.

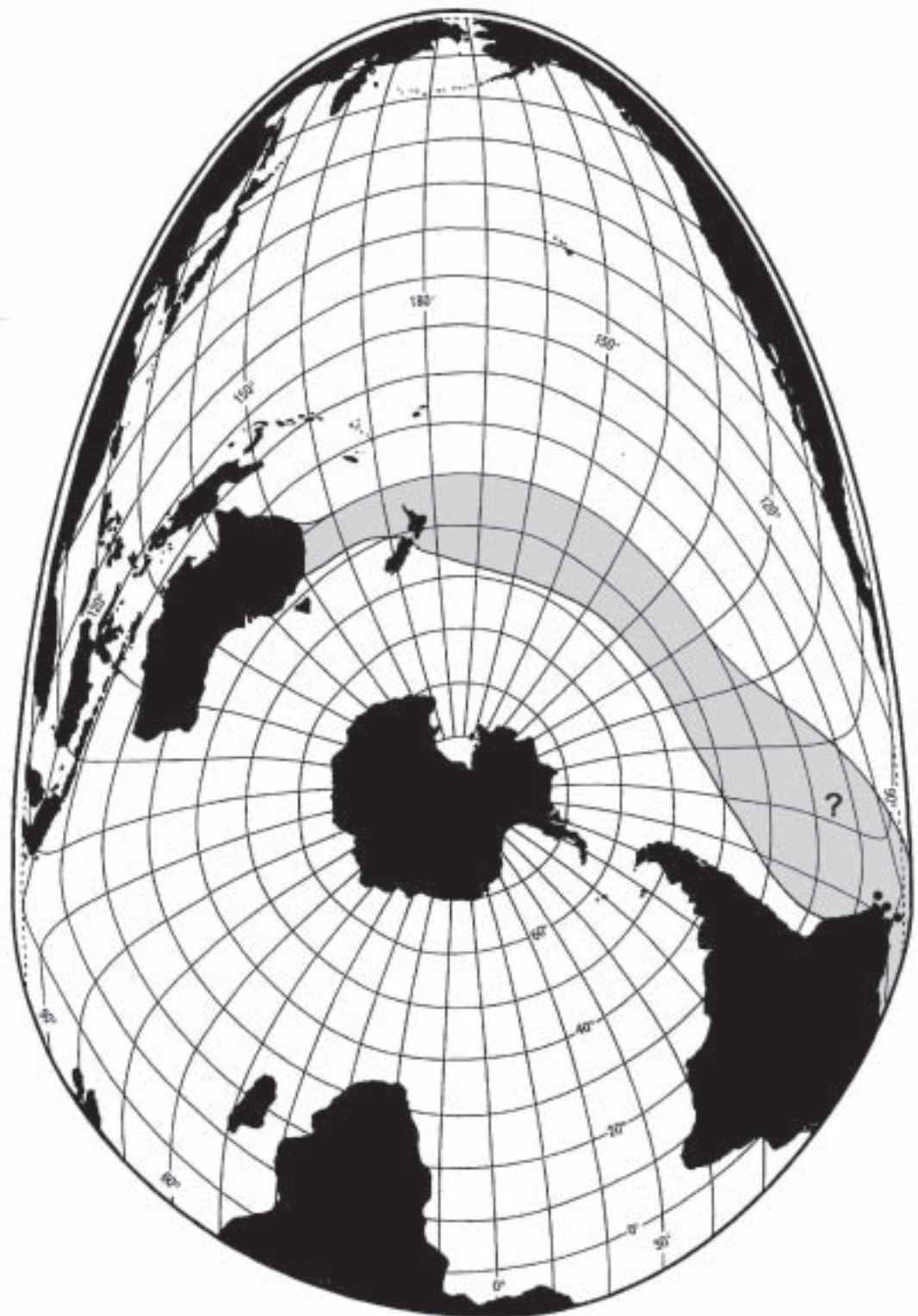


Figure 3. Black petrel. Grey shaded areas are an assessment of the general distribution range for the bulk of the population. Dots represent known band recoveries outside New Zealand waters. Areas of speculation (?) are based on published sighting material. See text.

Black-browed albatross

Diomedea melanophrys

Status: Endangered.

Population

Internationally commonest albatross. Some 98% of the population breed in southern Chile and the South Atlantic subantarctic. Small populations in the Indian Ocean subantarctic and Macquarie Island. Small numbers (c. 150 pairs) at Bollons I. (Antipodes Is), (c. 25 pairs) mixed with Campbell albatross at Campbell I. (also some interbreeding there), and The Snares. Campbell I. birds have genetic markers for both major South American/Atlantic groupings.

Breeding and survival

Annual, September to April.

Productivity: 70–86% fledglings from eggs laid.

Age of first return and first breeding: 2–3 years; 10 years.

Adult mortality: 8–9%.

Survival from fledging to recruitment: About 28%.

Foraging range

Breeding: Unknown, breeding season bycatch confined to Chatham and Campbell Rises, New Zealand.

Fledglings: Possibly towards South America.

Adolescents (pre-return to breeding site): Unknown. 50% of New Zealand bycatch of this age grouping mainly at East Cape. Numbers caught suggest they are mainly birds from breeding colonies outside New Zealand.

Non-breeding: Unknown, but see adolescents.

Known incidental capture in fisheries

New Zealand: Principally caught on pelagic longlines, with a small number from squid, scampi and fish trawls.

Overseas: One New Zealand banded bird caught in Chile, fishing type unspecified. One of the most commonly caught albatrosses in fisheries worldwide. Commonest seabird caught in the Australian EEZ where like New Zealand most birds caught were non adult.

Current research

Some monitoring of Campbell Island population in association with Campbell albatross.

Assessment of potential risk

Species listed as Endangered (2003) worldwide. Has shown a propensity for scavenging offal and chasing baits in New Zealand.

Deficiencies in knowledge

- Distribution of all age classes at sea.

Map

Range assessed principally from collected observations at sea and band recovery.

Principal references: 28, 40, 92, 233, 278, 199, 216, 269, 273–275, 321, 327.

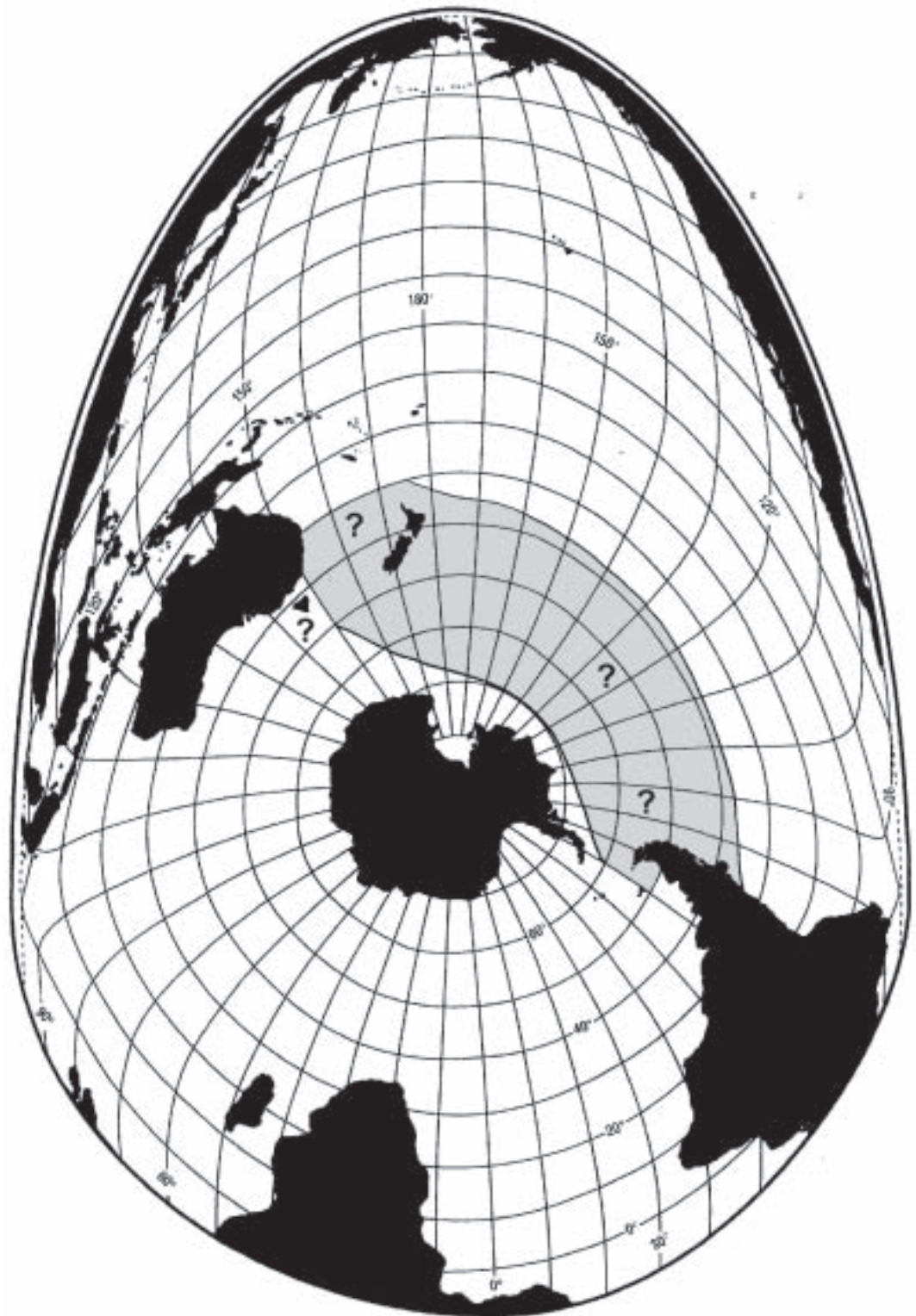


Figure 4. Black-browed albatross. Grey shaded areas are an assessment of the general distribution range for the bulk of the New Zealand population. Dot represents known band recovery of New Zealand bred bird outside New Zealand waters. Areas of speculation (?) are based on published sighting material. See text.

Buller's albatross

Thalassarche bulleri

Status: Vulnerable.

Population

Endemic to New Zealand, breeds only on the Snares and Solander Islands, estimated 11 500 breeding pairs, increasing at The Snares and stable or declining at Solander I.

Breeding and survival

Mainly annual, January to September.

Productivity: 68–76%.

Age of first return and first breeding: Not available.

Adult mortality: 5–8.7%.

Survival from fledging to recruitment: Unknown.

Foraging range

Breeding: Southern New Zealand to eastern Tasmania and Bass Strait.

Fledglings: Unknown, but juvenile specimens from Chile.

Adolescents (pre-return to breeding site): Unknown.

Non-breeding: Satellite tracking indicates a range from southwest Australia to Chile and southern Peru.

Known incidental capture in fisheries

New Zealand: Caught by pelagic and demersal longliners, squid and fish trawl fisheries, with emphasis on pelagic longline and fish trawl fisheries.

Overseas: Caught on pelagic longliners in Australia.

Current research

Satellite tracking at The Snares and Solander I. during the breeding season.

Assessment of potential risk

Species listed as vulnerable. Has been caught on a range of fishing practices in New Zealand and Australia. Regularly reported on the continental slope in Chile (between 30°S and 40°S).

Deficiencies in knowledge

- Distribution of pre-breeding age classes at sea.
- Information on incidental capture and fishing practice in Chile.

Map

Range assessed from satellite tracking. One line fishery caught band recovery of a 7-year-old bird in October 1979.

Principal references: 28, 40, 78, 92, 124, 125, 199, 218, 233, 269, 273–275, 278, 299, 300–302, 312, 314, 320, 327, 393, 395.

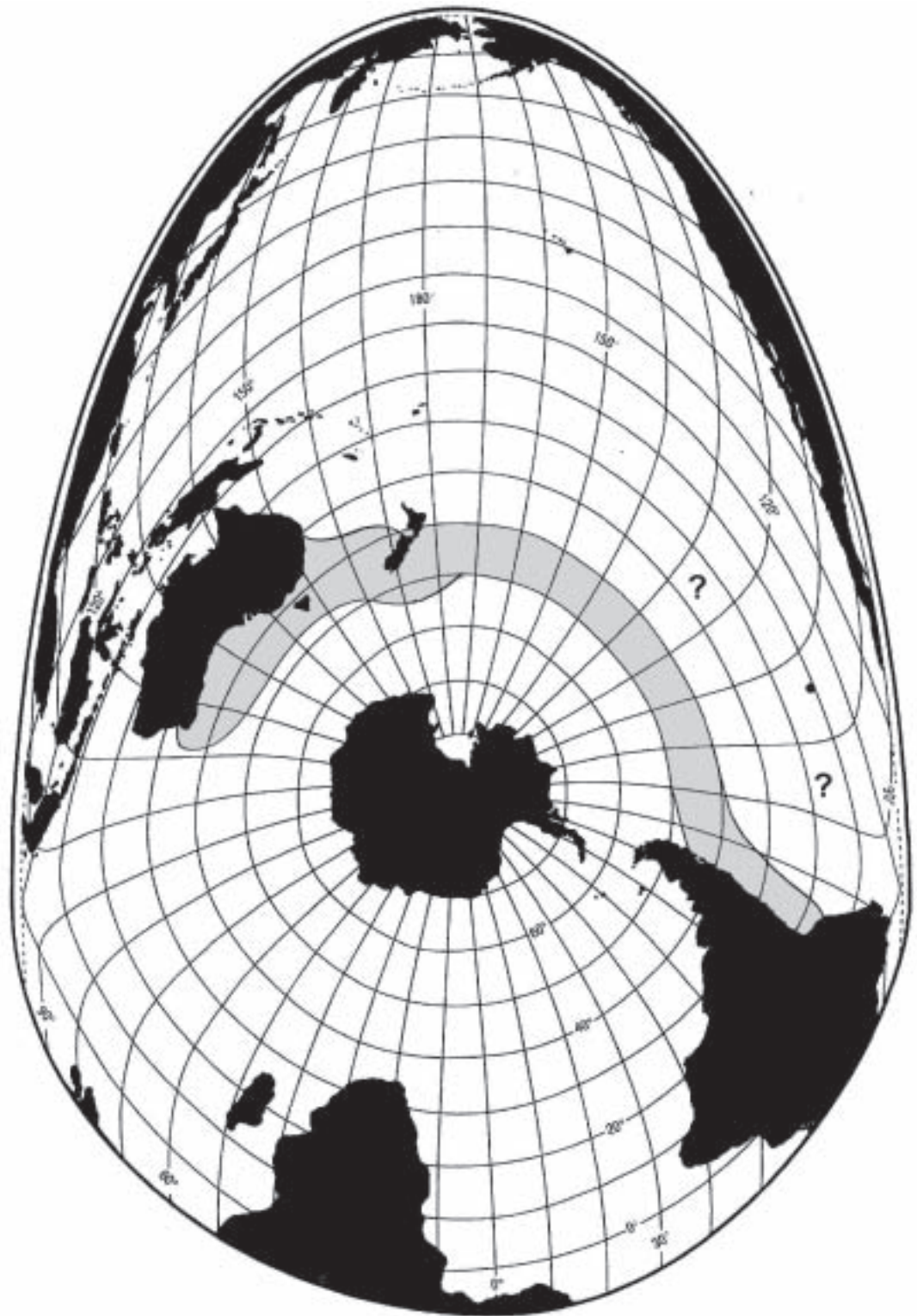


Figure 5. Buller's albatross. Grey shaded areas are an assessment of the general distribution range for the bulk of the population. Dot represents known band recovery outside New Zealand waters. Areas of speculation (?) are based on possible migration track. See text.

Buller's shearwater

Puffinus bulleri

Status: Vulnerable.

Population

Endemic to New Zealand, breeds only on Poor Knights Islands, population estimated 750 000 breeding pairs.

Breeding and survival

Annual: October to May.

Productivity: Unknown.

Age of first return and first breeding: Unknown.

Survival from fledging to recruitment: Unknown.

Foraging range

Breeding: Widely throughout New Zealand seas, over continental shelf waters mainly north of sub-tropical convergence and west to eastern Australia.

Fledglings: Unknown.

Adolescents (pre-return to breeding site): Unknown.

Non-breeding: Migrate to the northern and eastern North Pacific Ocean, from Japan to west coast of North America, California, Washington, Oregon and rarely Alaska. Occasionally Chile, Peru and Galapagos.

Known incidental capture in fisheries

New Zealand: Few caught by demersal longliner in 2000/01. Anecdotal evidence of capture in trawl nets.

Overseas: Caught in North Pacific Ocean squid net fisheries.

Current research

None.

Assessment of potential risk

Species has been caught on demersal longlines and possibly trawl in New Zealand waters. At risk from drift, gill and set nets. Scavenges food behind trawlers.

Deficiencies in knowledge

- Distribution of age classes at sea.
- Information on incidental capture and fishing practices in North Pacific.

Map

Range assessed from published at sea observations.

Principal references: 40, 99, 131, 188, 141, 143, 170, 199, 320, 336.

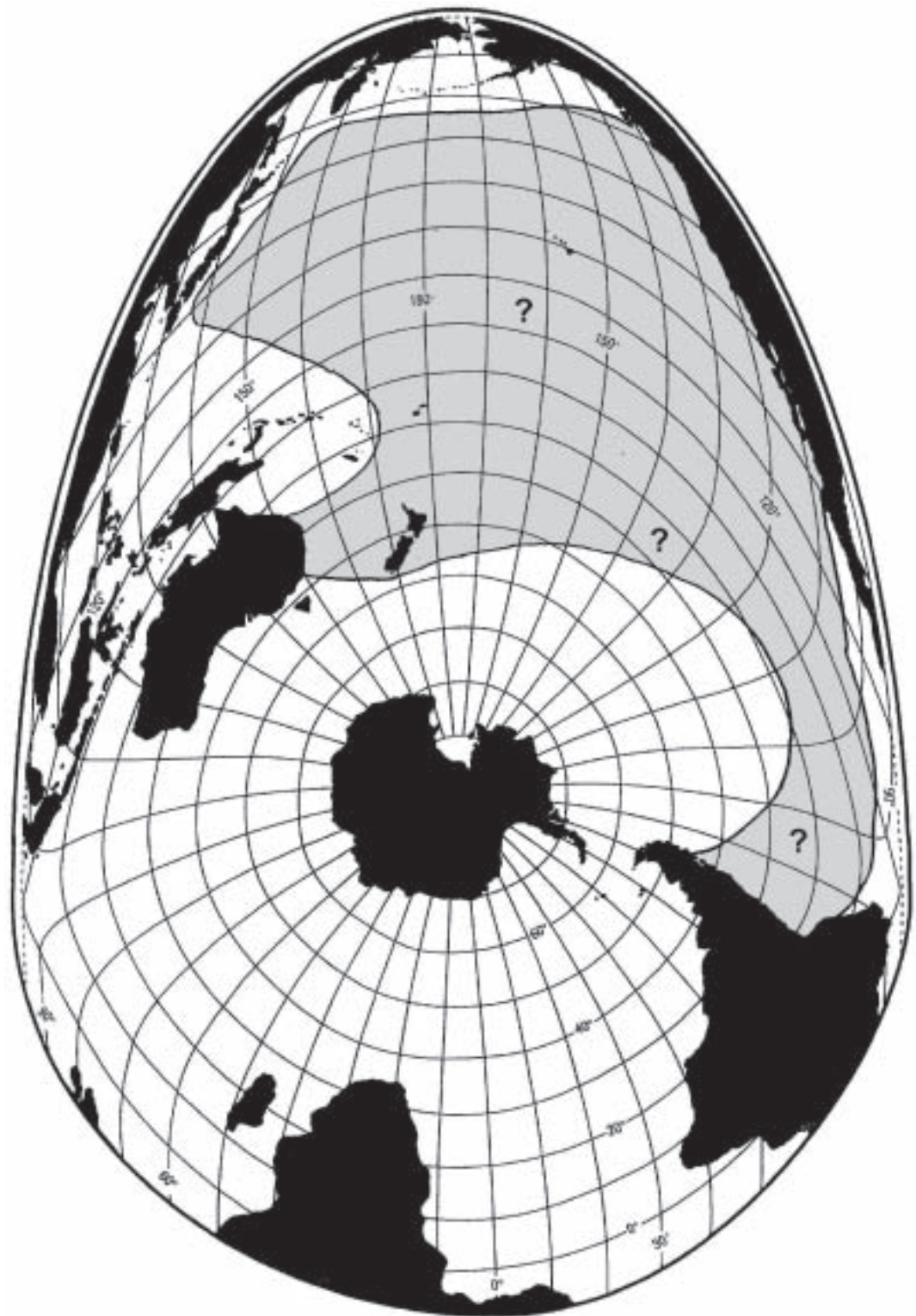


Figure 6. Buller's shearwater. Grey shaded areas are an assessment of the general distribution range for the bulk of the population. Areas of speculation (?) are based on published sighting material. See text.

Campbell albatross (New Zealand black-browed albatross)
Thalassarche impavida

Status: Vulnerable.

Population

Endemic to New Zealand, breeds only at Campbell Island, estimated 19 000–26 000 breeding pairs, but evidence of a significant decrease between 1970s and 1980s, before stabilising and slight increase since 1984.

Breeding and survival

Annual, September to May.

Productivity: 66% (51–84%) fledglings from eggs laid.

Age of first return and first breeding: 4 years; 10 years (6–13).

Adult mortality: 4.5%.

Survival from fledging to recruitment: <19%.

Foraging range

Breeding: Southern New Zealand to eastern Tasmania and Bass Strait.

Fledglings: Southern and eastern Australia, and South Pacific Islands north of New Zealand.

Adolescents (pre-return to breeding site): Probably similar to fledglings.

Non-breeding: Southern waters from Western Australia to mid South Pacific and north to 15°S. May be confined to southern Australian waters, the Tasman Sea and the western South Pacific Ocean.

Known incidental capture in fisheries

New Zealand: Principally caught on pelagic longlines and fish trawl fisheries, with emphasis on pelagic longliners catching mostly juveniles.

Overseas: Predominantly adults caught on pelagic longlines in Australia.

Current research

Periodic monitoring of populations at Campbell Island.

Assessment of potential risk

Species listed as vulnerable. Has been caught on a range of fishing practices in New Zealand and Australia. Significant decline of breeding population at same time as grey-headed albatross and rockhopper penguins at Campbell Island may involve factors other than fisheries incidental catch.

Deficiencies in knowledge

- Distribution of pre-breeding age classes at sea.
- Information on incidental capture and fishing practice in Southwest Pacific Islands.

Map

Range assessed principally from band recoveries and additionally some satellite tracking during breeding season.

Principal references: 28, 40, 78, 92, 124, 125, 199, 233, 269, 273–275, 278, 320, 327, 361.

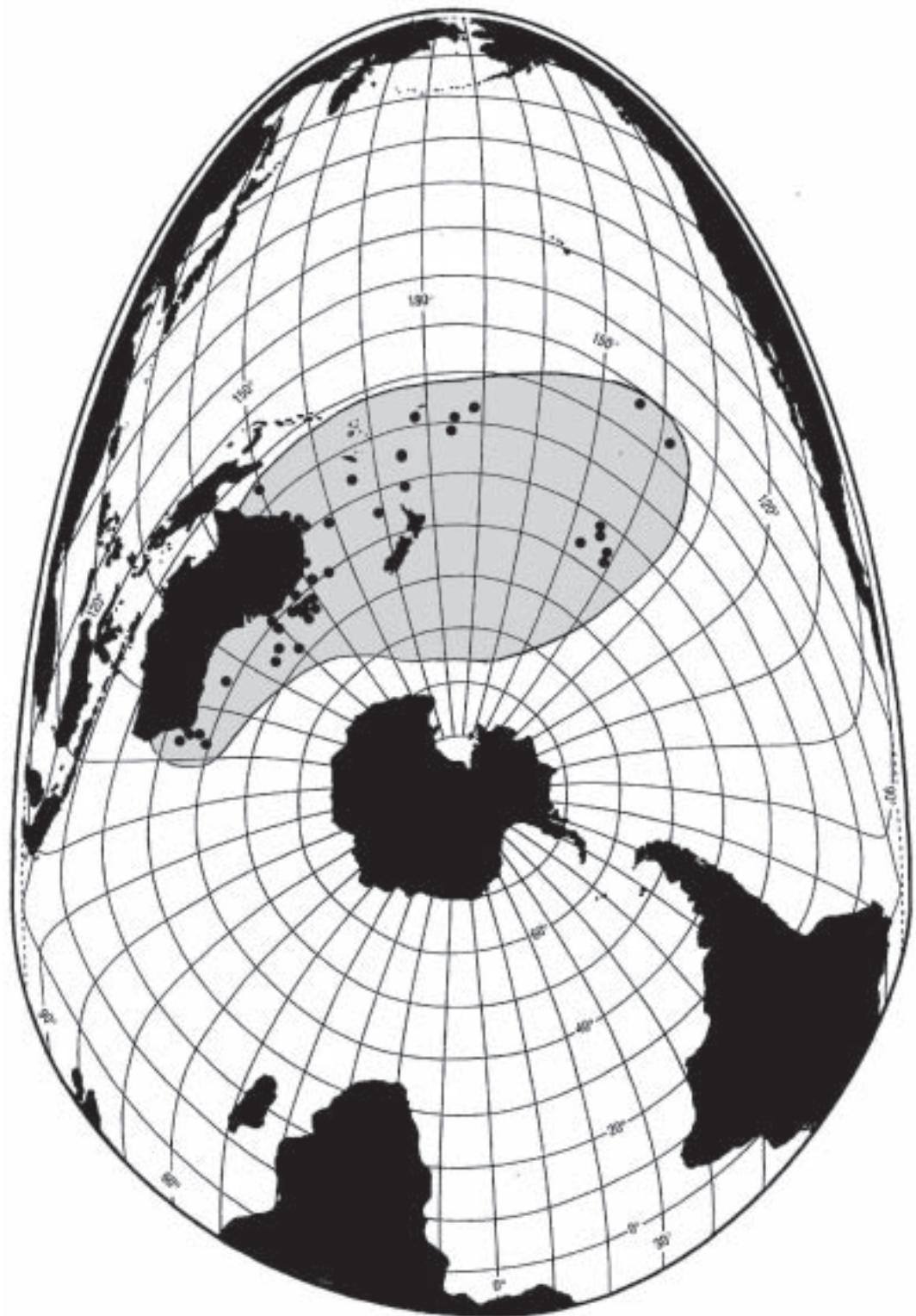


Figure 7. Campbell albatross. Grey shaded areas are an assessment of the general distribution range for the bulk of the population. Dots represent known band recoveries outside New Zealand waters. See text.

Chatham albatross

Thalassarche eremita

Status: Critically endangered

Population

Endemic to New Zealand, breeds only on The Pyramid (Chatham Islands), 4500 breeding pairs, currently assessed as stable.

Breeding and survival

Annual: August/September to April.

Productivity: 60–80% fledged from eggs laid.

Age of first return and first breeding: 4 years; 7 years.

Adult mortality: estimated 14% per annum.

Survival from fledging to recruitment: unknown.

Foraging range

Breeding: Within 750 km of colony during incubation and chick rearing.

Fledglings: Banding indicates dispersal to Chile and Peru.

Adolescents (pre-return to breeding site): Unknown, but probably similar to adults.

Non-breeding: Satellite tracking (1997–99) of adult and returned adolescents indicates a dispersal within the South Pacific Ocean east to Chile and Peru. Individual birds seen associated with longline fishing in Tasmania. Most of April–July is spent in Peruvian coastal waters north to 5°S.

Known incidental capture in fisheries

New Zealand: Caught on pelagic longliner in July, by demersal longliners for ling in September and by fish trawlers in October and February.

Overseas: Three banded or transmittered birds have been caught by coastal longline fisheries (artisanal, for swordfish and shark) in Chile and Peru, 1995–99. Reportedly exposed to incidental catch in fisheries during Peruvian summer (survey of fishermen), but species not identified and this is the breeding season when adults and pre-breeders are in New Zealand.

Current research

Annual population census at The Pyramid, assessment of mortality rates and productivity.

Assessment of potential risk

Species listed as critically endangered due to single breeding site. Has been caught on wide range of fishing practices in three countries.

Deficiencies in knowledge

- Distribution of age classes at sea in Peru and Chile.
- Information on incidental capture and fishing practice in Peru and Chile.

Map

Combination of satellite tracking, band recoveries and collected specimens. Extra-limital sightings in Tasmania and South Africa.

Principal references: 40, 78, 92, 93, 124, 199, 233, 252, 266, 270, 272, 275, 278, 312, 320, 327, 383.

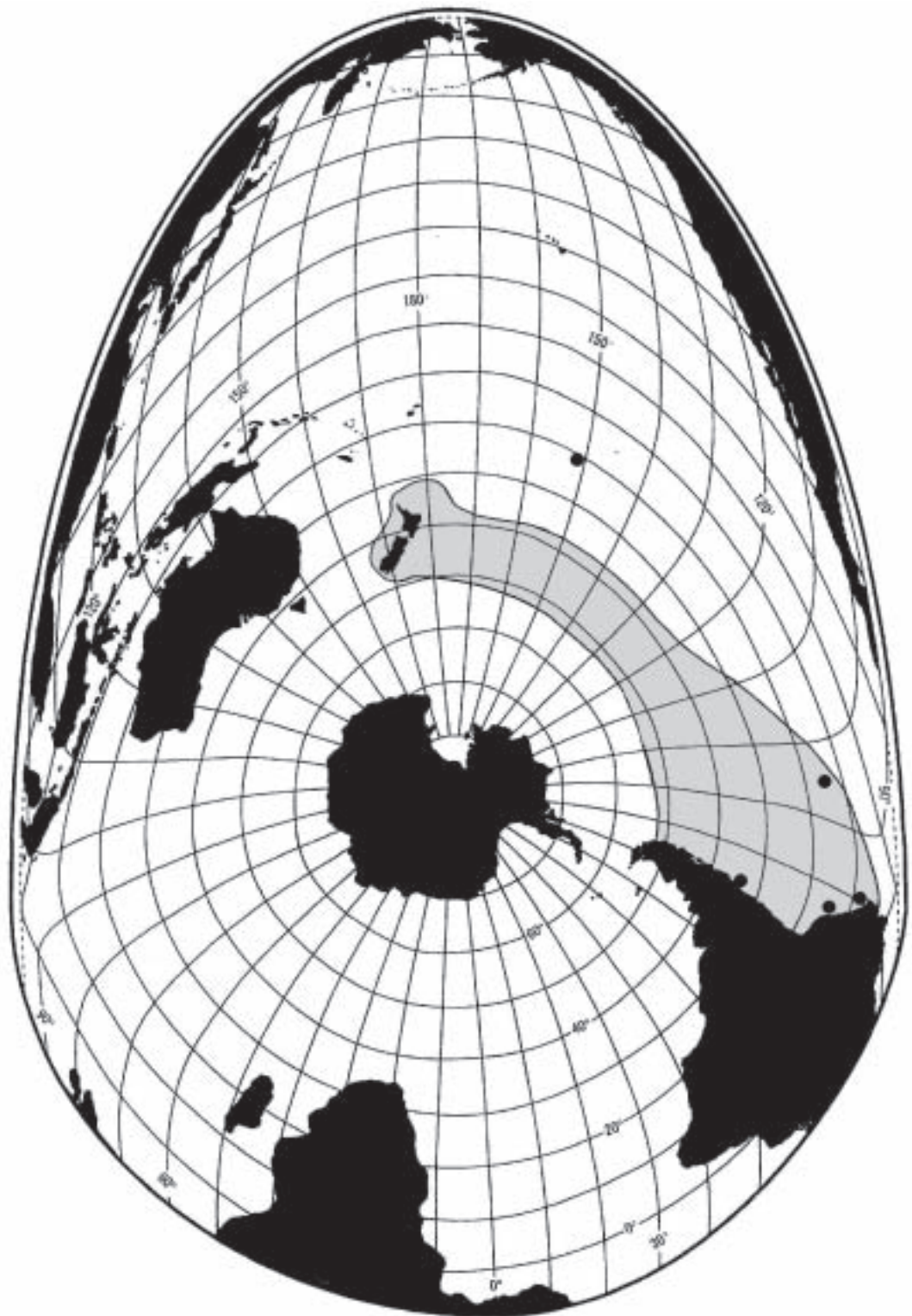


Figure 8. Chatham albatross. Grey shaded areas are an assessment of the general distribution range for the bulk of the population. Dots represent known museum specimen or band recoveries outside New Zealand waters. See text.

Flesh-footed shearwater

Puffinus carneipes

Status: Near Threatened.

Population

Breeds from St Paul (Indian Ocean) through southern and eastern Australia and northern New Zealand. Population estimated 20 000 breeding pairs in New Zealand.

Breeding and survival

Annual: September/October to April/May.

Productivity: Unknown.

Age of first return and first breeding: Unknown.

Survival from fledging to recruitment: Unknown.

Foraging range

Breeding: New Zealand—range over continental shelf waters of the North Island and Cook Strait.

Fledglings: Unknown.

Adolescents (pre-return to breeding site): Unknown.

Non-breeding: From southern New Zealand east to the Chathams, migrating to North Pacific Ocean, mainly off the eastern coast of Korea and Japan, but some off the western coast of North America, Alaska, Washington and California. Internationally, Indian Ocean west to southern coasts of Africa.

Known incidental capture in fisheries

New Zealand: Caught off northern New Zealand by pelagic and demersal longliners 1988–2002 and scampi trawlers 1996–2002.

Overseas: Caught off eastern Australia by pelagic longliners; caught previously in driftnets in North Pacific Ocean.

Current research

Monitoring of populations on some island colonies (particularly Marlborough Sounds).

Assessment of potential risk

Species caught by pelagic and demersal longliners and scampi trawlers in New Zealand waters and pelagic longliners in Australian waters and drift nets in North Pacific Ocean.

Deficiencies in knowledge

- Distribution of age classes at sea.
- Information on incidental capture and fishing practices in North Pacific.

Map

Range assessed from published records of sightings.

Principal references: 28, 29, 15, 34, 273–275, 49, 50, 99, 108, 125, 143, 199, 321, 350.

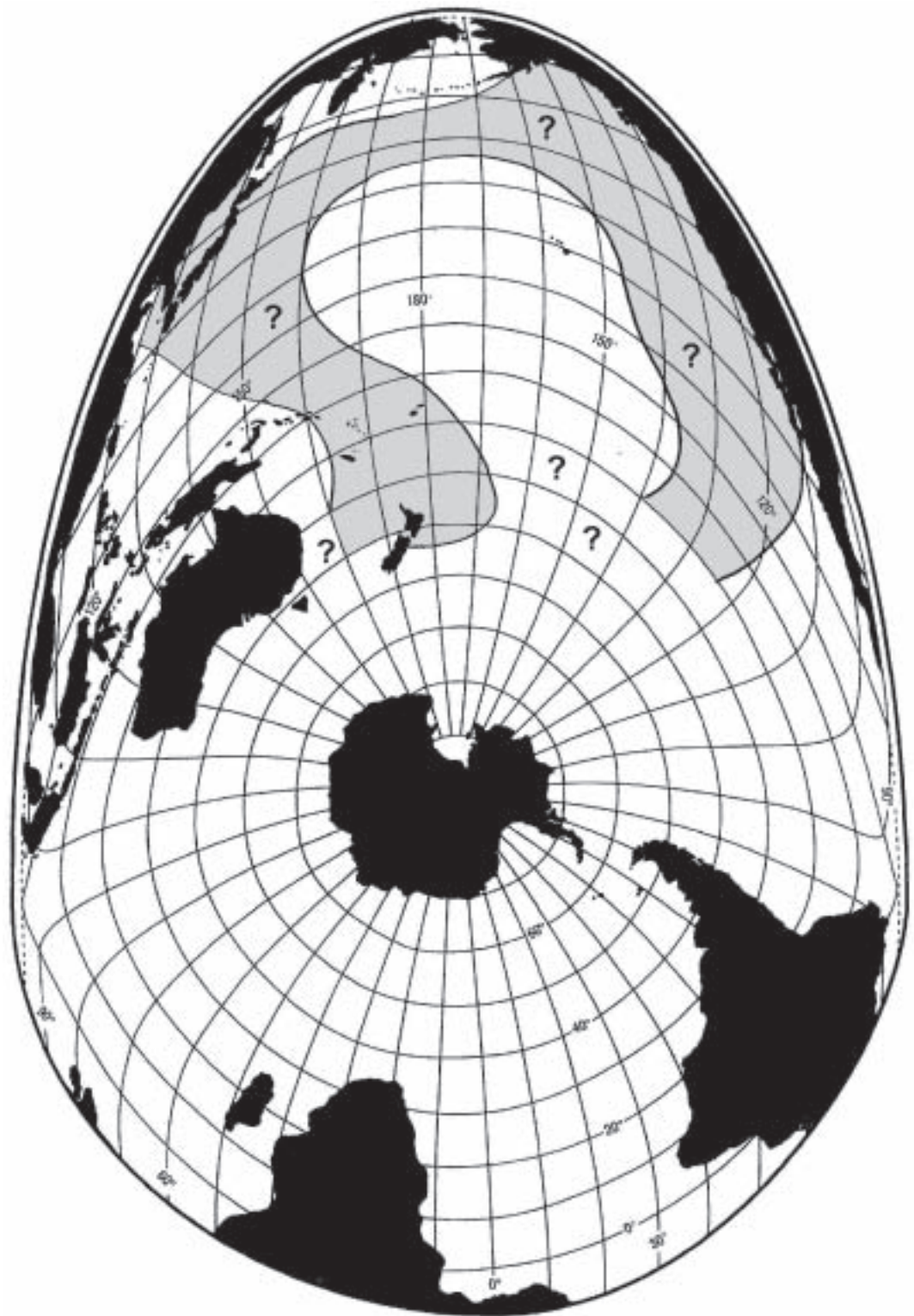


Figure 9. Flesh-footed shearwater. Grey shaded areas are an assessment of the general distribution range for the bulk of the population. Areas of speculation (?) are based on published sighting material. See text.

Fluttering shearwater

Puffinus gavia

Status: Lower Risk - Least Concern

Population

Endemic to New Zealand, breeds on many islands along the north-eastern coast of the North Island and in the Marlborough Sounds, population estimated 100 000 breeding pairs.

Breeding and survival

Annual: August to February.

Productivity: Unknown.

Age of first return and first breeding: 2 years; c. 4 years.

Survival from fledging to recruitment: Unknown

Foraging range

Breeding: Forage inshore and continental shelf close to breeding colony.

Fledglings: Disperse to eastern and southern Australia.

Adolescents (pre-return to breeding site): Unknown, but possibly remain in Australian waters.

Non-breeding: Sedentary in Australasia.

Known incidental capture in fisheries

New Zealand: One caught by demersal longline in 2000/01, caught in set net at Kaikoura.

Overseas: Unknown.

Current research

Translocation experiment and monitoring of a population.

Assessment of potential risk

Demersal longlines and set nets in Australia and New Zealand.

Deficiencies in knowledge

- Distribution of age classes at sea.

Map

Range assessed from band recoveries and other observations.

Principal references: 33, 35, 143, 199, 319, 321.

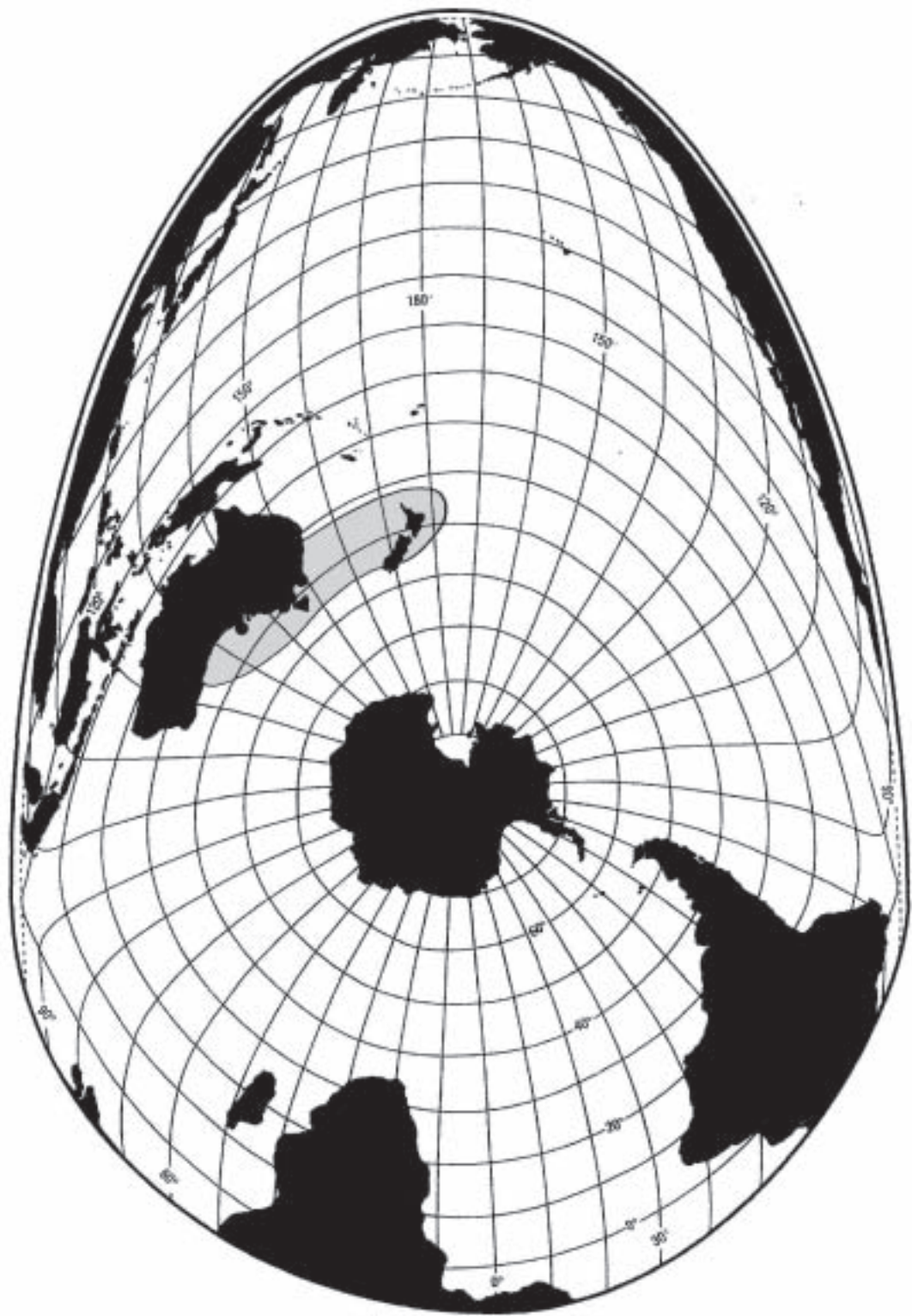


Figure 10. Fluttering shearwater. Grey shaded areas are an assessment of the general distribution range for the bulk of the population. Dots represent known band recoveries outside New Zealand waters. See text.

Gibson's (wandering) albatross

Diomedea gibsoni

Status: Vulnerable.

Population

Endemic to New Zealand, breeding on Adams, Disappointment and Auckland Island (Auckland Islands Group), biennial breeder with annual counts of nesting pairs between 4800 and 7500 breeding pairs annually in 1990s, assessed to be stable, with possible decline.

Breeding and survival

Biennial, December to December.

Productivity: 67% (61–78%).

Age of first return and first breeding: 4 years; Unknown 8+ years.

Adult mortality: 3–4%.

Survival from fledging to recruitment: Unknown.

Foraging range

Breeding: A few satellite tracks to south and west of New Zealand and central Tasman Sea (banded bird 3300 km from nest while feeding chick), but sight and banding observations suggest foraging to New South Wales.

Fledglings: Unknown, band returns indicate some move to eastern Australia.

Adolescents (pre-return to breeding site): Unknown, possibly similar to fledglings, band returns to western Bass Strait.

Non-breeding: Current evidence suggests this species may not move out of Australasian and southwest Pacific waters.

Known incidental capture in fisheries

New Zealand: Between 1987 and 1992 this species was a significant incidental capture in the pelagic longline fishery in New Zealand waters but at a rate one-third of that for Antipodean albatross. Few observed caught since 1998.

Overseas: Band returns and Australian reports detail incidental catch on pelagic longlines in Australia with at least one bird caught there in a trawl fishery.

Current research

Annual monitoring of population on Adams Island. Satellite tracking.

Assessment of potential risk

Species listed as vulnerable. Use of mitigation measures has significantly reduced incidental catch from pelagic longlines in New Zealand. Lack of knowledge in Australia.

Deficiencies in knowledge

- Distribution of pre-breeding age classes at sea.

Map

Range assessed from band recoveries and early published satellite tracking. Data on significant amount of satellite tracking over last five years not available.

Principal references: 28, 40, 78, 92, 100, 124, 138, 199, 218, 233, 260, 273–275, 278, 320, 327, 338, 339, 341, 345, 346, 348, 349.

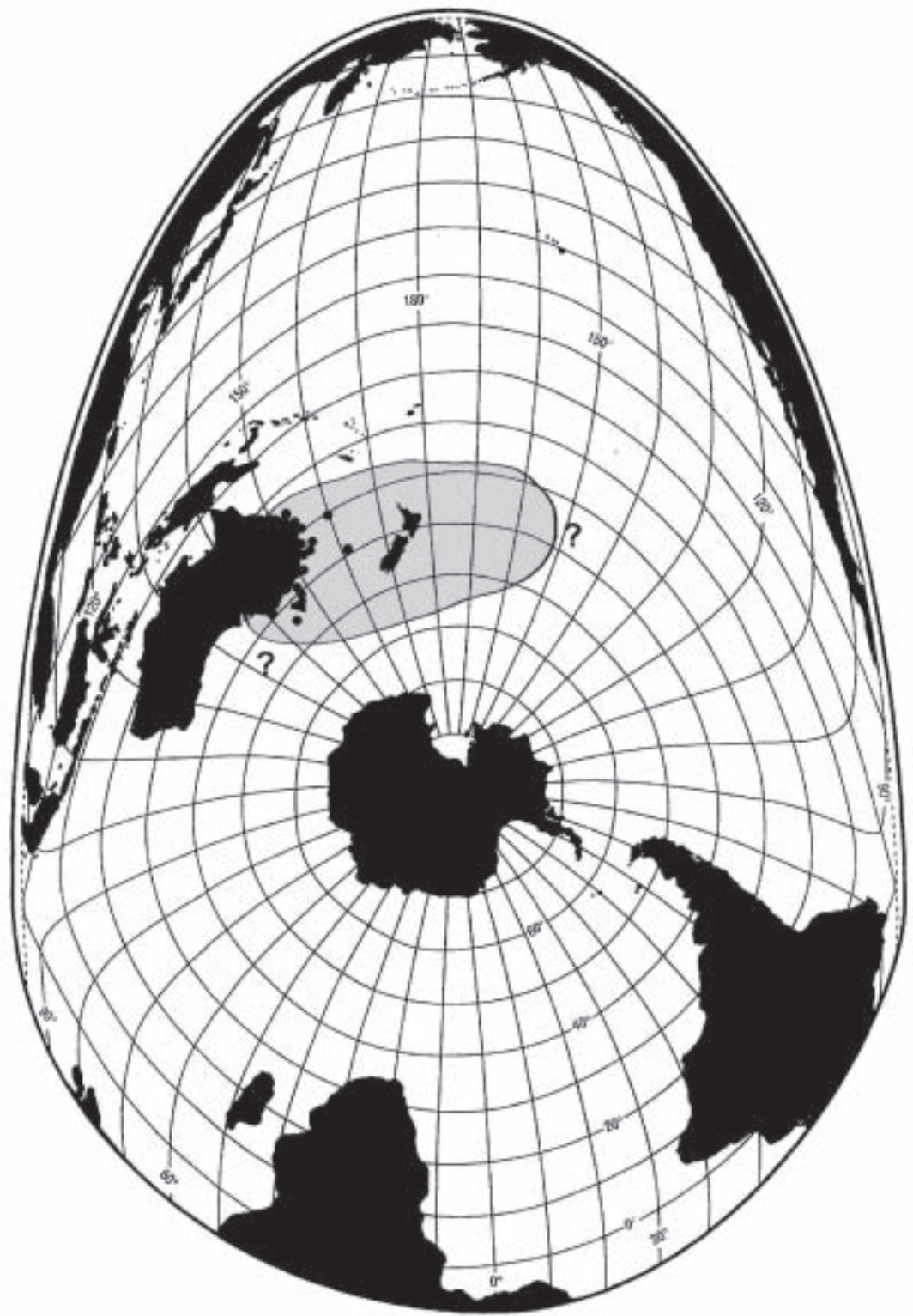


Figure 11. Gibson's (wandering) albatross. Grey shaded areas are an assessment of the general distribution range for the bulk of the population. Dots represent known band recoveries outside New Zealand waters. Areas of speculation (?) are based on sighting material and possible extensions from satellite tracking data. See text.

Grey petrel

Procellaria cinerea

Status: Near Threatened

Population

Circumpolar, breeding on many subantarctic islands. Breeds on Antipodes and Campbell Islands in New Zealand. Estimated 32 000–75 000 breeding pairs (Antipodes 2001).

Breeding and survival

Annual (probable): February to November.

Productivity: Unknown.

Age of first return and first breeding: Unknown.

Survival from fledging to recruitment: Unknown.

Foraging range

Breeding: Unknown, but bycatch records from south of Campbell Island to southern Kermadec Ridge, New Zealand EEZ.

Fledglings: Unknown.

Adolescents (pre-return to breeding site): Unknown.

Non-breeding: Unknown.

Known incidental capture in fisheries

New Zealand: Breeders extensively caught by demersal and pelagic longliners, but rarely by squid and fish trawlers during New Zealand breeding season.

Overseas: Caught by pelagic longliners in Australian Fishing Zone (Tasmania).

Current research

None, feasibility study undertaken at Antipodes (population distribution and estimate), April to June 2001.

Assessment of potential risk

Species has been caught in high numbers on longlines in New Zealand and Australian waters. Follows trawlers in New Zealand, but rarely caught.

Deficiencies in knowledge

- No detailed study of New Zealand population
- Distribution of age classes at sea.

Map

Range assessed from published distributions of sightings.

Principal references: 25, 34, 125, 143, 154, 171, 199, 218, 269, 273–275, 320, 352, 353, 335.

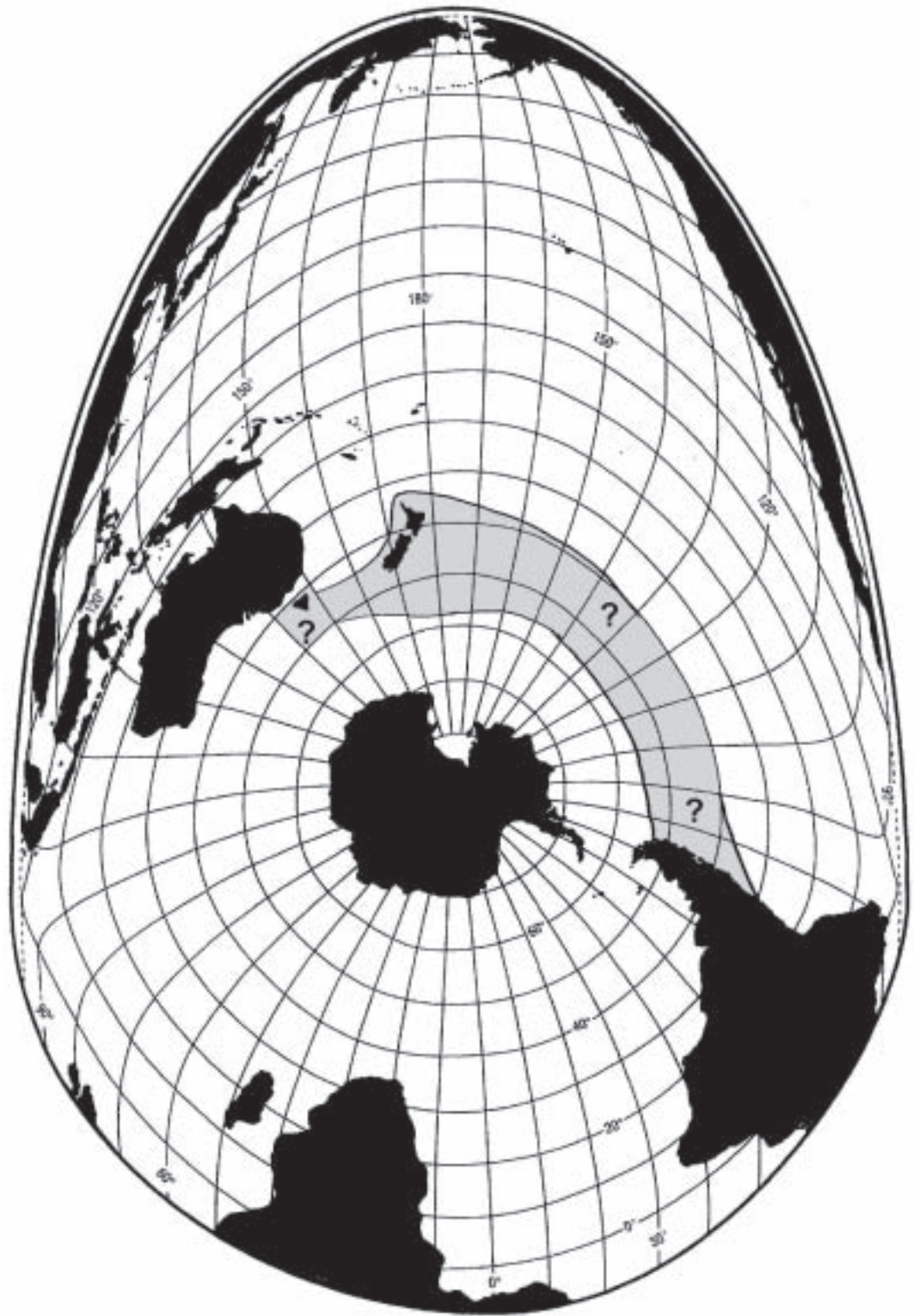


Figure 12. Grey petrel. Grey shaded areas are an assessment of the general distribution range for the bulk of the population. Areas of speculation (?) are based on published sighting material. See text.

Grey-faced petrel
Pterodroma macroptera gouldi

Status: Lower Risk

Population

Endemic subspecies. Breeds on islands, and headlands from Taranaki and northern Hawke's Bay to the Three Kings Islands. Estimates of up to c. 300 000 breeding pairs. *Macroptera* subspecies breeds SW Australia and subtropical and subantarctic islands in Atlantic and Indian Oceans.

Breeding and survival

Annual: June to January.

Productivity: 0–40%.

Age of first return and first breeding: 6 years; 7+ years.

Survival from fledging to recruitment: Unknown.

Foraging range

Breeding: Unknown, but 1 bycatch record from Hikurangi Trench.

Fledglings: Unknown, but 1 banded bird to New South Wales coast, Australia

Adolescents (pre-return to breeding site): Unknown.

Non-breeding: Banded adults from E Australia, and New Zealand bycatch from Coromandel Peninsula. and North Cape. Reported east into Pacific to 130° W between 30° and 58°S and west in Tasman Sea to Australia.

Known incidental capture in fisheries

New Zealand: Caught by demersal and pelagic longliners, and rarely by fish trawlers during New Zealand breeding season.

Overseas: Caught by longline fisheries in Australian Fishing Zone.

Current research

Various studies of breeding biology and movements between colonies from banded birds.

Assessment of potential risk

Species has been caught on longlines in New Zealand and Australian waters. Follows trawlers in New Zealand, but rarely caught.

Deficiencies in knowledge

- Distribution of age classes at sea.
- Confirmation of *gouldi* bycatch from Australia.

Map

Range assessed on band records and published distributions.

Principal references: 143, 167, 199, 269, 275, 321.

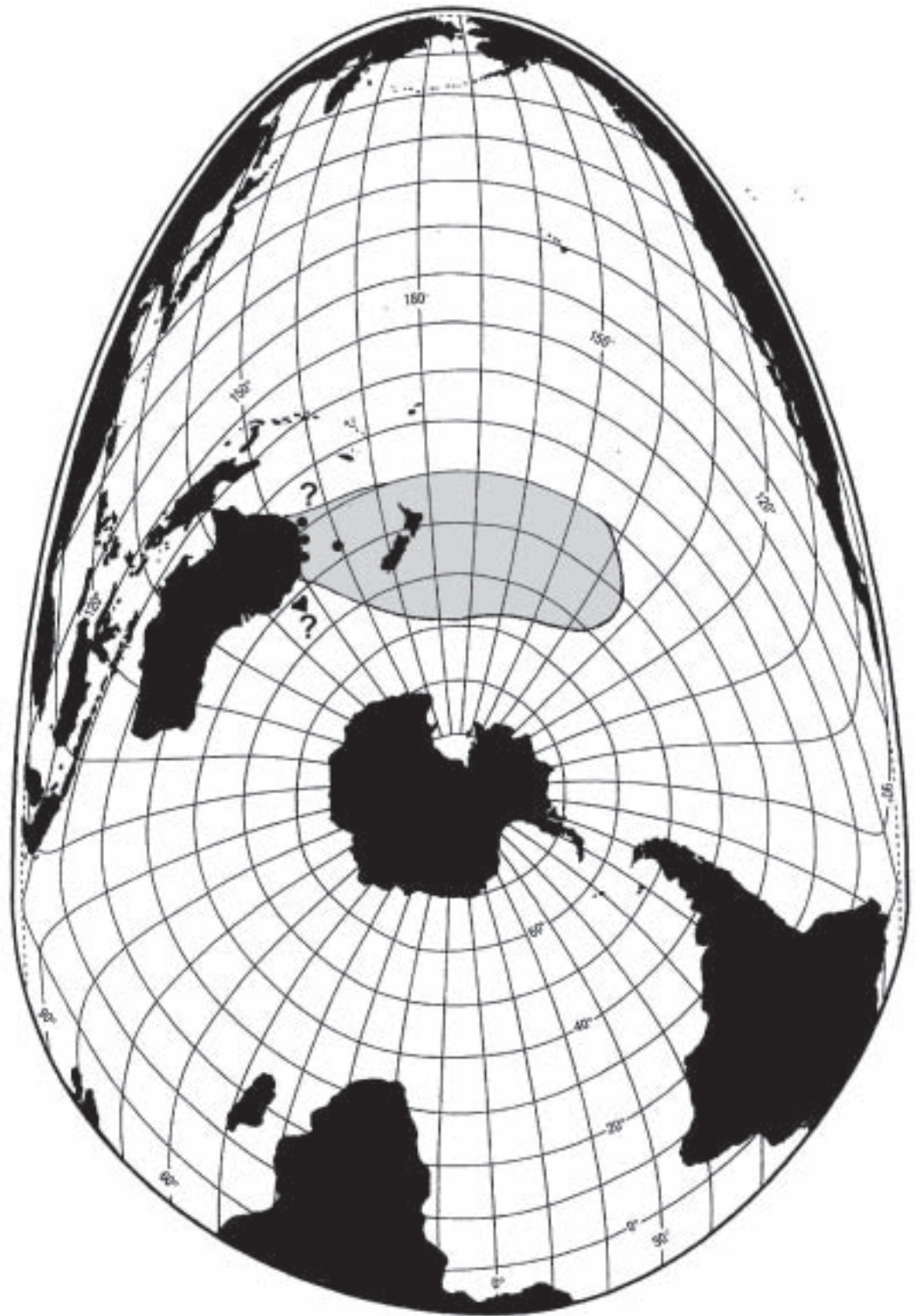


Figure 13. Grey-faced petrel. Grey shaded areas are an assessment of the general distribution range for the bulk of the population. Dots represent known band recoveries outside New Zealand waters. Areas of speculation (?) are based on published sighting material. See text.

Grey-headed albatross

Thalassarche chrysostoma

Status: Vulnerable.

Population

Circumpolar **breeding**, but with 7% of world population in New Zealand, breeding at Campbell Island (biennial breeder with estimated annual numbers of 6000–9000 breeding pairs per annum, significant decline since the 1940s, from well before commencement of local longline fishery, suggests involvement of factors other than incidental capture in fisheries). Most world populations declining.

Breeding and survival

Biennial, September to June.

Productivity: 40% (16–70).

Age of first return and first breeding: 5 years; 13.5 years (10–17)

Adult mortality: 4.7%.

Survival from fledging to recruitment: <16%.

Foraging range

Breeding: A few satellite tracks to south and east of New Zealand to 160°S over deep pelagic waters.

Fledglings: Unknown, but band returns suggest a westerly movement to Southern and Eastern Australia.

Adolescents (pre-return to breeding site): Unknown, possibly similar to fledglings, band returns to west of Australia.

Non-breeding: From Western Australia to New Zealand. [There have been band recoveries in New Zealand of birds bred at Marion Island and South Georgia.]

Known incidental capture in fisheries

New Zealand: A few immatures recorded from Fiordland pelagic longline fishery 1989–92 and a few adults from squid trawl fishery in 1990. Not recorded in observed incidental capture since.

Overseas: Banded birds caught by longlines in Southern and Western Australia. Large numbers, mainly juveniles, of this species have been caught in pelagic longline fisheries in Australia and Indian Ocean.

Current research

Periodic monitoring of population on Campbell Island.

Assessment of potential risk

Species listed as vulnerable, but many populations recording declines worldwide. New Zealand population may form a distinctive sub-group of a global species.

Deficiencies in knowledge

- Distribution of all age classes at sea.
- Genetic information on distinctiveness of New Zealand population.

Map

Range assessed from band recoveries and satellite tracking during breeding season.

Principal references: 40, 78, 92, 124, 125, 199, 233, 278, 320, 327, 361.

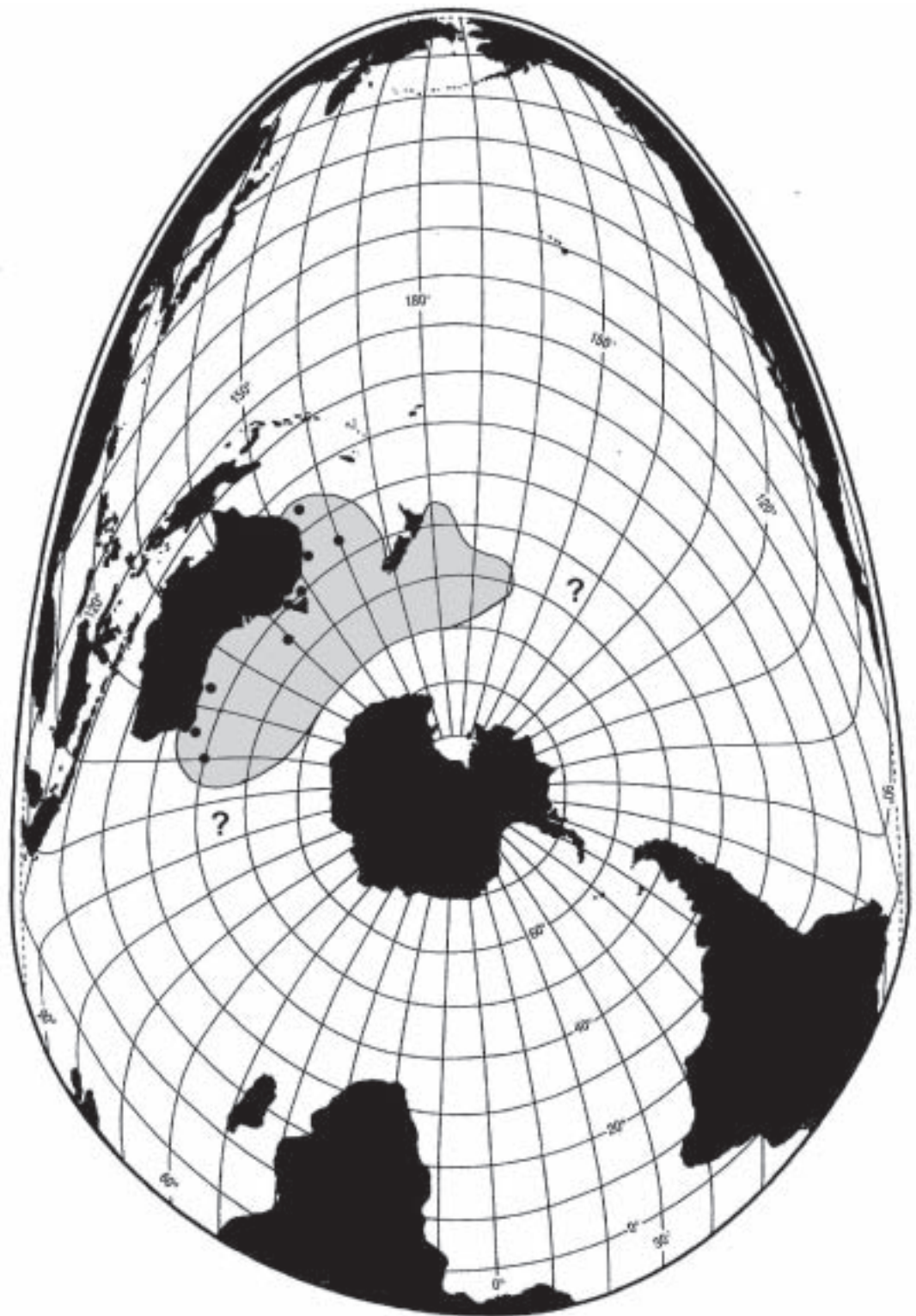


Figure 14. Grey-headed albatross. Grey shaded areas are an assessment of the general distribution range for the bulk of the population. Dots represent known band recoveries of New Zealand bred birds outside New Zealand waters. Areas of speculation (?) are based on published sighting material. See text.