

3. Ecological character

3.1 TOPOGRAPHY/GEOLOGY

The Tokatoka Ecological District is characterised by rolling to moderately dissected hill country up to 220 m a.s.l, mostly within the catchment of the Manganui River. Much of the area is underlain by allochthonous Cretaceous-Paleocene Mangakahia Complex sandstone and mudstone, but there are also extensive areas of Eocene-Oligocene Motatau Complex muddy limestone in the west, south and east of the District. Also in the west, between Turiwiri and Tokatoka, are a large number of lower Miocene Waitakere Group subvolcanic basaltic to dacitic plugs, sills, dikes and breccia pipes, some of which form prominent steep-sided hills. Extensive ribbons of alluvial deposits are present along the Manganui River valley and its main tributaries. (Brook 1996)

3.2 CLIMATE OF TOKATOKA ECOLOGICAL DISTRICT

The Tokatoka Ecological District experiences a mild, humid climate with winds predominately from the southwest. Climate information has been derived from data recorded at the Dargaville weather station, which is the closest station to the District.

Moist winds due to the influence of the sea bring abundant rainfall throughout the year. Data from the Dargaville weather station reveals that 43% of the District's annual rainfall occurs between May and August. Winter is generally characterised by a higher rainfall whilst dry spells are not uncommon during summer. Cyclonic storms can occur between December and April.

Because of the modifying influence of the sea and low latitudes, the Tokatoka Ecological District doesn't generally experience extremes in temperature. Mean annual temperatures vary between 14°C and 15.5°C, with an average daily temperature range of 8.9°C.

The Tokatoka Ecological District experiences an average of 2000 hours of sunshine per year (the same as in the rest of Northland) (Moir et al. 1986).

3.3 VEGETATION

A preliminary plant species checklist for Tokatoka Ecological District is presented in Appendix 5. Common names used in the text are listed with their species names in Appendix 6.

3.3.1 **Historic vegetation**

The clearance of formerly extensive kauri forests, along with intensive agricultural and other land development, has profoundly changed the character and ecology of the Tokatoka Ecological District.

The Kauri Bushmans Memorial Reserve (Q08/091) offers a small glimpse of what the kauri forest that once dominated this area was like.

Accounts of the District by the first European settlers are dominated by references to the magnificent kauri forests and the associated kauri industry. One account refers to the impressive kauri forests that were to be seen around the headquarters of the Manganui, Tauraroa and Waioira rivers. Other areas heavily forested in kauri were Waikiekie, Rehia, Parahi and Tokatoka (Stephen & Stephen, n.d.).

An account from a publication marking the centennial celebrations of the Paparoa-Matakohe area reads:

One of the most famous and last big bushes to be worked was the Forty-Acre at Ararua³. It contained approximately 1000 acres and was thus named because there was 40 acres of scrub in the middle, the result of fires probably hundreds of years ago. Almost 22 million feet of kauri was worked out between 1905-1909 and it was considered to be one of the most wonderful examples of our native bush.

There were three large trees in this forest, the largest being forty-five feet to the first branch—48 feet in girth and had it been solid, would have contained 77, 760 feet of kauri, enough for six average houses. As an example of comparison, Tane Mabuta, the well known tree in the Waipoua State Forest is estimated to contain a little over 50,000 super feet.

(Compiled by the Paparoa-Matakohe District Centennial Association).

The harakeke (flax) industry was also an important industry for the early European settlers. One harakeke mill operated at the headwaters of the Okahu Stream⁴, where harakeke was collected from kahikatea swamps (Bradley 1972).

There is little information available on vegetative cover before the influence of Europeans and probably even less on the pre-Maori landscape.

Today, the remnants that remain provide only glimpses of the vegetation and habitats that existed in the area prior to human occupation. Almost, certainly, many other vegetative types and their associated range of plants and animals would have existed within the District.

3.3.2 Present-day vegetation

The Tokatoka Ecological District is characterised by a mosaic of mostly small forested remnants, reflecting the high degree of landscape modification that has occurred throughout the District.

Because of the quick reconnaissance nature of this survey, it is very likely that vegetation types exist within the Tokatoka Ecological District that are not presented in this report.

The largest areas of natural habitats remaining are contained within the Manganui River Complex at P07/086 (875.6 ha). This site has a complete sequence of vegetation zones from wetland to riverine flood forest to hillslope forest.

³ The Ararua settlement is at grid reference 1705182E 6009085N.

⁴ The Okahu Stream connects to the Manganui River at the western end of the Manganui River Complex (P07/086) and runs southeast.

Kahikatea, kōwhai, and mānatu riverine flood forest are distinctive vegetation types within the Manganui River Complex and are the best examples of their type in Northland.

A range of divaricating species occur in association with each other, including round-leaved coprosma, *Coprosma rigida*, *C. propinqua*, *Hoberia angustifolia*, *Melicope simplex*, *Melicytus micranthus*, kaikōmako, mānatu, and small-leaved milktree.

Outside of the Manganui River Complex (P07/086), the largest natural areas are Pukekohe Hill Scenic Reserve and Surrounds (Q08/022) (209.1 ha), Smoky Hill Scenic Reserve and Surrounds (Q08/030) (153.8 ha), Parahi Scenic Reserve and Surrounds (Q08/010) (148.2 ha) and Hoanga Road Shrubland and Forest (P07/101) (291.5 ha). The first two sites contain old-growth forest while the last site is predominantly shrubland. Large areas of kānuka/mānuka shrubland (such as P07/101) are an increasingly diminishing habitat type within Northland and provide important habitat for threatened species such as NI brown kiwi, orchids and lizard species such as green geckos.

Taraire-dominant forest is the most common forest type throughout the Tokatoka Ecological District. Even though many of the sites containing this forest are small, they provide important 'stepping stone' habitat, or corridors or patches of suitable habitat, for bird species such as kūkupa, as they provide berries over the winter months.

Regenerating tōtara forest is the second most common forest type and occurs at approximately half of the sites, mostly on hillslopes. Secondary tōtara forest, forming riparian ribbons, feature in several of these sites.

There are a few small lowland podocarp forest remnants dominated by rimu. This is an uncommon habitat type in the Tokatoka Ecological District and in Northland generally.

Kauri forest occurs in just under a quarter of the natural areas in the District, mostly on hillslopes and ridges, and scattered throughout the District. A few sites contain large mature kauri.

In the northern Wairoa area and around the northern boundary of the Ruawai flats, some distinctive vegetation types occur. Dominant or co-dominant nikau and pūriri forest are a feature; however, these sites are very small, modified and fragmented and they will need to be protected and managed if they are to survive into the future.

Apart from the alluvial floodplains of the Manganui River, freshwater wetlands are extremely rare within the Tokatoka Ecological District. It is very likely that there are more wetland types present within the Manganui River Complex (P07/086) that were not identified because of the reconnaissance nature of this survey.

3.3.3 Main vegetation types

Table 6, p. 420, provides a list of vegetation types and associated site numbers recorded within the Tokatoka Ecological District.

SHRUBLAND

There are a small number of sites in the Tokatoka Ecological District that are solely shrubland. These occur mostly in the western half of the District. Hoanga Road Shrubland and Forest (P07/101) at just over 279 ha is the largest shrubland area in the District. Other significant shrubland sites include Tana Road Shrubland (Q08/043) at 51.3 ha.

Kānuka/mānuka

Kānuka/mānuka-dominant shrubland is the most common shrubland type in the District and is predominantly represented on Mangakahia Complex sandstone and mudstone.

Species occurring within this vegetation type include tōtara, tānekaha, mamaku, mapou, along with occasional emergent kauri, rimu or kahikatea.

Kānuka/mānuka-tōtara

Co-dominant kānuka/mānuka-tōtara shrubland is a relatively common shrubland type in the District, usually occurring in association with kānuka/mānuka shrubland. Several species are present occasionally, including, tānekaha, tī kōuka, māhoe, mamaku, kauri, rimu, kahikatea and rewarewa.

Tōtara

Tōtara-dominant shrubland occurs occasionally in the District, at a handful of sites in association with other shrubland types. Kānuka/mānuka is often frequent with occasional tānekaha, tī kōuka, nīkau, mamaku and the odd emergent kauri. Shrubland vegetation types that occur at one or a few sites are within the District include kānuka/mānuka-tōtara-treefern (P07/101), māhoe-mamaku (Q07/086), mamaku-patē (Q08/038), mamaku-kānuka/mānuka (P08/034), mānuka-māpou (P08/014), māpou-rangiora (P08/014) and tī kōuka-mamaku-patē (Q08/038).

PODOCARP FOREST

Regenerating podocarp-dominated forest occurs throughout the Tokatoka Ecological District.

Kahikatea

Outside true alluvial sites (see Wetland section), kahikatea is the most common podocarp forest type, occurring mostly on toeslopes and gentle hillslopes with rimu, tōtara, pukatea, nīkau, pūriri, rewarewa and tī kōuka as occasional species. There are a few small remnants on the 'alluvial flat' (P07/103, P08/031, Q07/106); however, they do not function as wetlands as they are very small and occur in very modified surrounds.

Rimu

Rimu-dominant forest occurs at Omana Lowland Forest Remnant (P07/114), Bull Road Bush (Q08/018) and Cross Family Trust Covenant and Surrounds (Q08/025). Kauri, kahikatea, tōtara, rewarewa, taraire, tawa and tānekaha often occur as occasional species within this vegetation type.

Tānekaha

Tānekaha is dominant at a few sites, often with frequent rimu, tōtara, and kānuka/mānuka. Occasional species include kauri, rimu, tōtara, rewarewa, kahikatea and kānuka/mānuka.

Tōtara

Tōtara forest is the second most common forest type in the District (taraire is the most common). A range of species are occasional on hillslope sites including kauri, rimu, tānekaha, tōwai, pūriri, rewarewa, tī kōuka and kānuka/mānuka. Golden Stairs Road Bush (Q08/051), at 25 ha, is a remnant solely represented by dominant tōtara which also contains frequent tānekaha and mamaku with occasional kauri, rimu, rewarewa, tōwai, kahikatea, tī kōuka, nikau and kānuka/mānuka.

CO-DOMINANT PODOCARP FOREST

Kahikatea with tōtara is the most common podocarp association in the District.

Occasional species include pūriri, rimu, karaka, rewarewa, nikau and tī kōuka. Tānekaha and tōtara occur at four sites and rimu and tōtara occur at three sites. Kahikatea-rimu forest occurs at one site in the District (P08/026).

BROADLEAF FOREST

Taraire

Taraire-abundant forest dominates the forest component of the Tokatoka Ecological District, occurring at over 70 sites throughout the area. This forest type occurs predominantly on Mangakahia Complex mudstone and sandstone. A range of species occur in low abundance in taraire forest. Rewarewa can be frequent; rimu, kahikatea, kauri, pūriri, kohekohe, pukatea, tōtara, mānuka and mamaku are often occasional. There are a couple of sites with abundant taraire and pūriri as a common canopy species.

Kānuka/mānuka

Kānuka/mānuka-dominant forest occurs throughout the District, usually in association with other vegetation types. Species that occur occasionally in this forest type include kauri, rewarewa, rimu, tōtara, kahikatea, pūriri, tānekaha, mamaku and tī kōuka.

Kōwhai

Outside of alluvial sites, kōwhai features as a conspicuous component of the canopy at a few sites on hillslopes, including Montgomerie's Memorial Bush Scenic Reserve and Surrounds (P08/036) which contains kōwhai-pūriri forest, Berghans Bush and Surrounds (P08/015) which contains kōwhai and kānuka/mānuka-kōwhai-pūriri forest and Pikiwahine Railway Bush Remnant (Q07/095), where an uncommon association of karaka and kōwhai occurs.

Nikau

Two sites close to Ruawai flats contain abundant nikau. At Whenuanui Scenic Reserve (P08/008), nikau comprises approximately 50% of the site, with frequent pūriri and occasional pukatea, kahikatea, kohekohe, tōtara, karaka, rewarewa, kōwhai, hangehange, puka and *Coprosma* spp. Abundant nikau with common pūriri occurs at Waikaraka Remnants (P08/007).

Pūriri

Pūriri-dominant lowland forest is rare in the Tokatoka Ecological District and throughout Northland. Two pūriri-dominant sites are present adjacent to the Ruawai flats: Greenhill Road Pūriri Remnant (P08/004) occurs on a gentle hillslope with frequent karaka and occasional kauri, rimu, matai, tawa,

titoki, taraire, rewarewa, tōtara, kahikatea, kohekohe, tī kōuka and nikau; Whenuanui Scenic Reserve (P08/008), located on a gentle hillslope, contains common Pūriri with frequent kōwhai and tōtara and occasional pukatea, kahikatea, rewarewa, nikau, puka and kānuka/mānuka. Dreadon Road Bush (P08/017) is another significant example of pūriri-dominant forest in the District.

Tōwai

Tōwai-dominant forest is recorded only once in the District—in a small hillslope remnant at Windy Hill Remnants (P07/106). Taraire and kānuka/mānuka are frequent and rimu, kauri, rewarewa, pukatea, tōtara, pūriri and mamaku are occasional.

CO-DOMINANT BROADLEAF FOREST

Nikau-taraire

Nikau-taraire forest is rare in the Tokatoka Ecological District. This association occurs in a two remnants adjacent to the Ruawai flats: Maheno Remnants (P08/006) (moderate hillslope) and State Highway 12 Remnants (P08/002) (gentle hillslope), which have a similar range of species including frequent pūriri and occasional karaka, tōtara as well as, in the latter site, kahikatea, rewarewa, matai, pukatea, kohekohe and puka.

Pūriri-taraire

Pūriri-taraire forest is also rare within the Ecological District. It is found at Maungaraho Rock Scenic Reserve and Surrounds (P08/034), Tokatoka Road Hillslope Forest (P08/030), and Dreadon Road Bush (P08/017). Species included within this forest type are kauri, rewarewa, tōtara, kānuka/mānuka, nikau and karaka.

Co-dominant broadleaf vegetation types that occur at one or a few sites in the Ecological District include: kānuka/mānuka-kōwhai-pūriri (P08/015), kānuka/mānuka-pūriri (P08/035), karaka-kohekohe-taraire (Q07/095), karaka-kōwhai (Q07/095), nikau-pūriri (P08/006) and nikau-pūriri-taraire (P08/047) forest.

BROADLEAF-PODOCARP FOREST

Kānuka/mānuka-tōtara

Co-dominant kānuka/mānuka-tōtara forest is the most common podocarp-broadleaf vegetation type in the District. A range of species occur occasionally within this forest type, and kauri is sometimes a frequent emergent.

Kānuka/mānuka-rimu

Kānuka/mānuka-rimu forest occurs at a few sites in the Tokatoka Ecological District with emergent rimu usually present as well.

Some very uncommon broadleaf-podocarp forest types present in the District include: tī kōuka-kahikatea-nikau (P08/002), kahikatea-nikau (P08/026), kahikatea-pūriri (Q08/030), kahikatea-taraire (Q08/038 and Q08/044) and nikau-pūriri-tōtara (P08/002).

Kauri forest

In the Tokatoka Ecological District, kauri forest is mostly recorded on ridges and upper hillslopes on Mangakahia Complex sandstone and/or mudstone. Only a few small sites are entirely dominated by kauri. These include Turiwiri Scenic Reserve (P07/097) and Poyner Road Remnant (Q08/017), which both contain mature kauri. Kauri Bushmens Memorial Scenic Reserve within site Q08/041 is an example of the kauri forest that once dominated large areas of the District. The odd large mature kauri tree has survived in a few remnants. Lower Arcadia Road Remnants (Q08/031) is an example of this. Kauri forest occurs there in association with rimu, tānekaha and tōtara.

FRESHWATER WETLANDS

Freshwater wetlands are very rare in the Tokatoka Ecological District. Most of the wetland habitat in the District is associated with the Manganui River Complex (P07/086). The Manganui River floodplain occupies an area of 8700 ha (LENZ analysis; Kaye Seymour pers. comm.). Using the Northland PNA Programme, it has been estimated that only about 10% of the entire Manganui River floodplain supports important natural areas, with the most extensive sites occurring in the Tokatoka Ecological District at P07/086. Because of the limitations of this survey, it is very likely that there are wetland areas within the Manganui River Complex that are not described in this report.

Gumland

Gumland is now a very uncommon wetland type in Northland and only one gumland site has been recorded in the Tokatoka Ecological District: at Curnow Road Gemstone Conservation Area (P07/090). Poyner Road Shrubland (Q08/056) has a gumland-like flat mānuka shrubland canopy; however, until the site is viewed from within it cannot be confirmed as gumland. Likewise, at Okahu Stream and Surrounds-Wainui Road (Part of the Manganui River Complex) (P07/091), the mānuka shrubland present has gumland elements, but does not fully represent gumland habitat. Gumlands are typically dominated by mānuka, which occurs on strongly leached, podzolised, infertile soils where drainage is impeded. Seasonally, these areas become waterlogged in winter and very dry in summer. Mānuka dominates Curnow Road Gemstone Conservation Area, and there are records of a diverse range of orchid species.

Herbfield

A dense association of alligator weed, parrot's feather, primrose willow-*Persicaria strigosa*-*Persicaria decipiens* occurs in the Manganui River Complex (P07/086) within the Manganui River Government Purpose Wildlife Management Reserve.

Reedland

Baumea sp.-*Cyperus* sp. and surface water-*Cyperus* sp.-raupō occurs within the Manganui River Complex (P07/086). A small *Baumea rubignosa* wetland occurs within Okahu Stream and Surrounds-Wainui Road (Part of the Manganui River Complex) (P07/091).

There is a small area of raupō reedland adjacent to a shrubland hillslope at Tana Road Shrubland (Q08/043).

Sedgeland

A dense sward of the indigenous sedge *Carex gaudichaudiana* (regionally significant species) occurs within the Manganui River Complex (P07/086) at the Manganui River Government Purpose Wildlife Management Reserve.

Open water

The open water of the Manganui River has not been separately mapped; it has been included in the floodplain wetland habitat. Three artificial lakes have been recorded within the District:

- A constructed open-water wetland occurs alongside the bush area of Newmans Bush (Q07/087).
- Two artificial lakes occur in the north of the Pukekohe Scenic Reserve (Q08/022).

Alluvial and riverine flood forest

Kahikatea

Kahikatea riverine flood forest occurs mostly within the Manganui River Complex (P07/086). Species that occur occasionally in this forest include matai, tōtara, titoki, rimu, pukatea, black maire, *Hoheria angustifolia*, and tī kōuka. There are some small isolated sites of kahikatea forest on the flat outside of the Manganui River Complex; however, these sites no longer function as wetlands.

Tī kōuka

Tī kōuka-dominant forest is rare in the Tokatoka Ecological District and very rare throughout the whole of Northland. In this District it is mostly associated with the Manganui River complex.

Mānatu

Mānatu-abundant forest is a distinctive feature of the Manganui River Complex (P07/086), along with frequent kānuka/mānuka and occasional karaka, kōwhai, *Hoheria angustifolia*, pigeonwood, tī kōuka, nikau and putaputawētā.

Mānuka

Mānuka riverine flood forest occurs within the Manganui River Complex (P07/086). Mānatu may be frequent and titoki, kōwhai, *Hoheria angustifolia*, tōtara and tī kōuka occasional in this forest type.

Matai

A couple of small areas of matai riverine flood forest were noted within the Manganui River Complex (P07/086) in the Manganui River Government Purpose Wildlife Management Reserve along with kōwhai, tōtara and titoki. Matai as a forest type is virtually extinct in Northland, as it has all been cleared.

Kōwhai

Kōwhai-dominant alluvial forest types are mostly associated with the Manganui River Complex (P07/086) where they are a key feature of the floodplain forest. Species which occur occasionally within this canopy include kahikatea, tī kōuka, mānatu, titoki, nikau and *Muehlenbeckia australis* (climbing in the canopy).

Tōtara

Tōtara forest occurs at a few alluvial sites. Kahikatea, titoki, rewarewa, mānatu, kōwhai, matai, pukatea, ti kōuka and kānuka/mānuka are often occasional species in this forest type.

Ti kōuka-kahikatea

Ti kōuka-kahikatea forest is mostly associated with the Manganui River Complex (P07/086). Outside of the Manganui River complex there is an example of this forest type on a small alluvial flat adjacent to the northern Wairoa River at Berghans Bush and Surrounds (P08/015), where it occurs with occasional rimu, mānuka, nikau and divaricating shrubs.

Uncommon alluvial forest types within the Tokatoka Ecological District include: ti kōuka-kānuka/mānuka-harakeke (Q08/035), ti kōuka-mānatu (P07/086), ti kōuka-mānuka (P07/086), mānuka-mānatu (P07/086), mānatu-pūriri (P07/086), mānatu-titoki (Q08/002), ti kōuka-kahikatea-nikau (P08/002), kōwhai-mānatu-tōtara (Q07/108), kahikatea-mānatu-tōtara (P07/086), kahikatea-ti kōuka (P07/086), kahikatea-ti kōuka-kōwhai-mānatu (P07/086), kahikatea-tōtara (Q07/102), titoki-tōtara (Q07/091), and tōtara-kōwhai (Q07/108) forest.

3.3.4 Species of botanical interest

Much of the former indigenous biodiversity of Tokatoka Ecological District has been lost. Today, it is one of the most modified Ecological Districts in Northland, with only 7.4% of its land area now covered in indigenous natural areas (as identified in this survey). As a comparison, the natural indigenous land cover (land only) of the neighboring Districts is: 19% (Tangihua), 9% (Whangarei), 28.4% (Waipu), 9.8% (Otamatea (Northland Conservancy portion only)) and 14% (Kaipara (Northland Conservancy portion only)). To date, 4 Threatened, 8 At Risk, 1 Data Deficient and 43 Regionally significant plants have been recorded within Tokatoka Ecological District and further survey may reveal additional species, particularly in areas that have not been well studied.

There are several historical records of Threatened, At Risk and Regionally significant plants from the Papanui area on the southern border of the Tokatoka Ecological District (DOC Bioweb). They include: *Trilepidea adamsii*, T. Kirk (1867), (Extinct); *Ophioglossum petiolatum*, T. Kirk (undated), (Nationally Critical); *Tupaea antarctica*, T. Kirk (undated), (Declining CD); *Calystegia marginata*, T. F. Cheeseman (1925), (Naturally Uncommon SO, SP); *Ileostylus micranthus*, Kirk (1867), (regionally significant); *Metrosideros carminea*, T. Kirk (undated), (regionally significant); and *Bolboschoenus caldwellii*, Cooper (1949), (regionally significant).

Significant botanical features of the District include: the very rare riverine flood forest types associated with the Manganui River Complex such as (1) kōwhai-dominant, kahikatea-dominant and mānatu-dominant forest; (2) the diverse range of divaricating plants (including *Coprosma rotundifolia*, *Coprosma rigida*, *C. propinqua*, *Hoberia angustifolia*, *Melicope simplex*, *Melicytus micranthus*, *Myrsine divaricata*, kaikōmako, mānatu, and small-leaved milktree); and, (3) other floodplain-indicative plants such as *Viola lyallii*.

3.3.5 Threatened and At Risk plant species

Information on the threatened flora in this report has been compiled from herbarium records provided by the Auckland Institute and Museum (AK), DOC's Threatened Plants Database in Bioweb and from the Sites of Special Biological Interest (SSBI) information system⁵ and observations during this survey. Conservation status is derived from de Lange et al. 2009 which follows the New Zealand threat classification system of Townsend et al. 2008 (see Appendix 3 for Categories of Threat).

THREATENED

Daucus glochidiatus

(Nationally Critical DP, SO)

Daucus glochidiatus is an indigenous carrot-like herb which is found southwards in New Zealand from the Three Kings Islands in the north and also in the Chatham Islands; however, it is now greatly reduced from its former extent, probably due to competition from faster-growing, taller weeds such as kikuyu, buffalo grass, pampas and rats tail, which occur in the same habitat. Recorded from Maungaraho Rock Scenic Reserve (P08/024) in 1997 by the Auckland Botanical Society (Stanley 1997).

Hebe saxicola

(Nationally Critical OL, SP)

Hebe saxicola is only known from Maungaraho Rock Scenic Reserve (P08/034), where it was first collected in 1997 (AK 301052). It is a recently described hebe that was previously included in *Hebe perbella* (de Lange & Rolfe 2008), which is restricted to western Northland. *Hebe saxicola* is threatened by invasive weeds such as pampas, willow-leaved hakea and boneseed and, possibly, the effects of people rock climbing at its remaining known location (de Lange & Rolfe 2008).

Senecio scaberulus

(Nationally Critical EF)

Senecio scaberulus is an endemic grey/green to silvery grey-green fireweed currently restricted to the North Island and Chatham Islands (it was last reliably recorded from the South Island in 1860). Once widespread, it is now very rare, mostly found on the coast but having also been found at inland sites such as lava fields. Its main threats include hybridisation with *S. hispidulus*, habitat loss, competition from weeds and animal browse. In the Tokatoka Ecological District, *Senecio scaberulus* was recorded in 1997 from Maungaraho Rock Scenic Reserve (P08/024) (AK 233091).

Picris burbridgeae

(Nationally Endangered EF, PD, SO, SP)

Picris burbridgeae is an indigenous native oxtongue only known from the northern North Island where it is found on offshore islands and in coastal and lowland habitats. Its main threats are habitat loss, succession (as it does not tolerate heavy shade), weed invasion and accidental removal because of its 'weedy' appearance (NZPCN 2010). It was recorded in 1997 from Maungaraho Rock Scenic Reserve (P08/024) (AK 232960).

⁵ SSBI site information for this Ecological District and for SSBI sites within the rest of Northland can be obtained/viewed on request from the Department of Conservation, Northland Conservancy Office in Whangarei.

AT RISK

Dianella haemata

(Declining _{DP})

Dianella haemata is a flax-like, swamp-dwelling, perennial herb, endemic to the North Island, from Northland to the Mamaku Plateau and near Te Awamatu (NZPCN 2010). In the Tokatoka Ecological District, it has been recorded from Curnow Road Gemstone Conservation Area (P07/090) (2010 DOC plant survey—see SSBI P07/H078).

Lagenifera lanata

(Relict _{SP})

Lagenifera lanata is a small herb endemic to Northland. It is often found under kākūka or growing on exposed clay or in shallow leaf litter near the coast. In the Tokatoka Ecological District it has been recorded from Curnow Road Gemstone Conservation Area (P07/090) (2010 DOC plant survey—see SSBI P07/H078).

Adelopetalum tuberculatum

(Naturally Uncommon _{SP})

Adelopetalum tuberculatum is an epiphytic orchid endemic to the North Island and northern South Island. It is usually found on trees and tree branches where it forms a tight clump.

Adelopetalum tuberculatum is recorded at only one site in the Tokatoka Ecological District, Smoky Hill Scenic Reserve and Surrounds (Q08/030) in 1993 where it was epiphytic on kahikatea (DOC Bioweb).

Anzybas rotundifolius

(Naturally Uncommon)

Anzybas rotundifolius is a small orchid endemic to the North Island and Chatham Island. In Northland, it is frequently found in gumland shrubland, often in shaded sites and by sides of drains. In the Tokatoka Ecological District, it has been recorded from Curnow Road Gemstone Conservation Area (P07/090) (1999, SSBI P07/H078).

Crassula ruamabanga

(Naturally Uncommon _{SP})

Crassula ruamabanga is an endemic herb with a distribution from the Wairoa River near Dargaville in the north to Stewart Island and the Chatham Islands (NZPCN 2010). It is very rare in Northland. It was recorded in the Tokatoka Ecological District in 2008 from the Manganui River Complex (P07/086) (Champion & Townsend 2008).

Doodia mollis

(Naturally Uncommon _{SP})

Doodia mollis is an endemic rasp fern recorded in the Tokatoka Ecological District from the Manganui River Complex (P07/086) (1998, SSBI P07/H049) and from Whenuanui Scenic Reserve (P08/008) in 1995 (SSBI P08/H031).

Kortbalsella salicornioides

(Naturally Uncommon _{SP})

Kortbalsella salicornioides is an endemic dwarf mistletoe of the North, South and Stewart Islands. It is a parasite, usually found on mānuka and kākūka and, very occasionally, on small-leaved *Coprosma* spp. It was recorded from

Curnow Road Gemstone Conservation Area (P07/090) in 1999 (AK 300261) and reconfirmed in 2010 (DOC plant survey—see SSBI P07/H078); and Maungarahō Rock Scenic Reserve (P08/034) in 1997 (AK 232713).

Libocedrus plumosa kawaka
(Naturally Uncommon sp)

Kawaka is an endemic podocarp tree of the North and northern South Islands where it is found in localised patches within coastal to lowland forest, often in association with kauri in the north (NZPCN 2010). Kawaka has a wide distribution, but is usually represented by scattered lone specimens. In the Tokatoka Ecological District it has only been recorded from two sites: Rehia Bush and Surrounds (P08/001) (previously recorded in 1977 SSBI P08/H013 and reconfirmed during this survey) and Whenuanui Domain Scenic Reserve (P08/008) in 1995 (SSBI P08/H031).

3.3.6 Data Deficient species

Pimelea orthia

Pimelea orthia is a shrub endemic to the northern North Island from Te Pahi to Mahia Peninsula (where subsp. *protea* occurs). It occurs in gumland shrubland and on other poor soils, and on dunes and rock outcrops. It was recorded in Tokatoka Ecological District from Curnow Road Gemstone Conservation Area (P07/090) in a 2010 DOC plant survey—see SSBI P07/H078.

3.3.7 Regionally significant species

Plants listed as regionally significant in Northland have been determined in a draft list prepared by Northland Conservancy, DOC. Regionally significant plants are generally those that are rare or uncommon in Northland Conservancy and have large populations elsewhere, or have large populations in the Conservancy and are endemic to it or are very rare elsewhere. Information on regionally significant flora in this report has been compiled from Northland Conservancy records, the Sites of Special Biological Interest (SSBI) information system, Auckland Herbarium and observations during this survey.

Asplenium gracillimum

Asplenium gracillimum is an indigenous fern usually found in lowland forest where it can be common in the ground tier, especially in high-rainfall areas (NZPCN 2010). It is uncommon in Northland and has only been recorded from the Manganui River Complex (P07/086) (1998, SSBI P07/H049) and Whenuanui Scenic Reserve (P08/008) (1995, AK 221747) in the Tokatoka Ecological District.

Carex gaudichaudiana

Carex gaudichaudiana is an indigenous sedge which can be found in wet areas such as bogs and seeps and river flats. It is uncommon in Northland, with only one record from the Tokatoka Ecological District—the Manganui River Complex (P07/086) (Champion & Townsend 2008).

Carex maorica

Carex maorica is an endemic sedge of the North and South Islands where it is found in coastal to lowland freshwater wetlands (NZPCN 2010). It is uncommon in Northland and only recorded in the Tokatoka Ecological

District from the Manganui River Complex (P07/086) (1994, AK 294668) (reconfirmed in a 2010 DOC habitat survey—see SSBI P07/H049) and Okahu Stream Forest and Surrounds-Wainui Road (Part of Manganui River Complex) (P07/091), (2011; recorded as part of this survey).

Coprosma rigida

Coprosma rigida is an endemic shrub with stiff red-brown branches which occur at right angles to the main stem. It is uncommon in Northland, and indicative of a threatened habitat type—riparian forest and forested floodplain—which has been reduced in extent by deforestation. It is recorded in the Tokatoka Ecological District from Newmans Bush (Q07/087) (1991, SSBI Q07/R07/H085), the Manganui River Complex (P07/086) (recorded during this survey and in Champion & Townsend 2008), Curnow Road Gemstone Conservation Area (P07/090) (1999, SSBI P07/H078 and reconfirmed in a 2010 DOC plant survey—see SSBI P07/H078) and Okahu Stream Forest and Surrounds-Wainui Road (Part of Manganui River Complex) (P07/091) (2011, recorded as part of this survey).

***Coprosma rotundifolia* round-leaved coprosma**

Round-leaved coprosma is an endemic shrub with roundish, softly hairy leaves. It is uncommon in Northland and indicative of a threatened habitat type—riparian forest and forested floodplain—which has been reduced in extent by deforestation. Recorded from Newmans Bush (Q07/087) (1991, SSBI Q07/R07/H085), the Manganui River Complex (P07/086) (recorded during this survey and in Champion & Townsend 2008), Paiawa Road Forest (Part of Manganui River Complex) (Q08/002) (1994, AK 294665), Curnow Road Gemstone Conservation Area (P07/090) (2010 DOC plant survey—see SSBI P07/H078), and Okahu Stream Forest and Surrounds-Wainui Road (Part of Manganui River Complex) (P07/091), (2011 recorded as part of this survey) in the Tokatoka Ecological District.

Coprosma tenuicaulis

Coprosma tenuicaulis, or swamp coprosma, is a shrub up to 3 m tall with spreading branchlets which occurs in lowland swamp forest and shrubland. Due to habitat loss, this species is now regarded as being regionally significant. Within the Tokatoka Ecological District it is recorded from the Manganui River Complex (P07/086) (2008, SSBI P07/H049) and Curnow Road Gemstone Conservation Area (P07/090) (2010 DOC plant survey—see SSBI P07/H078).

Cordyline pumilo

Cordyline pumilo is a low-growing short-stemmed cabbage tree that is endemic to the northern North Island, where it occurs sparsely in open forest. In the Tokatoka Ecological District it has been recorded from Curnow Road Gemstone Conservation Area (P07/090) in a 2010 DOC plant survey—see SSBI P07/H078, and Okahu Stream Forest and Surrounds-Wainui Road (Part of Manganui River Complex) (P07/091) (2011 recorded as part of this survey).

Corybas cheesmanii

Corybas cheesmanii is an endemic orchid usually found in or under deep leaf litter, in dark, shaded sites under shrubland or forest. Often only the seed pods are seen as the leaf and flower can grow entirely submerged in the

litter. In the Tokatoka Ecological District it was recorded from Curnow Road Gemstone Conservation Area (P07/090) in a 2010 DOC plant survey—see SSBI P07/H078.

***Cyathea smithii* Smiths tree fern**

Smith's tree fern is uncommon in Northland, as it is usually restricted to high-altitude places; however, in the Tokatoka Ecological District it was recorded in 2010 from the lowland gumland habitat of Curnow Road Gemstone Conservation Area (P07/090) during a 2010 DOC plant survey—see SSBI P07/H078.

Dracophyllum lessonianum

Dracophyllum lessonianum is an endemic grass tree that occurs from Te Pahi to Kawhia (NZPCN) in gumland shrubland. It was recorded in the Tokatoka Ecological District from Curnow Road Gemstone Conservation Area (P07/090) in a 2010 DOC plant survey—see SSBI P07/H078.

Drosera peltata

Drosera peltata is an indigenous sundew found in coastal to lowland habitats usually in gumland shrublands. In the Tokatoka Ecological District it has been recorded from Curnow Road Gemstone Conservation Area (P07/090) in a 2010 DOC plant survey—see SSBI P07/H078.

***Eleocarpus hookerianus* pōkākā**

Pōkākā is a tree with a wildly divaricating juvenile form. It is endemic to New Zealand but has a very local distribution in Northland. It has been recorded in the Tokatoka Ecological District from Smoky Hill Scenic Reserve and Surrounds (Q08/030) (c. 1994, SSBI Q08/H009).

Elymus multiflorus

Elymus multiflorus is a grass of dry and coastal sites from the Three Kings, North and South Islands and Eastern Australia. It has been recorded from the Tokatoka Ecological District in 1997 (AK 232709) from Maungaraho Rock Scenic Reserve (P08/034).

Epacris pauciflora

Epacris pauciflora is a shrub endemic to the North and South Islands. It has been recorded in the Tokatoka Ecological District from Curnow Road Gemstone Conservation Area (P07/090) in a 2010 DOC plant survey—see SSBI P07/H078.

***Fuchsia excorticata* kōtukutuku**

Kōtukutuku is endemic to New Zealand (as far south as the Auckland Islands) where it is common along streams and rivers in forest. However, it is uncommon in Northland, its high palatability to browsing mammals being the most likely cause of its decline. In the Tokatoka Ecological District it has been recorded from Pukekohe Hill Scenic Reserve and Surrounds (Q08/022) (2006, SSBI Q08/H004).

Gleichenia microphylla

Gleichenia microphylla is a tangle fern that is uncommon in Northland. It has been recorded from Curnow Road Gemstone Conservation Area (P07/090) in the Tokatoka Ecological District (2010 DOC plant survey—see SSBI P07/H078).

Gonycarpus incanus

Gonycarpus incanus is a woody herb that has been recorded from Curnow Road Gemstone Conservation Area (P07/090) (1999, SSBI P07/H078 and reconfirmed in a 2010 DOC plant survey—see SSBI P07/H078).

Grammitis billardierei

Grammitis billardierei is a widespread, indigenous fern with erect to short-creeping rhizomes. It commonly occurs as a low epiphyte, on rocks or, occasionally, on the ground, from lowland forest to alpine scrub (Brownsey & Smith-Dodsworth 2000). It was recorded from Maungaraho Rock Scenic Reserve (P08/034) in 2008 by P. de Lange and J. Rolfe (AK 302263; de Lange & Rolfe 2008).

Grammitis ciliata

Grammitis ciliata is an endemic fern with erect to short-creeping rhizomes and hairy stipes. It is usually found on clay banks, damp earth or rock in lowland to montane forest (Brownsey & Smith-Dodsworth 2000). It was recorded from Maungaraho Rock Scenic Reserve (P08/034) in 2008 by P. de Lange and J. Rolfe (AK 302262; de Lange & Rolfe 2008).

Helichrysum lanceolatum

Helichrysum lanceolatum is an endemic shrub, found in coastal and lowland shrubland and forest throughout the North Island and South Island. In Tokatoka Ecological District it was recorded at Tokatoka Scenic Reserve (part of P08/014) by the Auckland Botanical Society in 1997 (Stanley 1997).

Hebe macrocarpa* var. *macrocarpa

Hebe macrocarpa var. *macrocarpa* is endemic to the northern North Island from Whangarei to Kawhia (Bayley & Kellow 2006). In Tokatoka Ecological District it was recorded from Maungaraho Rock Scenic Reserve (P08/034) in 2008 (AK 302259).

Hoberia angustifolia

Hoberia angustifolia is a tree endemic to the North and South Islands, where it occurs in lowland forest and semi-swamp forest (Salmon 1980). In Northland it has a very local distribution, being known only from the William Upton Memorial Reserve in the Tangihua Ecological District; and in swamp forest within the Manganui River Complex (P07/086) (recorded during this survey and in Champion & Townsend 2008) and Okahu Stream Forest and Surrounds-Wainui Road (Part of Manganui River Complex) (P07/091), (2011, recorded as part of this survey) in the Tokatoka Ecological District.

Leptostigma setulosa

Leptostigma setulosa is an endemic herb of the North, South and Stewart Islands (NZPCN 2010). It has been recorded in the Tokatoka Ecological District from Curnow Road Gemstone Conservation Area (P07/090) (2010 DOC plant survey—see SSBI P07/H078).

Lobelia angulata

Lobelia angulata (formerly known as *Pratia angulata*) is an endemic small creeping herb found in the North, South and Stewart Islands (NZPCN 2010). It is found in damp lowland to subalpine sites and is uncommon in Northland. It is recorded in the Tokatoka Ecological District from Curnow

Road Gemstone Conservation Area (P07/090) (1999, SSBI P07/H078), Okahu Stream Forest and Surrounds-Wainui Road (Part of Manganui River Complex) (P07/091) (2011, recorded as part of this survey), and Paiawa Road Forest (Part of Manganui River Complex) (Q08/002) (1994, AK 294662).

***Lophomyrtus obcordata* rōhutu**

Rōhutu is an endemic shrub which occurs locally in coastal to lowland forests throughout New Zealand, usually south of Kaitaia (35°) (Allan 1961). It is very uncommon in Northland with a local distribution. It has been recorded in the Tokatoka Ecological District from the Manganui River Complex (P07/086) (1998, SSBI P07/H049).

Luzula picta* var. *picta

Luzula picta var. *picta* is an endemic rush recorded from Tokatoka Scenic Reserve (part of P08/014) by the Auckland Botanical Society in 1997 (Stanley 1997).

***Metrosideros robusta* northern rātā**

Northern rātā is an emergent forest tree that is endemic to New Zealand where it occurs in coastal and lowland forest and occasionally extends into montane forest in some parts of the country. Northern rātā is regarded as regionally significant because it is threatened by possum browse. It is recorded from several sites in the Tokatoka ED, all recorded during this survey including P07/086, P07/100, P08/026, Q07/091, Q08/031 and Q08/040.

***Myrsine divaricata* weeping māpou**

Weeping māpou is a divaricating shrub with, as the common name suggests, a weeping habit. It is endemic to the North, South, Stewart and Auckland Islands and is uncommon north of the Waikato Region (NZPCN 2010). It is recorded in the Tokatoka Ecological District from the Manganui River Complex (P07/086) (Champion & Townsend 2008 and recorded during this survey), Okahu Stream Forest and Surrounds-Wainui Road (Part of Manganui River Complex) (P07/091) (2011 recorded as part of this survey), Curnow Road Gemstone Conservation Area (P07/090) in a 2010 DOC plant survey—see SSBI P07/H078, Smoky Hill Scenic Reserve and Surrounds (Q08/030) (c. 1994, SSBI Q08/H009) and Manganui-Taylor's Road Bush and Surrounds (Q08/019) (1992, SSBI Q08/H003).

Nertera depressa

Nertera depressa is an indigenous herb that is uncommon in Northland. In the Tokatoka Ecological District, it has been recorded from Curnow Road Gemstone Conservation Area (P07/090) (2010 DOC plant survey—see SSBI P07/H078).

Nertera scapanoides

Nertera scapanoides is a creeping herb which is very uncommon in Northland, recorded in the Tokatoka Ecological District from the Manganui River Complex (P07/086) (1998, SSBI P07/H049).

***Nestegis cunninghamii* black maire**

Black maire is an endemic canopy tree found in lowland forests. In Northland it is rare and indicative of a threatened habitat type—riverine forest. It has been recorded in the Tokatoka Ecological District from Whenuanui Scenic

Reserve (P08/008) in 1995 (SSBI P07/H078), within the Manganui River Complex (P07/086) in 2007 (AK 301489; and Champion & Townsend 2008), Okahu Stream Forest and Surrounds-Wainui Road (Part of Manganui River Complex) (P07/091) (2011, recorded as part of this survey), and in 1994 during PNAP survey of Paiawa Road Forest (Part of Manganui River Complex) (Q08/002).

Passiflora tetrandra kohia

Kohia is an endemic climber with glossy leaves and orange fruit. It occurs in lowland forest in the North and South Islands. It has been recorded in the Tokatoka Ecological District from Newmans Bush (Q07/087) (1991, SSBI Q07/R07/H085), Pukekohe Scenic Reserve and Surrounds (Q08/022) in 2006 (SSBI Q08/H004), Manganui River Complex (P07/086) (Champion & Townsend 2008), Okahu Stream Forest and Surrounds-Wainui Road (Part of Manganui River Complex) (P07/091) (2011, recorded as part of this survey), and Whenuanui Scenic Reserve (P08/008) in 1995 (SSBI P08/H031).

Pennantia corymbosa kaikōmako

Kaikōmako is a small tree with a divaricating juvenile form. It is endemic to the North, South and Stewart Islands but is uncommon north of Auckland and on Stewart Island (NZPCN 2010). It was recorded from the Manganui River Complex (P07/086) in 2008 (Champion & Townsend 2008—also recorded during this survey), Okahu Stream Forest and Surrounds-Wainui Road (Part of Manganui River Complex) (P07/091) (2011, recorded as part of this survey), Newmans Bush (Q07/087) (1991, SSBI Q07/R07/H085), Pukekohe Scenic Reserve and Surrounds (Q08/022) (2006, SSBI Q08/H004), Smoky Hill Scenic Reserve and Surrounds (Q08/030) (c. 1994, SSBI Q08/H009) and Whenuanui Scenic Reserve (P08/008) in 1995 (SSBI P08/H031).

Phormium cookianum wharariki

Wharariki is smaller than harakeke (*Phormium tenax*) and is characterised by its drooping and twisted capsules. Found throughout the South Island and locally in the North Island, it is uncommon in Northland, usually occurring at higher altitudes. In the Tokatoka Ecological District it was recorded from Tokatoka Scenic Reserve (part of P08/014) by the Auckland Botanical Society in 1997 (Stanley 1997).

***Plagianthus regius* subsp. *regius* mānatu, lowland ribbonwood**

Mānatu is a tall-growing endemic tree from the North, South and Stewart Islands and is often conspicuous in lowland alluvial forest (NZPCN 2010). It is now uncommon in Northland and indicative of a habitat type that is threatened through habitat loss—riparian forest. Mānatu was recorded in the Tokatoka Ecological District during this survey from a number of sites including P07/086, P07/091, P07/093, P07/104, P07/115, P08/025, P08/028, Q07/090, Q07/093, Q07/102, Q07/103, Q07/104, Q08/002, Q08/013, Q08/018 and Q08/019.

Psilotum nudum

Psilotum nudum is a distinctive fern-ally common in the tropics and subtropics, but restricted to the Poor Knights Islands and northern North Island in New Zealand. It prefers dry, open, rocky, sunny, coastal sites or hydrothermally-heated soil. In the Tokatoka Ecological District it was recorded at Maungaraho Rock Scenic Reserve (P08/034) by the Auckland Botanical Society in 1997 (Stanley 1997).

Pterostylis agathicola

Pterostylis agathicola is a greenhood orchid, endemic to the northern North Island where it is usually associated with kauri. It was recorded in the Tokatoka Ecological District from Curnow Road Gemstone Conservation Area (P07/090) (1999, SSBI P07/H078).

Raukaua anomalus

Raukaua anomalus is an endemic shrub with zigzagging, interlacing branchlets and is uncommon in Northland. It is recorded in the Tokatoka Ecological District from Smoky Hill Scenic Reserve (Q08/030) (1995, AK 228982), Bull Road Bush (Q08/018) (1998, AK 235999), and Okahu Stream Forest and Surrounds-Wainui Road (Part of Manganui River Complex) (P07/091) (2011 recorded as part of this survey).

Rubus schmidelioides* var. *schmidelioides

Rubus schmidelioides var. *schmidelioides* is a climbing scrambling plant that has a scattered distribution in Northland, and is indicative of a threatened habitat type—riparian forest. It is recorded in the Tokatoka Ecological District from the Manganui River Complex (P07/086) (reconfirmed in Champion & Townsend 2008), Okahu Stream Forest and Surrounds-Wainui Road (Part of Manganui River Complex) (P07/091, (2011, recorded as part of this survey), and Whenuanui Scenic Reserve (P08/008) in 1995 (SSBI P08/H031).

Thelymitra aemula

Thelymitra aemula is an endemic sun orchid found in the northern North Island, where it favours gumland shrubland or sparsely vegetated slopes where kauri was once or is still present (Rolfe & de Lange 2010). In the Tokatoka Ecological District, *Thelymitra aemula* has been recorded from Curnow Road Gemstone Conservation Area (P07/090) (1999, SSBI P07/H078).

Thelymitra tholiformis

Thelymitra tholiformis is an endemic sun orchid found in the northern North Island, where it favours gumland shrubland or sparsely vegetated slopes where kauri was once or is still present (Rolfe & de Lange 2010). In the Tokatoka Ecological District it has been recorded from Curnow Road Gemstone Conservation Area (P07/090) (1999, SSBI P07/H078).

Uncinia distans

Uncinia distans is an endemic hook grass of the North and South Islands (NZPCN 2010). Recorded from Maungaraho Rock Scenic Reserve (P08/034) in the Tokatoka Ecological District by the Auckland Botanical Society in 1997 (Stanley 1997).

Viola filicaulis* and *V. lyallii

Viola filicaulis and *V. lyallii* are creeping endemic herbs found in moist places throughout New Zealand, but both are sparsely recorded north of Auckland. *Viola filicaulis* has been recorded from the Manganui River Complex (P07/086) (1998, SSBI P07/H049) and Curnow Road Gemstone Conservation Area (P07/090) (1999, SSBI P07/H078). *Viola lyallii* has been confirmed (P.J. de Lange, pers. comm. 2011) as the species collected from Manganui River Complex (P07/086) in a DOC habitat survey in November 2010—see SSBI P07/H049, and was recorded from Okahu Stream Forest and Surrounds-Wainui Road (Part of Manganui River Complex) (P07/091) in 2011 as part of this survey.

3.3.8 Threatened, At Risk and Regionally significant plants not recorded recently in the Tokatoka Ecological District

EXTINCT

Trilepidea adamsii

Trilepidea adamsii is an extinct mistletoe which was endemic to the North Island where it was found from the Waipoua River to the Waikato Region and Coromandel Peninsula. Its habitat was probably restricted to coastal and lowland kauri forest margins and associated open shrubland areas. The last specimen of this species was collected from the Pakaroa Range, east of Cambridge, Waikato in 1954 (Norton & de Lange 1997). In the Tokatoka Ecological District, Kirk collected this species in 1867 from Paparoa Bridge, which is at the southern boundary of the District (DOC Bioweb).

THREATENED and AT RISK

Ophioglossum petiolatum (Nationally Critical_{RF, SO, SP})

Ophioglossum petiolatum is an indigenous fern with the common name of stalked adder's tongue. In New Zealand it has been recorded from the Three Kings, North, South and Chatham Islands in coastal and lowland habitats (NZPCN 2010) on the margins of swamps and streams (Brownsey & Smith-Dodsworth 2000). It was recorded by T. Kirk from near Paparoa Bridge, at the southern-most boundary of the Tokatoka Ecological District (DOC Bioweb).

Tupeia antarctica (Declining_{CD})

Tupeia antarctica is a white-flowered mistletoe endemic to the North and South Islands. It is parasitic on a wide range of hosts including karo, *Coprosma* spp., fivefinger and putaputawētā. In the Tokatoka Ecological District it was recorded by T. Kirk from near Paparoa Bridge at the southern most boundary of the District (DOC Bioweb).

Calystegia marginata (Naturally Uncommon_{SO, SP})

Calystegia marginata is an indigenous small-flowered bindweed which has a ribbed flower stalk. In the North Island it occurs in coastal and lowland secondary forest and shrubland, and is also present in eastern Australia. In the Tokatoka Ecological District it was recorded by T.F. Cheeseman in 1925 at Paparoa at the southern-most boundary of the District (DOC Bioweb).

REGIONALLY SIGNIFICANT SPECIES

Bulboschoenus caldwellii

Bulboschoenus caldwellii is an indigenous sedge that is found in coastal saltmarshes and other poorly drained saline areas including pasture bordering tidal streams and estuaries. Its distribution is from the Kaipara Harbour where it was recorded in 1949 (AK 36466) to Otago, and is also present in Australia (NZPCN 2010).

Ileostylus micranthus

Ileostylus micranthus is an indigenous mistletoe (also found on Norfolk Island) which occurs mainly in coastal and lowland habitats on a diverse range of host species including exotic plants (de Lange et al. 1996). In the Tokatoka Ecological District it was recorded by Kirk (AK 11264, date unknown).

Metrosideros carminea

Metrosideros carminea (carmine rātā) is an endemic climbing rātā with carmine-coloured flowers found from Te Pahi in the north southwest to Taranaki and southeast to Mahia Peninsula (NZPCN 2010). It was recorded in the Tokatoka Ecological District by T. Kirk (AK 11444, date unknown) from Paparoa, at the southern boundary of the District.

Olearia solandri

Olearia solandri is a coastal shrub endemic to the North Island and northern South Island. In Northland, this shrub has a very local distribution, found on the margins of the Kaipara, Hokianga and Mangawhai Harbours. It was recorded in the Tokatoka Ecological District in 1963 (AK 924409) in a swamp near Tokatoka.

3.4 FAUNA

Information on fauna in this report has been compiled from SSWI (Site of Special Wildlife Interest) and SSBI information systems, as well as from field observations carried out during this survey. The New Zealand conservation status of fauna species (except for birds and fish) is derived from Hitchmough et al. 2007 which uses the threat classification system of Molloy et al. 2002 (see Appendix 3). The conservation status for birds is derived from Miskelly et al. 2008, the conservation status for fish from Allibone et al. 2010 and the conservation status for reptiles from Hitchmough et al. 2010, all use the threat classification system of Townsend et al. 2008 (see Appendix 3). Nomenclature follows Miskelly et al. (2008) for birds, Hitchmough et al. (2010) for reptiles, Allibone et al. (2010) for fish and Hitchmough et al. (2007) for all other indigenous species.

A comprehensive discussion and checklist of fauna, particularly invertebrates, is beyond the scope of the present study. The descriptions for each site detail known Threatened, At Risk and Regionally significant fauna, and sometimes records of non-threatened species. There are very few records of reptiles and invertebrates and it is recognised that they comprise a significant aspect of indigenous ecosystems which is often overlooked. Indigenous New Zealand insects are our largest fauna group, and are intimately associated with indigenous habitat processes such as the consumption of plant material, pollination, breakdown of leaves, litter and logs, soil formation, general scavenging, parasitism, and predation, as well as providing the main food for birds, lizards, and most freshwater fish (Watt 1975). With the presently limited state of knowledge of these species, the protection of a diverse and representative range of habitat types is considered the most important strategic approach to provide a minimum basis on which populations can be maintained.

A checklist of fauna recorded in the Tokatoka Ecological District is included in Appendix 7.

3.4.1 Threatened and At Risk bird species

THREATENED

***Anas superciliosa superciliosa* grey duck, pārerā (Nationally Critical) Indigenous**

Populations of grey duck have seriously declined primarily due to habitat loss and introgressive hybridisation and competition with the introduced mallard (Heather & Robertson 2000). Genetic analyses have revealed that even morphologically 'pure' grey ducks have substantial introgression as revealed by genetic analyses (DOC unpubl. data 2009). Within the Tokatoka Ecological District there are historical records from the artificial lakes just north of Pukekohe Scenic Reserve (part of Q08/022) (1977, SSBI Q08/H005 and H006), and a 1998 record from the Manganui River Complex (P07/086) (SSBI P07/H053).

***Botaurus poiciloptilus* Australasian bittern, matuku (Nationally Endangered _{sp, TO}) Indigenous**

Australasian bitterns are swamp-dwelling birds with only one historical SSBI record from the Manganui River Complex (P07/086) (1977/78, SSBI P07/H049). The Atlas of Bird Distribution in New Zealand 1999-2004 (Robertson et al. 2007) has recorded that bitterns are present within the Tokatoka Ecological District.

***Apteryx australis* NI brown kiwi (Nationally Vulnerable _{CD, PD, RF}) Endemic**

Habitat loss and predation by feral and domestic animals have severely impacted NI brown kiwi populations throughout Northland. Currently, it is not known whether kiwi are still present within the Tokatoka Ecological District. The most recent records are mainly from a DOC Northland kiwi survey conducted in 1992/93 mostly by Departmental staff member Pat Miller (DOC internal files); and there are a couple of records from 1994 (SSBI information system) and remaining records from the New Zealand Wildlife Service surveys (part of Sites of Special Wildlife Interest (SSWI) surveys) during 1977-78. It is possible that kiwi are still present at some sites in the District, such as in the relatively large and rurally placed reserves of Parahi Scenic Reserve and Smoky Hill Scenic Reserve. If kiwi are present at these sites, they would be Northland's southernmost populations.

Post-1990 NI brown kiwi records/reports for the Tokatoka Ecological District:

- Wallace Road Bush (P07/092) 1994/95 sighting by the landowner reported during this survey
- Maungatawhiri Forest Remnant (P07/096)—reported in 1992/93 DOC Northland kiwi survey
- Hoanga Road Shrubland and Forest (P07/101)—reported in 1992/93 DOC Northland kiwi survey (SSBI P07/H044)
- Girls High School Road Bush (P07/112)—reported in 1992/93 DOC Northland kiwi survey
- Berghans Bush and Surrounds (P08/015)—1992 record from DOC Northland kiwi survey (SSBI P08/H005)

- Waiotira Road Bush (Q07/086)—reported in 1992/93 DOC Northland kiwi survey
- Bartlett Road Bush (Q07/091)—reported in 1992 DOC Northland kiwi survey (SSBI Q07/R07/H063)
- Tauraroa Bush (Q07/092)—1994 reported (SSBI Q07/R07/H062)
- Pikiwahine Bush Remnants (Q07/094)—recorded (northern remnant) in 1992/93 DOC Northland kiwi survey (SSBI Q07/R07/H067)
- Parahi Scenic Reserve and Surrounds (Q08/010)—3 kiwi recorded in 1992 DOC Northland kiwi survey (SSBI Q08/H022)
- Pukekohe Scenic Reserve and Surrounds (Q08/022)—reported in 1992 DOC Northland kiwi survey (SSBI Q08/H004)
- Smoky Hill Scenic Reserve and Surrounds (Q08/030)—1994 record SSBI Q08/H009 (also recorded in 1992/93 DOC Northland kiwi survey; a kiwi egg was found).

***Poliiocephalus rufpectus* NZ dabchick, weweia
(Nationally Vulnerable) Endemic**

NZ dabchicks are endemic wetland birds. There is only one SSBI record of NZ dabchicks from the Tokatoka Ecological District and this record—in 1977, from the artificial lakes just north of Pukekohe Scenic Reserve, part of Q08/022 (SSBI Q08/H005 and H006)—is now over 30 years old. The Atlas of Bird Distribution in New Zealand 1999–2004 (Robertson et al. 2007) have recorded that NZ dabchicks are present within this Ecological District.

***Pbalacrocorax varius varius* pied shag, kāruhiruhi
(Nationally Vulnerable) Indigenous**

Pied shags are generally widespread on the coast in New Zealand. Current estimations suggest that there are possibly fewer than 2000 pairs, and although there has been a large decline over the past 100 years, populations may have now stabilised (DOC unpubl. data 2009). There are two relatively recent records from the Tokatoka Ecological District—from the Manganui River Complex (P07/086), 1998, SSBI P07/H053 and Curnow Road Gemstone Conservation Area (P07/090), 1998–99, SSBI P07/H078.

AT RISK

***Bowdleria punctata vealeae* NI fernbird, mātātā
(Declining ^{RR, st}) Endemic**

The NI fernbird is a subspecies whose population has declined through loss of wetlands and shrubland habitat and the introduction of mammalian predators (Heather & Robertson 2000). The NI fernbird population continues to decline due to factors such as clearance of available habitat by pastoralisation and coastal development (DOC unpubl. data 2009). There is only one known record of fernbirds from the Tokatoka Ecological District—at Curnow Road Gemstone Conservation Area (P07/090) (1999, SSBI P07/H078).

***Anthus novaeseelandiae novaeseelandiae* NZ pipit, pihoihoi
(Declining) Endemic**

NZ pipits are found in open habitats from the coast to the alpine tops (Heather & Robertson 2000). Their habitat range has greatly reduced, particularly in areas developed for dairying and cropping (DOC unpubl. data 2009). No

records were found within sites recorded in this survey. However, pipits are noted as being recorded from within the Tokatoka Ecological District (Robertson et al. 2007).

***Himantopus himantopus leucocephalus* pied stilt, poaka
(Declining_{so}) Indigenous**

Pied stilts are distinctive black and white waders with long pinky-red legs. Their populations have declined by 50% over the last 20 years (DOC unpubl. data 2009). Within the Tokatoka Ecological District there is one SSBI historical record (1977-79 SSBI P07/H049) from the Manganui River Complex (P07/086). The Atlas of Bird Distribution in New Zealand 1999-2004 (Robertson et al. 2007) has recorded that pied stilts are present within the Tokatoka Ecological District.

***Porzana tabuensis plumbea* spotless crane, pūweto
(Relict_{so}) Indigenous**

Spotless cranes are very secretive indigenous birds that are rarely seen. Their numbers have been greatly reduced by the loss of wetland habitat. They have a very restricted distribution, being largely confined, on the mainland, to raupō and sedge swamps. There are only historical records of them from the Tokatoka Ecological District, including in the Manganui River Complex (P07/086) (1977-79, SSBI P07/H049) and it is likely that they still occur there.

***Rallus philippensis assimilis* banded rail, moho-perurū
(Naturally Uncommon DP) Indigenous**

Banded rails are wetland birds of limited distribution nationally; however, Northland is their national stronghold (Peter Anderson pers. comm.). Banded rails are now generally found in mangrove forests, saltmarshes and rush-dominated freshwater wetlands (Heather & Robertson 2000). They have only been recorded in the Tokatoka Ecological District from the Manganui River Complex (P07/086) (1977-1979, SSBI P07/H049), and although this record is historical, it is likely that they still occur here.

***Phalacrocorax carbo novaehollandiae* black shag, kawau
(Naturally Uncommon_{so, sp}) Indigenous**

The black shag is an indigenous bird that has a widespread distribution. A black shag rookery (over 50 birds) was recorded by the New Zealand Wildlife Service from the Manganui River Complex (P07/086) (SSBI P07/H053) in 1977-78, with the most recent SSBI record from the Manganui River in 1988 (SSBI P07/H049). There is also a 1977 record by the New Zealand Wildlife Service from the artificial lakes just north of Pukekohe Scenic Reserve within Q08/022 (SSBI Q08/H005, Q08/H006). The Atlas of Bird Distribution in New Zealand 1999-2004 (Robertson et al. 2007) has recorded that black shags are present within the Tokatoka Ecological District.

***Phalacrocorax melanoleucos brevirostris* little shag
(Naturally Uncommon_{Inc}) Indigenous**

The little shag, our smallest species of shag, has a widespread distribution in New Zealand. There are only two SSBI records of little shags from the Tokatoka Ecological District, (neither recent)—from the Manganui River

Complex (P07/086) recorded by the New Zealand Wildlife Service between 1977-1979 (SSBI P07/H049), and a 1977 record by the New Zealand Wildlife Service from the artificial lakes just north of Pukekohe Scenic Reserve within Q08/022 (SSBI Q08/H005, Q08/H006). The Atlas of Bird Distribution in New Zealand 1999-2004 (Robertson et al. 2007) has recorded that little shags are present within the Tokatoka Ecological District.

3.4.2 Regionally significant bird species

Fauna listed as regionally significant in Northland have been determined in a draft list prepared by DOC's, Northland Conservancy. Regionally significant birds are generally those that are rare or uncommon in Northland Conservancy and/or are actively declining. Information on regionally significant birds in this report has been compiled from Northland Conservancy records, the Sites of Special Biological Interest (SSBI) information system and observations made during the course of this survey.

***Tachybaptus novaehollandiae* Australasian little grebe** **Indigenous**

Australasian little grebes self-introduced from Australia in the 1960s and 1970s and inhabit ponds and lakes in the northern North Island. There are no records attached to PNAP sites within the Tokatoka Ecological District, but they are noted as being present in the Atlas of Bird Distribution in New Zealand 1999-2004 (Robertson et al. 2007).

***Anas rhynchotis variegata* Australasian shoveler, NZ shoveler,** **kuruwhengi** **Indigenous**

The Australasian shoveler is an indigenous duck. There are two subspecies, one of which breeds in Australia (*A. rhynchotis rhynchotis*) and the other, which is also known as NZ shoveler, breeds in New Zealand (*A. rhynchotis variegata*). Shovelers occur throughout New Zealand, preferring lakes, shallow wetlands and ponds, usually away from cities (Heather & Robertson 2000). Habitat loss has led to a decline in their numbers in Northland. There are only historical SSBI records from the Tokatoka Ecological District—at the Manganui River Complex (P07/086) (1977-79, SSBI P07/H049). The Atlas of Bird Distribution in New Zealand 1999-2004 (Robertson et al. 2007) have recorded that Australasian shovelers are present within this District.

***Anas gracilis* grey teal, tētē** **Indigenous**

The grey teal is an indigenous species found on lowland lakes and estuaries throughout the North and South Islands (Heather & Robertson 2000). In recent years, grey teal have been recorded in their hundreds utilising the fertile alluvial floodplains within the Manganui River Government Purpose Wildlife Management Reserve (part of P07/086) (SSBI P07/H053) and are known to breed in response to fluctuating water levels (Nigel Miller pers. comm.). In Northland, grey teal are mainly restricted to the Manganui River area and the Pouto Peninsula (P. Anderson pers. comm.).

***Hemiphaga novaeseelandiae* kūkupa, kererū, NZ pigeon**

Endemic

Kūkupa are endemic forest birds generally found in lowland broadleaf-podocarp forest where they enjoy the large fruits of trees such as taraire, pūriri, karaka, tawa and miro. Kūkupa are the only birds that can disperse these seeds and therefore play a key role in the regeneration of New Zealand's native forest. A lot of the habitat within the Tokatoka Ecological District is fragmented and isolated and these 'stepping stones', or corridors or patches of suitable habitat, will help in the survival of kūkupa populations. However, predation, poaching and competition for food, will severely affect their long-term survival. There are over 30 records of kūkupa within the District, with many records recorded during this survey.

3.4.3 Threatened invertebrates

CHRONICALLY THREATENED

Amborhytida dunniae

(Gradual Decline)

Amborhytida dunniae is a species of landsnail which is endemic to Auckland and Northland that has a sporadic distribution resulting from extensive habitat destruction. The main threats to the species are predation by mammalian predators and loss or degradation of habitat, especially from browsing and trampling by livestock or land clearance (Brook 2002). In the Tokatoka Ecological District, live *Amborhytida dunniae* were recorded in 2007 from Whenuanui Scenic Reserve (P08/008) (SSBI P08/H031).

***Paryphanta busbyi busbyi* kauri snail**

(Gradual Decline)

Kauri snails are endemic to Northland and north Auckland, with a fragmented distribution resulting from extensive destruction of indigenous vegetation. Predation by pigs, rats, possums, and, possibly, hedgehogs, and continued loss of habitat, are the main threats to this species (Brook 2002). In the Tokatoka Ecological District they have been recorded at the following sites:

- Manganui River Complex (P07/086) in 1988 (SSBI P07/H049)
- Hoanga Road Shrubland and Forest (P07/101) in 1992 (SSBI P07/H044)
- Boar Stream Bush (P07/110) in 1980 (SSBI P07/H047)
- Whenuanui Scenic Reserve (P08/008) in 2007 (SSBI P08/H031)
- Lusk Road Bush (P08/024) in 1999 (SSBI P08/H025)
- Kauri Hill Bush Remnants (P08/026) in 1999 (F. Brook pers. comm.)
- Te Whiro Bush and Surrounds (P08/036) in 1989 (SSBI P08/H003)
- Waiotira Road Bush (Q07/086) (F. Brook pers. comm.)
- Upper Mititai Road Bush (Q07/098)—dead kauri snail recorded during this survey (1998)
- Parahi Scenic Reserve and Surrounds (Q08/010) in 1992 (SSBI Q08/H022)
- Manganui-Taylors Road Bush and Surrounds (Q08/019) in 1992 (SSBI Q08/H003)

- Pukekohe Scenic Reserve and Surrounds (Q08/022) in 2006 (SSBI Q08/H004)
- Cross Family Trust Covenant and Surrounds (Q08/025) in 2002 (DOC internal report)
- Smoky Hill Scenic Reserve and Surrounds (Q08/030) in 1992 (SSBI Q08/H009)

3.4.4 Regionally significant invertebrates

Peripatus sp.

Peripatus are sometimes called ‘velvet worms’ due to their velvety look. They have been recorded at three sites in the Tokatoka Ecological District: Manganui-Taylor’s Road Bush and Surrounds (Q08/019) in 1992 (SSBI Q08/H003), Lusk Road Bush (P08/024) in 1992 (SSBI P08/H025), and Te Whiro Bush and Surrounds (P08/039) in 1989 (SSBI P08/H003).

3.4.5 Threatened lizards

AT RISK

Naultinus elegans elegans Auckland green gecko (Declining)

The Auckland green gecko is an arboreal species endemic to Auckland and Northland (north to, approximately, the Hokianga Harbour). In 2006, a green gecko was reported by a nearby landowner to Pukekohe Scenic Reserve (Q08/022) in the shrubland area adjacent to the reserve on its northern boundary (SSBI Q08/H004).

Oligosoma ornatum ornate skink (Declining CD, PD)

Ornate skinks are only found in the North Island. Whilst populations are increasing on offshore islands, mainland populations are decreasing, with few recent records in Northland. There are only historical records in the Tokatoka Ecological District—from the Okahu Stream wetland (part of the Manganui River Complex (P07/086) in 1977 by the New Zealand Wildlife Service (SSBI P07/H049), and in 1978 from Hoanga Road Shrubland and Forest (P07/101) (SSBI P07/H044).

Hoplodactylus pacificus Pacific gecko (Relict CD, PD)

Pacific geckos occur in the North Island only. Populations on the mainland are seriously declining; however, they are abundant on island strongholds and are recovering on other islands. In the Tokatoka Ecological District, Pacific geckos were recorded from Wairere Valley Bush Remnant (Q08/034) in 1998 by a landowner who found one within their private residence (Bioweb).

3.4.6 Regionally significant lizards

Hoplodactylus granulatus forest gecko

Forest geckos are found throughout most of mainland New Zealand, but there are, however, very few records in Northland. In the Tokatoka Ecological District there is a possible record from Te Whiro Bush and Surrounds (P08/039) (1989, SSBI P08/H003).

3.4.7 Threatened aquatic fauna

***Neochanna diversus* black mudfish**

At Risk (Relictual)

Black mudfish are freshwater fish found in the northern part of the North Island. In Northland, the distribution of black mudfish overlaps with that of the Northland endemic Northland mudfish (*Neochanna beleois*). Black mudfish are threatened by gambusia (particularly because they eat mudfish fry), habitat fragmentation, drainage, weeds, and eutrophication. Black mudfish were recorded for the first time in the Tokatoka Ecological District in 2007 from the Manganui River Complex (P07/086) (NIWA 2008).

***Paranephrops planifrons* kōura, freshwater crayfish**

Chronically Threatened (Gradual Decline)

Kōura are a freshwater crayfish and there are two species in New Zealand. *Paranephrops planifrons* occurs in the North Island and northern and western South Island and *P. zealandicus* (also Gradual Decline), occurs in the eastern and southern South Island (DOC unpubl. data). Kōura are threatened by habitat destruction and deterioration. In the Tokatoka Ecological District they have been recorded from Lusk Road Bush (P08/024) (1992, SSBI P08/H025), and Pukekohe Scenic Reserve and Surrounds (Q08/022) (NIWA 2008).

***Amarinus lacustris* freshwater crab**

Chronically Threatened (Sparse)

This is the only freshwater crab in New Zealand. It is an indigenous species generally found in lakes from Northland to Waikato, and is also found in southeast Australia (DOC unpubl. data) and Norfolk and Lord Howe Islands (Winterbourn 1983). In the Tokatoka Ecological District there is a 1993–94 un-referenced record (SSBI P07/H049) from the Manganui River Complex (P07/086).

3.5 THREATS

The Tokatoka Ecological District comprises mainly 'small island habitats' sparsely distributed across the District. Further modification and fragmentation of habitats will significantly add to the loss of the biodiversity that remains in the District.

At the start of this survey in 1998, a cursory look at habitat loss in the District was undertaken by comparing 1981 and 1997 NZMS 260, Q08 topographical maps (Infomap, Department of Survey and Land Information). It was not hard to see that some uncommon and threatened habitat types such as riparian forest, riverine flood forest, lowland forest and shrubland areas had been cleared or reduced in size between these years. For example, indigenous habitat that was contiguous with the Manganui River Complex (P07/086) in 1981 had been cleared, and, in some places, planted in pine forest (*Pinus* spp.) without apparent native buffers, or converted into open pasture.

PNAP sites in this survey were originally mapped onto topographical maps. Transference onto 2002 aerial photography showed some significant clearance and modification to sites. Furthermore, about 75%⁶ of site maps were then

⁶ Only 75% of Tokatoka Ecological District could be compared, as 2008 aerial photography was not available for the whole of the District at the time the report was prepared.

updated from 2002 onto 2008 aerial photography. This comparison showed that during this 6-year period, at least 159 ha of significant natural habitat had been cleared. This is concerning in an ecological district where only about 7.4% of its area comprises significant natural areas.

Lowland and shrubland remnants in particular within the Tokatoka Ecological District are poorly represented. They have been cleared mostly for agricultural use, pine forestry, and, possibly, as a firewood source.

Wetlands are also extremely rare in the Tokatoka Ecological District, with the Manganui River Complex containing the only extensive wetland habitat in the District. As well as habitat loss, other issues affecting the Manganui River Complex include grazing and trampling by farm stock, nutrient run-off from farm practices, dominance of invasive weeds such as tradescantia, alligator weed, parrot's feather, and primrose willow, impacts from gambusia on native fish (particularly black mudfish), and continued drainage. It is recommended that a biocontrol agent for tradescantia be pursued, and that a surveillance programme set up to monitor the threat from a range of weeds not presently known from this site (Champion & Townsend 2008).

As is the case throughout Northland, possums, pigs, rodents, and mustelids have an ongoing impact on the vegetation and wildlife values of the District.

Disturbed and exposed areas are open to the threat of invasive weeds, with weeds such as black wattle and other *Acacia* spp., wildling pines, pampas, gorse, dally pine, and *Cotoneaster* spp. particularly evident in the District.

The Critically Endangered *Hebe saxicola*, found only at Maungaraho Rock Scenic Reserve, is threatened by invasive weeds such as pampas, willow-leaved hakea and boneseed (de Lange & Rolfe 2008). There is now a biocontrol agent for boneseed (boneseed leaf roller), with colonies established in a few areas in Northland currently outside of the Tokatoka Ecological District⁷.

This survey is an important step towards identifying the remaining significant natural areas left in the Tokatoka Ecological District, with the aim of working towards legal protection and management of the best of what is left. It is hoped that this report will provide impetus for active management in a range of significant natural areas in the District to control threats from human activity, animal and plants pests. At some sites, buffers and corridors will greatly assist retention and enhancement of biodiversity. These actions are necessary to ensure the long-term survival and viability of many of the significant natural areas remaining in the District.

⁷ The sites with boneseed leaf roller colonies are on the Northland Regional Council website: www.nrc.govt.nz/Environment/Weed-and-pest-control/all-about-biological-control/Boneseed-leafroller/ at Hihi (Berghan Pt), Ahipara, and Mangawhai.