Conservation Status of Reptile Species in Tāmaki Makaurau / Auckland

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Elegant gecko. Photograph by Dylan van Winkel.
Tuatara. Photograph by Georgianne Griffiths.

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Executive summary

The conservation status of all known reptile taxa in Tāmaki Makaurau / Auckland was assessed, using the New Zealand Threat Classification System (NZTCS) for the first time. We used the draft Department of Conservation regional guidelines and followed the process outlined by the Greater Wellington Regional Council. A total of 28 reptile species were identified as present in Tāmaki Makaurau / Auckland, including 9 marine reptiles, 11 skinks, 7 geckos and tuatara. Four species were assessed as Threatened, 14 as At Risk, 1 as Introduced and Naturalised and 9 as Non-resident Native (Regional Vagrant). An additional 5 species were identified that have become extinct or may have formerly occurred in the region.

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1 Introduction

Completing regional conservation status assessments for reptiles in Tāmaki Makaurau / Auckland is a component of Auckland Council's Biodiversity Focus Area (BFA) Programme. Under this programme, several projects are being established to deliver on council's obligations for regional biodiversity management under Te Tahua Pūtea Tau 2021-2031 Long-term Plan (Auckland Council 2021), the Auckland Council Indigenous Biodiversity Strategy (Auckland Council 2012), Te Mana o te Taiao – Aotearoa New Zealand Biodiversity Strategy 2020 (Department of Conservation), the draft National Policy Statement for Indigenous Biodiversity (Ministry for the Environment) and Mahere ā-Rohe Whakahaere Kaupapa Koiora Orotā mō Tāmaki Makaurau Auckland Regional Pest Management Plan 2020-2030 (Auckland Council 2020).

The Department of Conservation regularly (DOC) assesses the national conservation status of many taxa using the New Zealand Threat Classification System (NZTCS; Townsend et al. 2008, Rolfe et al. 2021). National conservation status assessments of New Zealand reptiles, including marine migrant, vagrant and introduced species are published every five years as part of the DOC New Zealand Threat Classification Series (Hitchmough 2002; Hitchmough et al. 2007, 2010, 2013, 2016, 2021). While the national assessments are helpful for prioritising conservation management, research, monitoring and natural resource management decisions, regional considerations are not taken into account. In the Tāmaki Makaurau / Auckland context, this is particularly relevant where a species is more threatened in the region than nationally or where the region represents a national stronghold for a species.

Regional threat status of a species is particularly important in the context of consenting processes under the Resource Management Act (RMA), and in conservation planning where habitat loss as a result of land use changes may occur at a site that supports the type locality or a regionally rare population of a species. Under the RMA, regional and district councils have a statutory obligation to manage threatened species habitats. A key requirement of achieving recovery of threatened species and managing their habitats in Tāmaki Makaurau / Auckland is to have a good understanding of regional population sizes and know where declines are occurring. Furthermore, regional assessments will provide a much stronger foundation for assessing species nationally as they utilize regional expert knowledge and data that may not otherwise be readily available.

Wellington Regional Council has completed threat assessments for lizards and several other taxa groups (Crisp 2020). Methodologies for that work were based on the national NZTCS system (Townsend et al. 2008, Rolfe et al. 2021) and thresholds for area of occupancy/species number adjusted for land area in the region (Appendix A). National strongholds and additional regional qualifiers including natural or historic range limits were also considered (Appendix B).

This report is the first conservation status assessment for reptiles in Tāmaki Makaurau / Auckland.

2 Methods

A panel comprised of Auckland Council internal (Sabine Melzer, Melinda Rixon) and external (Rod Hitchmough, Dylan van Winkel, Chris Wedding, Simon Chapman) experts assessed the status of the reptile species in Tāmaki Makaurau / Auckland in July 2021.

This report covers all native or naturalized terrestrial and marine reptiles in the region and followed the draft Department of Conservation (DOC) process for assessing regional conservation status (Department of Conservation 2014, pers. comm. Pascale Michel). Taxa that have become naturalised in New Zealand after being deliberately or accidentally introduced by human agency are classified as Introduced and Naturalised. To be considered naturalised, a taxon must have established a self-sustaining population in the wild over at least three generations and must have spread beyond the site of initial establishment.

We used spatial data from the national DOC Herpetofauna database as well as additional recent species records that had not yet been submitted to DOC. These included records from Auckland Council, Wildland Consultants Ltd., Ecology New Zealand and Bioresearches. Spatial data was viewed in ArcGIS Pro GIS software in conjunction with other map layers, including vegetation cover (Land Cover Database v. 5.0; Manaaki Whenua – Landcare Research 2020) and land water boundaries to inform decisions on area of occupancy and distribution.

All reptile species from the national NZTCS list (Hitchmough et al. 2021) not observed in the region were removed from consideration. Nationally threatened species that reproduce or are resident for more than half their life cycle in the region were assigned a regional conservation status by applying the NZTCS criteria (Townsend et al. 2008, Rolfe et al. 2021). However, to maintain highest protection of threatened species and for consistency between regional and national assessments, regional status must not be a lower threat category than the national status. For example, a Nationally Endangered taxon cannot be assessed as Regionally Vulnerable or lower, but it could be assessed as Regionally Critical. Population trend criteria are applied based on current knowledge, projecting from recent past into the future.

The process for determining the regional threat status of a species is shown in Appendix 1 and a full list of qualifiers applied in Appendix 2. If more than 20% of the national population is breeding or resident for more than half their life cycle in Tāmaki Makaurau / Auckland, the species was assigned National Stronghold status and the NZTCS criteria applied. Regional thresholds, allowing for differences in land area, were applied as drafted by the Department of Conservation (Department of Conservation 2014). Thresholds are designed to be used universally across a wide range of taxa and allow for using either an area or population size estimate based on the information available for a species. For Tāmaki Makaurau / Auckland, the threshold was set at less than 500 mature individuals present or a habitat occupancy area of less than 250ha. If a species did not meet the threshold, it was assigned a regional conservation status by applying the NZTCS criteria. If it did meet the threshold and the population was ±10% stable or increasing, it was assigned the status regionally not threatened.

3 Results

A total of 28 reptile species was identified as present in Tāmaki Makaurau / Auckland (Fig. 1, Table 1). These include 9 marine reptiles, 11 skinks including the introduced plague skink, 7 geckos and tuatara. All resident native reptiles are Regionally Threatened or At Risk. The region was identified as a national stronghold (>20% national population) for 9 species: chevron skink (*Oligosoma homalonotum*), ornate skink (*Oligosoma ornatum*), striped skink (*Oligosoma striatum*), egg-laying/Suter's skink (*Oligosoma suteri*), moko skink (*Oligosoma moco*), Hauraki skink (*Oligosoma townsi*), Pacific gecko (*Dactylocnemis pacificus*), Muriwai gecko (*Woodworthia aff. maculata* "Muriwai") and Mokohīnau gecko (*Dactylocnemis* "Mokohīnau"). Muriwai gecko and Mokohīnau gecko are the only reptile species endemic to Tāmaki Makaurau / Auckland.

Of the four Threatened species, two are Regionally Critical (robust skink, *Oligosoma alani*; tuatara, *Sphenodon punctatus*) and two are Regionally Vulnerable (chevron skink, Muriwai gecko). Robust skink are only known from Groper / Tatapihi Island in the Mokohīnau island group in the Hauraki Gulf and occupy an area of <1ha. Tuatara were classified as Regionally Critical as there are less than 250 mature individuals restricted to pest free off-shore islands in the region. The Chevron skink is a regional endemic but secondary to mainland Northland extinction. The Muriwai gecko is endemic to the region with an estimated population size between 1000 and 5000 mature individuals.

Fourteen species were identified as being Regionally At Risk (Fig. 1, Table 1). Seven are Regionally Declining; copper skink (*Oligosoma aeneum*), ornate skink, western shore/ Tātahi skink (*Oligosoma aff. smithi* "Three Kings, Te Paki, Western Northland"), striped skink, elegant gecko (*Naultinus elegans*), forest gecko (*Mokopirirakau granulatus*) and Pacific gecko. Both copper and ornate skink are thought to be regionally abundant overall with population sizes of more than 100,000 mature individuals, but the regional trend is estimated to be a 10-30% decline associated most likely to habitat loss. The edge habitat often occupied by copper skink has little protection and is being cleared at alarming rates due to development pressures. Habitat loss is considered a major problem for ornate skinks on the mainland, whereas populations are recovering on Te Hauturu-o-Toi / Little Barrier Island and the species is abundant on Great Barrier Island / Aotea. Western shore / Tātahi skink are estimated to occupy a regional area of less than 1000ha but is restricted to the mainland without secure island populations. Distributional limits of the species are still unclear, and the species is considered data poor. Several targeted surveys in suitable habitat did not result in the discovery of new populations (Baling, 2016). Striped skink are estimated to occupy an area of ≤10,000ha and are classified as data poor. The species is mainly restricted to off-shore islands except for sporadic and isolated observations of individuals on the mainland. Great Barrier Island / Aotea holds almost half of all records of striped skink observations from the last 30 years and therefore Tāmaki Makaurau / Auckland is a stronghold of the species with at least 20% of the national population. The distribution on Te Hauturu-o-Toi / Little Barrier Island is unclear but the species could potentially be present throughout forest habitat. Elegant gecko occupy an area of more than 10,000ha but the species is facing habitat loss with an estimated 10-50% decline. However, the

species has also disappeared from many historic sites with intact habitat so other pressures are likely impacting survival. Forest gecko and Pacific gecko occupy an area of more than 10,000ha and are declining at an estimated rate of 10-30% with habitat loss representing a critical pressure. The Pacific gecko population on Te Hauturu-o-Toi / Little Barrier Island is increasing but in decline elsewhere. There is no island stronghold for forest gecko despite populations on Aotea and Te Hauturu-o-Toi.

There are two Regionally Naturally Uncommon species. Shore skink occupy an area of less than 1000 ha. The species is considered stable within ±10% but while populations are increasing or stable on some of the Hauraki Gulf Islands, populations are in decline on the mainland (except for pest-free mainland sanctuaries) and Great Barrier Island / Aotea. The balance between these opposite trends in different sectors of the regional population was considered to be a roughly stable population overall. Mokohīnau gecko is restricted to the Mokohīnau island group and is endemic to the region.

There are four Regionally Recovering species in the region. Hauraki and egg-laying/Suter's skink occupy an area of less than 100ha and have an estimated population trend of >10% increasing. The status of Hauraki skink on the Mokohīnau Islands (Stack H) is unclear and the species may be in decline or extinct at that location. Te Hauturu-o-Toi / Little Barrier Island represents a stronghold for Hauraki skink and recently egg-laying/ Suter's skink have been detected there as well. Raukawa (*Woodworthia maculata*) and Duvaucel's (*Hoplodactylus duvaucelii* "northern") gecko are restricted to off-shore islands in the region with either 5000-20000 mature individuals or <1000ha occupancy. While Duvaucel's gecko has been translocated to Tāwharanui Open Sanctuary, the population is not yet established.

Tāmaki Makaurau / Auckland is a national stronghold for the Regionally Relict Moko skink. While this species is overall >10% increasing in the region, it is declining on Great Barrier Island / Aotea, Waiheke Island and Tiritiri Matangi Island.

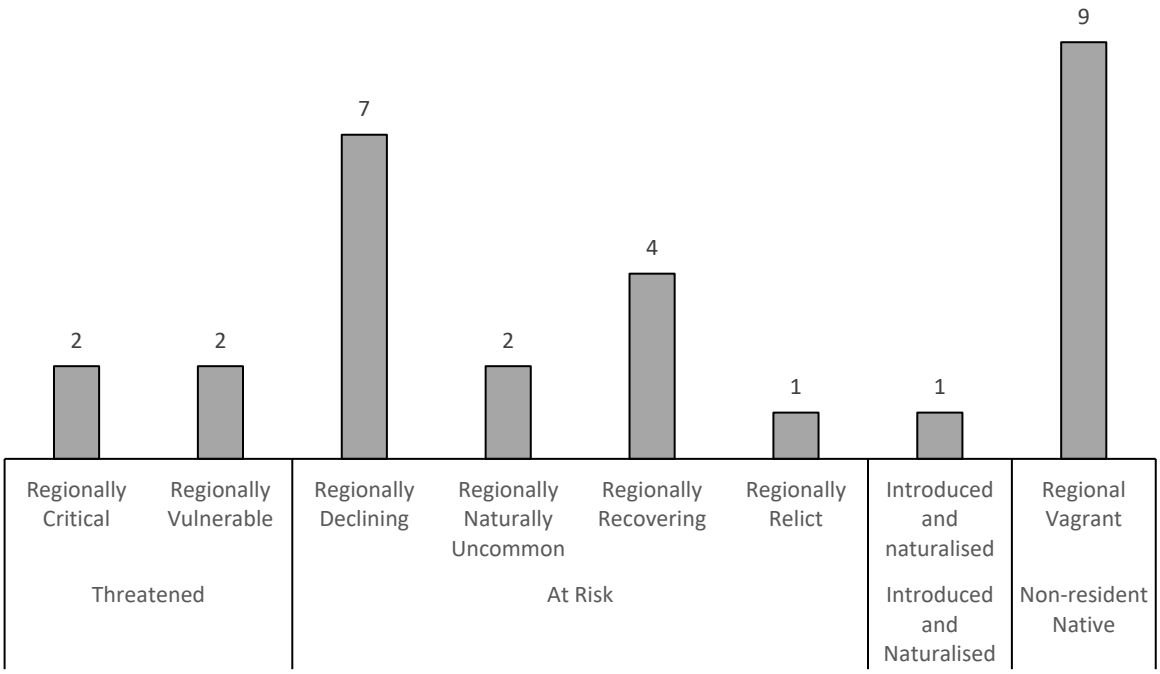

Figure 1. Graph summarising regional conservation status of reptiles in Tāmaki Makaurau / Auckland.

Table 1: Regional conservation status of Tāmaki Makaurau / Auckland reptiles.

Common Name	Name and Authority	National Cons. Status (2021)	Regional Cons. Status	Regional Criteria	National Stronghold	Regional Population	Regional Area	Regional Trend	Regional Confidence Population	Regional Confidence Trend	Regional Qualifiers	Regional Threat Assessment Notes
tuatara	*Sphenodon punctatus* (Gray, 1842)	Relict	Regionally Critical	A (1)	No	<250		>10% increase	Quantitative	Quantitative	CI, CD, INC, Rel	< 250 mature individuals in the region (eg. Motuihe ~ 20-30, Tiritiri Matangi ~ 50 mature adults)
copper skink	*Oligosoma aeneum* (Girard, 1857)	Declining	Regionally Declining	C (1/1)	No	>100000		10-30% decline	Quantitative	Qualitative	PD	Habitat loss; preferred habitat has very little protection. Edge species not abundant in forested areas. Plague skinks now abundant at many sites where copper skinks used to be found. However, a robust species with the ability to recolonise if habitat is available.
Hauraki skink	*Oligosoma townsi* (Chapple, Patterson, Gleeson, Daugherty, Ritchie, 2008)	Recovering	Regionally Recovering	A	Yes		<100 ha	>10% increase	Quantitative	Qualitative	CI, CD, PD, Rel, NStr, TL	Little Barrier is stronghold with increasing population; has bigger population than Hen &Chicken Islands in Northland. Thought to be in decline or even extinct on Mokohīnau Islands (Stack H)
ornate skink	*Oligosoma ornatum* (Gray, 1843)	Declining	Regionally Declining	C (1/1)	Yes	>100000		10-30% decline	Quantitative	Qualitative	CD, PD, NStr	National Stronghold but in decline with loss of habitat on mainland. Recovering on Little Barrier and abundant on Great Barrier Island / Aotea.
egg-laying skink	*Oligosoma suteri* (Boulenger, 1906)	Relict	Regionally Recovering	A	Yes		<100 ha	>10% increase	Quantitative	Quantitative	RR, CI, CD, PD, Rel, NStr, TL	National Stronghold with recent record from Te Hauturu-o-Toi / Little Barrier Island.
moko skink	*Oligosoma moco* (Duméril & Bibron, 1939)	Relict	Regionally Relict	B	Yes		>10000 ha	>10% increase	Quantitative	Qualitative	CD, INC, PD, Rel, NStr	National Stronghold. Also present on Kawau Island. Declines on Great Barrier, Waiheke and Tiritiri Matangi Islands but increasing on Rangitoto, Motutatpu and Motuihe Islands.

Common Name	Name and Authority	National Cons. Status (2021)	Regional Cons. Status	Regional Criteria	National Stronghold	Regional Population	Regional Area	Regional Trend	Regional Confidence Population	Regional Confidence Trend	Regional Qualifiers	Regional Threat Assessment Notes
shore skink	*Oligosoma smithi* (Gray, 1845)	Declining	Regionally Naturally Uncommon		No		<1000 ha	±10% stable	Quantitative	Expert opinion	RR, CI, CD, PD, PF	> 3000 mature individuals, incr/stable on Te Hauturu-o-Toi / Little Barrier Island & other islands where translocated to. Declining at mainland sites except pest free fenced sites Shakespear and Tāwharanui Regional Parks. Slow decline on Great Barrier Island / Aotea and probably worse decline at Te Arai – overall stable in the Region
Tātahi / western shore skink	*Oligosoma aff. smithi* "Three Kings, Te Paki, Western Northland"	Declining	Regionally Declining	A (2/1)	No		<1000 ha	10-30% decline	Quantitative	Qualitative	DPT, OL, CI, NR	No safe guarded island populations -> population probably declining
chevron skink	*Oligosoma homalonotum* (Boulenger, 1906)	Nationally Vulnerable	Regionally Vulnerable		Yes						CD, RR, NSTr	Regional endemic – but secondary to mainland Northland extinction
robust skink	*Oligosoma alani* (Robb, 1970)	Recovering	Regionally Critical	A (3)	No		<1 ha	N/A	Quantitative	N/A	CI, CD, Rel, OL, CR	< 1 ha – just Groper Island, Mokohīnau Island Group
striped skink	*Oligosoma striatum* (Buller, 1871)	Declining	Regionally Declining	B (2/1)	Yes		2000-10000 ha	10-30% decline	Quantitative	Expert opinion	DPS, DPT, Sp, CD, CR, PD, NStr, NR	Tāmaki Makaurau / Auckland represents 20% of known locations with Great Barrier Island / Aotea holding almost 50% of all records in the last 30 years. On Te Hauturu-o-Toi / Little Barrier Island potentially present throughout forest. Likely decline on Great Barrier and mainland.
plague skink	*Lampropholis delicata* (De Vis, 1888)	Introduced and Naturalised	Introduced and naturalised									
elegant gecko	*Naultinus elegans* Gray, 1842	Declining	Regionally Declining	C (2/1)	No		>10000 ha	10-50% decline	Quantitative	Qualitative	CR, TL, PD, PF	Both habitat loss and disappearance from historic sites with intact habitat

Common Name	Name and Authority	National Cons. Status (2021)	Regional Cons. Status	Regional Criteria	National Stronghold	Regional Population	Regional Area	Regional Trend	Regional Confidence Population	Regional Confidence Trend	Regional Qualifiers	Regional Threat Assessment Notes
forest gecko	*Mokopirirakau granulatus* (Gray, 1845)	Declining	Regionally Declining	C (2/1)	No		>10000 ha	10-30% decline	Quantitative	Qualitative	CD, PD	No island stronghold – population on Great Barrier and Te Hauturu-o-Toi / Little Barrier Islands not dense but potential for a dense population on Little Barrier. In decline on Waiheke due to current and projected habitat loss from development. Habitat loss also a critical pressure on the mainland
Pacific gecko	*Dactylocnemis pacificus* (Gray, 1842)	Not Threatened	Regionally Declining	C (2/1)	Yes		>10000 ha	10-30% decline	Quantitative	Qualitative	CD, PD, PF, NStr	National Stronghold probably borderline 20%. In decline on mainland, Waiheke and Great Barrier Island / Aotea due to habitat loss but increasing on Te Hauturu-o-Toi / Little Barrier Island.
Raukawa gecko	*Woodworthia maculata* (Gray, 1845)	Not Threatened	Regionally Recovering	B	No		<1000 ha	>10% increase	Expert opinion	Quantitative	CD, Rel	Only on islands -> increasing overall (declining on GBI but stable on The Noises). Patchy distribution, mainly coastal
northern Duvaucel's gecko	*Hoplodactylus duvaucelii* “northern” (Dumeril & Bibron, 1836)	Relict	Regionally Recovering	B	No	5000-20000		>10% increase	Qualitative	Quantitative	CD, INC, PD, Rel	No mainland site, translocated population at Tāwharanui is not yet established.
Muriwai gecko	*Woodworthia aff. maculata* "Muriwai"	Nationally Vulnerable	Regionally Vulnerable	C (1/1)	Yes						DPT, RR, CI, CR, NSTr, RE	Regional endemic
Mokohīnau gecko	*Dactylocnemis* "Mokohīnau"	Naturally Uncommon	Regionally Naturally Uncommon		Yes						CD, IE, RR, NR, RE, TL, NSTr	Regional endemic
loggerhead turtle	*Caretta caretta*	Vagrant	Regional Vagrant								DPS, DPT, TO	
green turtle	*Chelonia mydas* (Linnaeus, 1758)	Migrant	Regional Vagrant								TO	Probably only vagrant in the region, less than 15 individuals/year

Common Name	Name and Authority	National Cons. Status (2021)	Regional Cons. Status	Regional Criteria	National Stronghold	Regional Population	Regional Area	Regional Trend	Regional Confidence Population	Regional Confidence Trend	Regional Qualifiers	Regional Threat Assessment Notes
leatherback turtle	*Dermochelys coriacea* (Vandelli, 1761)	Migrant	Regional Vagrant								TO	
hawksbill turtle	*Eretmochelys imbricata* (Linnaeus, 1766)	Vagrant	Regional Vagrant								DPS, DPT, TO	
yellow-bellied sea-snake	*Pelamis platurus* (Linnaeus, 1766)	Not Threatened	Regional Vagrant								DP, SO	
yellow-lipped sea krait	*Laticauda colubrina* (Schneider, 1799)	Vagrant	Regional Vagrant								DPS, DPT, SO	
brown lipped sea krait	*Laticauda laticaudata* Linnaeus 1758	Vagrant	Regional Vagrant								DPS, DPT, SO	
olive ridley turtle	*Lepidochelys olivacea* (Eschscholtz, 1829)	Vagrant	Regional Vagrant								DPS, DPT, TO	
Saint-Giron's sea krait	*Laticauda saintgironsi* Cogger & Heatwole, 2005	Vagrant	Regional Vagrant								DPS, DPT, SO	

Table 2: Species that have become extinct or may have formerly occurred in the Tāmaki Makaurau / Auckland Region.

Species	Status	Justification
Oligosoma "Whirinaki"	Confident	Known distribution spans Tāmaki Makaurau / Auckland.
Oligosoma robinsoni	Confident	Subfossil remains identified in caves as far north as Waipu (Worthy 1991) (identified as *O. infrapunctatum*, but presumably *O. robinsoni*).
Toropuku inexpectatus	Speculative	May have been on Te Hauturu-o-Toi / Little Barrier Island and Great Barrier Island / Aotea.
Oligosoma macgregori	Confident	Known distribution spans Tāmaki Makaurau / Auckland.
Oligosoma oliveri	Speculative	Distribution (Poor Knights Islands, Mercury Islands, Aldermen Islands) spans the region. Presumably overlapped with *O. townsi* in the past. DNA confirmed identification of subfossil bones would provide more evidence of widespread mainland distribution before human arrival.

4 Discussion

Completing regional conservation status assessments for reptiles in Tāmaki Makaurau / Auckland is a component of Auckland Council's Biodiversity Focus Area (BFA) Programme. BFAs represent the minimum set of sites requiring targeted management of critical pressures to ensure regional viability of indigenous ecosystems, sequences and species is maintained in the region over the long-term (>50 years). Under this programme, several projects are being established to deliver on council's obligations for regional biodiversity management.

Regional conservation status assessments will help guide the prioritisation of species for targeted management, survey, monitoring and research to ensure regional viability of indigenous species is maintained in the region over the long-term. Auckland Council staff have recently completed several workshops to identify BFAs and key pressures for herpetofauna prior to the regional conservation status assessment. This work helped collate information on species' spatial distribution, population trends and identify key pressures and research needs.

While work under the different projects is being shaped to improve outcomes for threatened species in the region, survey and monitoring of several reptiles is currently underway. The Muriwai gecko is endemic to the region and Auckland Council is committed to ongoing monitoring of the species and developing targeted control of pressures at key sites (Bioresearches 2021). Further survey work is planned to determine if the species is present between the known sites to better understand distribution. Auckland Zoo has been conducting surveys in suitable habitat at a site in Northland and Waikato but so far, no geckos have been detected. Three moko skink surveys were completed at Ōtuataua Stonefields historic reserve over the course of the past six years as an individual was found there in 2004 and the importance of identifying and protecting a functioning mainland population was recognised. The most recent survey was completed in May 2021 but no moko skink were detected (Choromanski 2021). The regionally critical robust skink is only known from Groper Island / Tatapihi in the region and occupying an area of approximately 0.87ha. A restoration plan for this species is urgently needed and translocations to other sites in the Mokohīnau Island group is strongly recommended.

A comprehensive framework and plan for management needs for threatened reptiles as well as species-led outcome monitoring are being developed under the BFA programme. This will provide more reliable population trend data, allow for adaptive management, and improve outcomes for reptiles in the region.

Regarding the assessment of exotic reptiles in this and future reports, only plague skinks meet the criteria to be classified as Introduced and Naturalised. (The definition is at least three generations of wild breeding plus spread from the point of release.) Several species commonly kept as pets including eastern water dragons, blue-tongued skinks, bearded dragons, snake-necked turtles, Reeves turtles and red-eared slider turtles all escape or are released from captivity regularly and

many of these survive well outside captivity. However, they do not at present meet the sustained breeding and spread criteria for listing.

Red-eared sliders (*Trachemys scripta elegans*) in particular are known to be present in waterbodies throughout much of the region (I Bassett, pers. comm. 1 March). No systematic survey has been done on this species within the region, therefore their breeding status is currently unknown. However, predictive modelling and observations of breeding to date in other regions suggest that, due to their temperature-dependant sex determination, it is likely that only male offspring are currently being produced in Tāmaki Makaurau / Auckland (Cadi et al. 2004; Kikillus et al 2010; Ling 2021). Local population build-up of these male offspring is possible, augmented by continued release of captive females, but the three-generation wild breeding threshold is highly unlikely to be reached in the foreseeable future.

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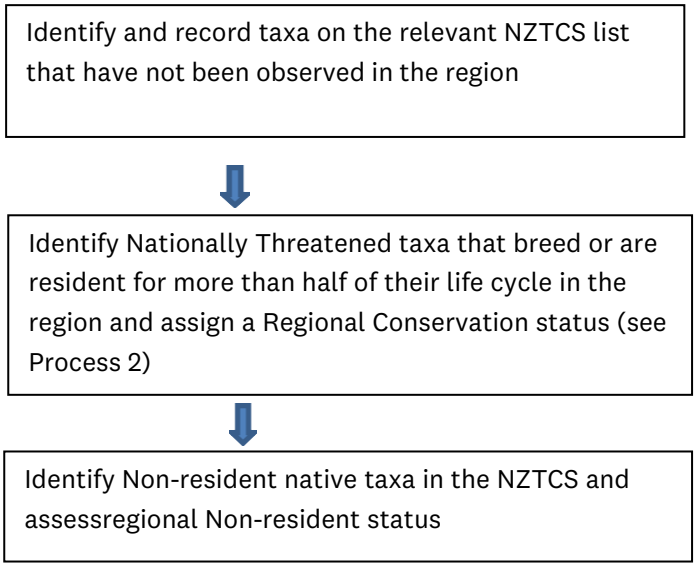
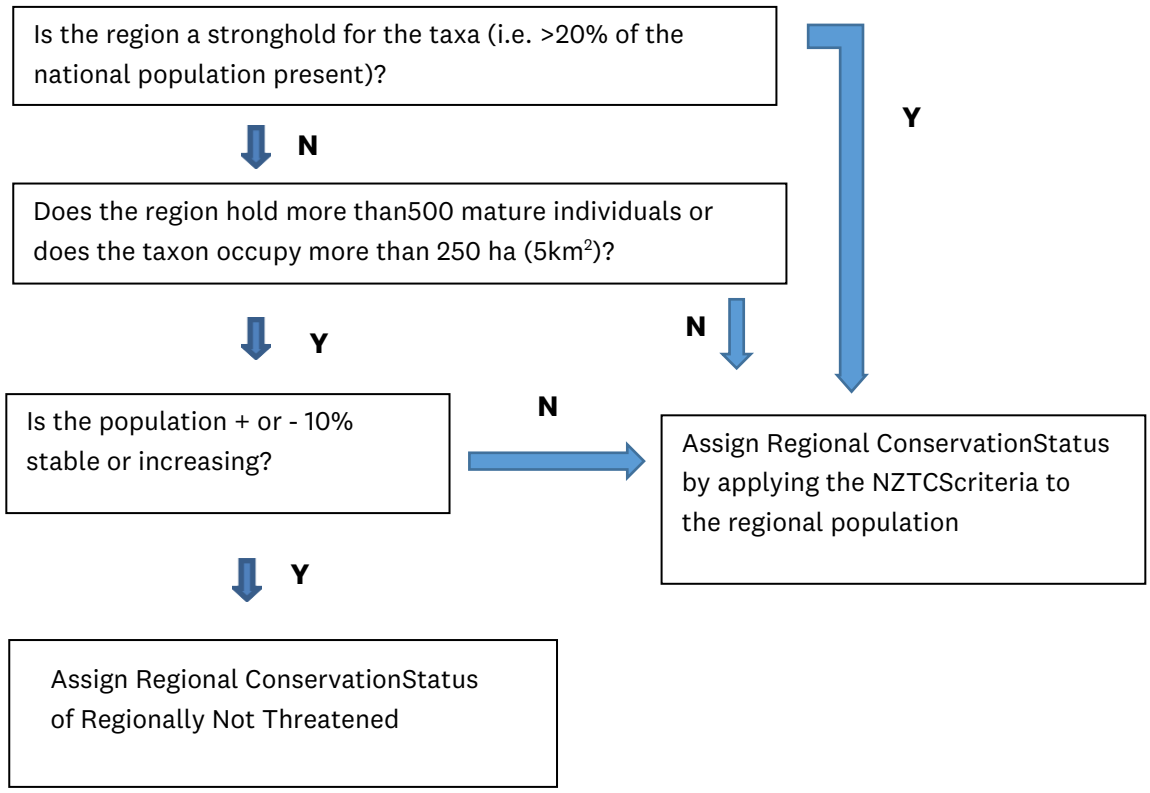
Appendix 1: Process for determining the regional threat status of a species

Process 1: Determination of regional threat status



Process 2: Determination of strongholds and Regionally Not Threatened species



Appendix 2: List of national and regional qualifiers

Code	Qualifier	Qualifier Type	National/Regional	Description
DPR	Data Poor: Recognition	Assessment Process Qualifier	National	Confidence in the assessment is low because of difficulties in determining the identity of the taxon in the field and/or in the laboratory. Taxa that are DPR will often be DPS and DPT. In such cases, the taxon is most likely to be Data Deficient.
DPS	Data Poor: Size	Assessment Process Qualifier	National	Confidence in the assessment is low because of a lack of data on population size.
DPT	Data Poor: Trend	Assessment Process Qualifier	National	Confidence in the assessment is low because of a lack of data on population trend.
DE	Designated	Assessment Process Qualifier	National	A taxon that the Expert Panel has assigned to what they consider to be the most appropriate status without full application of the criteria. For example, a commercial fish stock that is being fished down to Biomass Maximum Sustainable yield (BMSy) may meet criteria for 'Declining', however, it could be designated as 'Not Threatened' if the Expert Panel believes that this better describes the taxon's risk of extinction
IE	Island Endemic	Biological Attribute Qualifier	National	A taxon whose natural distribution is restricted to one island archipelago (e.g. Auckland Islands) and is not part of the North or South Islands or Stewart Island/Rakiura. This qualifier is equivalent to the 'Natural' Population State value in the database.
NS	Natural State	Biological Attribute Qualifier	National	A taxon that has a stable or increasing population that is presumed to be in a natural condition, i.e., has not experienced historical human-induced decline.
RR	Range Restricted	Biological Attribute Qualifier	National	A taxon naturally confined to specific substrates, habitats or geographic areas of less than 1000 km2 (100 000 ha), this is assessed by taking into account the area of occupied habitat of all sub-populations (and summing the areas of habitat if there is more than one sub-population), e.g. Chatham Island forget-me-not (*Myosotidium hortensia*) and Auckland Island snipe (*Coenocorypha aucklandica aucklandica*). This qualifier can apply to any 'Threatened' or 'At Risk' taxon. It is redundant if a taxon is confined to 'One Location' (OL).

Code	Qualifier	Qualifier Type	National/Regional	Description
Sp	Sparse	Biological Attribute Qualifier	National	The taxon naturally occurs within typically small and widely scattered subpopulations. This qualifier can apply to any 'Threatened' or 'At Risk' taxon.
NO	Naturalized Overseas	Population State Qualifier	National	A New Zealand endemic taxon that has been introduced by human agency to another country (deliberately or accidentally) and has naturalised there e.g., *Olearia traversiorum* in the Republic of Ireland.
OL	One Location	Population State Qualifier	National	Found at one location in New Zealand (geographically or ecologically distinct area) of less than 100 000 ha (1000 km2), in which a single event (e.g. a predator irruption) could easily affect all individuals of the taxon, e.g. L'Esperance Rock groundsel (Senecio esperensis) and Open Bay Island leech (*Hirudobdella antipodum*). 'OL' can apply to all 'Threatened', 'At Risk', Non-resident Native – Coloniser and Non-resident Native – Migrant taxa, regardless of whether their restricted distribution in New Zealand is natural or human-induced. Resident native taxa with restricted distributions but where it is unlikely that all sub-populations would be threatened by a single event (e.g. because water channels within an archipelago are larger than known terrestrial predator swimming distances) should be qualified as 'Range Restricted' (RR).
SO	Secure Overseas	Population State Qualifier	National	The taxon is secure in the parts of its natural range outside New Zealand.
SO?	Secure Overseas?	Population State Qualifier	National	It is uncertain whether a taxon of the same name that is secure in the parts of its natural range outside New Zealand is conspecific with the New Zealand taxon.
S?O	Secure? Overseas	Population State Qualifier	National	It is uncertain whether the taxon is secure in the parts of its natural range outside New Zealand.
TO	Threatened Overseas	Population State Qualifier	National	The taxon is threatened in the parts of its natural range outside New Zealand.
TO?	Threatened Overseas?	Population State Qualifier	National	It is uncertain whether a taxon of the same name that is threatened in the parts of its natural range outside New Zealand is conspecific with the New Zealand taxon.
T?O	Threatened? Overseas	Population State Qualifier	National	It is uncertain whether the taxon is threatened in the parts of its natural range outside New Zealand.

Code	Qualifier	Qualifier Type	National/Regional	Description
CI	Climate Impact	Pressure Management Qualifier	National	The taxon is adversely affected by long-term climate trends and/or extreme climatic events. The following questions provide a guide to using the CI Qualifier: Is the taxon adversely affected by long-term changes in the climate, such as an increase in average temperature or sea-level rise? If NO = no Qualifier but needs monitoring and periodic re-evaluation because projected changes to the average climate and sea-level rise may adversely impact the taxon (including via changes to the distribution and prevalence of pests, weeds and predators) in the future. If YES = CI Qualifier Is the taxon adversely affected by extreme climate events, such as a drought, storm or heatwave? If No = no Qualifier but needs monitoring and periodic re-evaluation because projected changes to the climate are likely to increase the frequency and/or severity of these events in the future. If YES = CI Qualifier Use of the Climate Impact Qualifier would indicate the need for more in-depth research, ongoing monitoring of climate impacts, and potentially a climate change adaptation plan for the taxon.
CD	Conservation Dependent	Pressure Management Qualifier	National	The taxon is likely to move to a worse conservation status if current management ceases. The term 'management' can include indirect actions that benefit taxa, such as island biosecurity. Management can make a taxon CD only if cessation of the management would result in a worse conservation status. The influence of the benefits of management on the total population must be considered before using CD. The benefit of managing a single subpopulation may not be adequate to trigger CD, but may trigger Partial Decline (PD). Taxa qualified CD may also be PD because of the benefits of management.
CR	Conservation Research Needed	Pressure Management Qualifier	National	Causes of decline and/or solutions for recovery are poorly understood and research is required.

Code	Qualifier	Qualifier Type	National/Regional	Description
EW	Extinct In The Wild	Pressure Management Qualifier	National	The taxon is known only in captivity or cultivation or has been reintroduced to the wild but is not self-sustaining. Assessment of a reintroduced population should be considered only when it is self-sustaining. A population is deemed to be self-sustaining when the following two criteria have been fulfilled: it is expanding or has reached a stable state through natural replenishment and at least half the breeding adults are products of the natural replenishment, and it has been at least 10 years since reintroduction
EF	Extreme Fluctuations	Pressure Management Qualifier	National	The taxon experiences extreme unnatural population fluctuations, or natural fluctuations overlaying human-induced declines, that increase the threat of extinction. When ranking taxa with extreme fluctuations, the lowest estimate of mature individuals should be used for determining population size, as a precautionary measure.
INC	Increasing	Pressure Management Qualifier	National	There is an ongoing or forecast increase of > 10% in the total population, taken over the next 10 years or three generations, whichever is longer. This qualifier is redundant for taxa ranked as 'Recovering'.
PD	Partial Decline	Pressure Management Qualifier	National	The taxon is declining over most of its range, but with one or more secure populations (such as on offshore islands). Partial decline taxa (e.g. North Island kākā *Nestor meridionalis septentrionalis* and Pacific gecko *Dactylocnemis pacificus*) are declining towards a small stable population, for which the Relict qualifier may be appropriate.
PF	Population Fragmentation	Pressure Management Qualifier	National	Gene flow between subpopulations is hampered as a direct or indirect result of human activity. Naturally disjunct populations are not considered to be 'fragmented'.
PE	Possibly/Presumed Extinct	Pressure Management Qualifier	National	A taxon that has not been observed for more than 50 years but for which there is little or no evidence to support declaring it extinct. This qualifier might apply to several Data Deficient and Nationally Critical taxa.

Code	Qualifier	Qualifier Type	National/Regional	Description
RF	Recruitment Failure	Pressure Management Qualifier	National	The age structure of the current population is such that a catastrophic decline is likely in the future. Failure to produce new progeny or failure of progeny to reach maturity can be masked by apparently healthy populations of mature specimens. Population trend qualifiers
Rel	Relict	Pressure Management Qualifier	National	The taxon has declined since human arrival to less than 10% of its former range but its population has stabilised. The range of a relictual taxon takes into account the area currently occupied as a ratio of its former extent. Reintroduced and self-sustaining populations within or outside the former known range of a taxon should be considered when determining whether a taxon is relictual. This definition is modified from the definition of the At Risk – Relict category in the NZTCS manual (Townsend et al. 2008). The main difference is that trend is not included in the qualifier definition. This enables the qualifier to be applied to any taxon that has experienced severe range contraction, regardless of whether that contraction continues or has been arrested. This qualifier complements the 'Naturally Uncommon (NU)' qualifier which can be applied to taxa whose abundance has declined but which continue to occupy a substantial part of their natural range.
FR	Former Resident		Regional	Breeding population (existed for more than 50 years) extirpated from region but continues to arrive as a regional vagrant or migrant. FR and RN are mutually exclusive.
HR	Historical Range		Regional	The inferred range (extending in any direction) of the taxon in pre-human times meets its natural limit in the region.
IN	Introduced Native		Regional	Introduced to the region, though not known to have previously occurred in it.
NS	National Stronghold		Regional	More than 20% of the national population breeding or resident for more than half their life cycle in the region.
NR	Natural Range		Regional	The known range (extending in any direction) of the taxon meets it natural limit in the region.

Code	Qualifier	Qualifier Type	National/Regional	Description
RE	Regional Endemic		Regional	Known to breed only in the region.
RN	Restored Native		Regional	Reintroduced to the region after having previously gone extinct there.
TL	Type Locality		Regional	The type locality of the taxon is within the region. Ignore if the taxon is or has ever been regionally extinct.

Find out more: biodiversity@aucklandcouncil.govt.nz
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