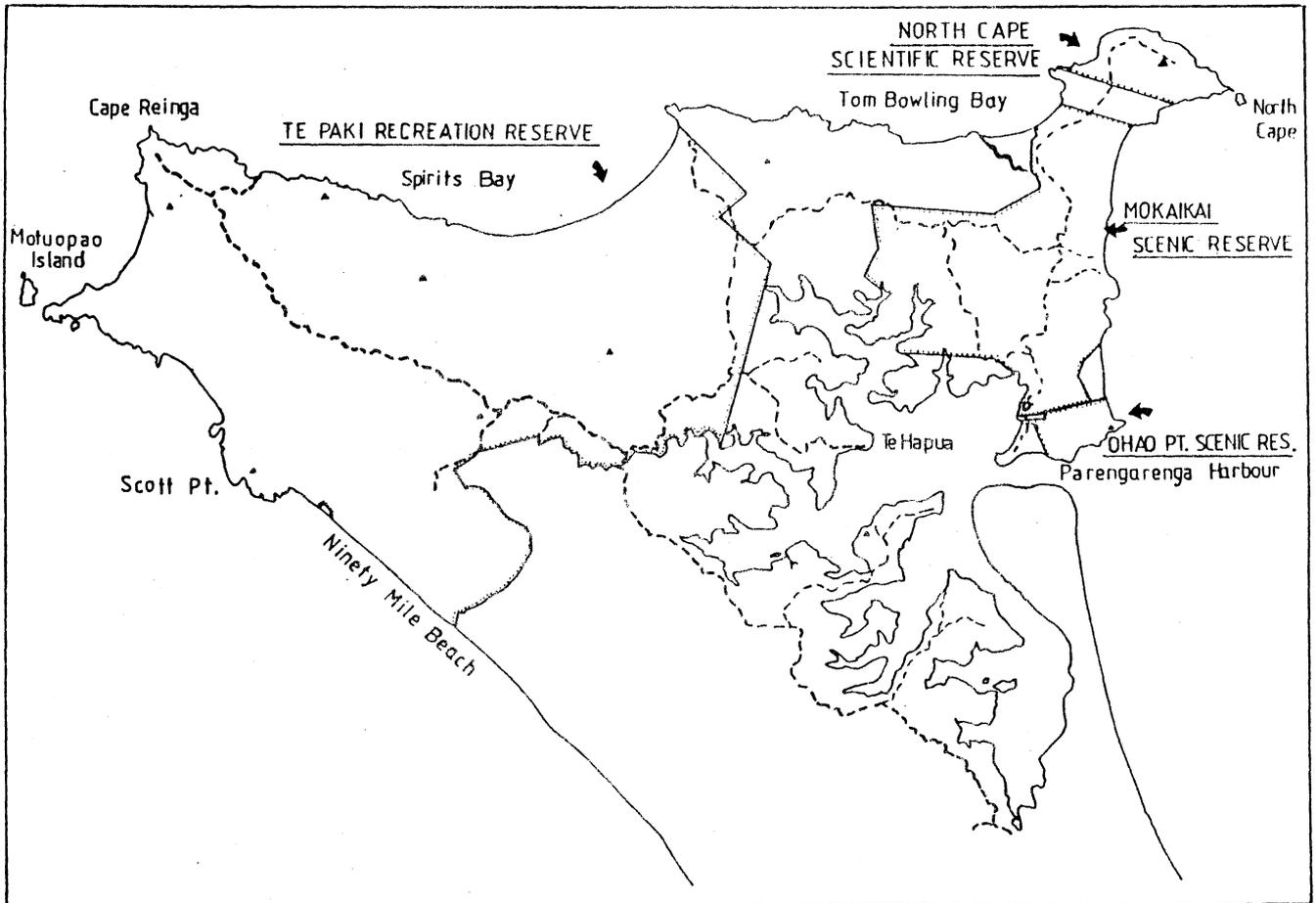


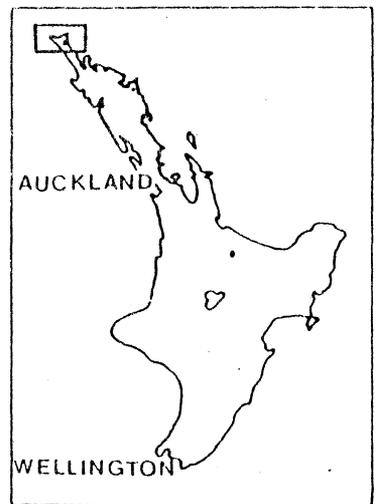
FIG. 1.

Te Pahi Farm Park



KEY

- main roads and 4wd tracks
- reserve boundaries
- ▲ trig point



SCALE (Kilometres)

1 0 1 2 3 4 5 6 7 8

A SURVEY OF THE ORCHID FLORA OF TE PAKI FARM PARK

D.P. McCrae

INTRODUCTION

During 1988-89, as part of the Department of Conservation's Te Paki Farm Park Flora Survey, I undertook a survey of the orchid flora within the Park boundaries.

This, the first systematic orchid survey of any area in New Zealand, provided much valuable information on the distribution and ecology of Northland's orchids.

THE PARK

The Park, (Fig. 1) which lies at the northernmost tip of the North Island, is a complex of five reserves. These include the Te Paki Recreational Reserve, Mokaikai and Ohao Scenic Reserves, North Cape Scientific Reserve and Motuopao Island Nature Reserve.

The total area comprises more than 23,000 ha of remote terrain reaching from the sandy and rocky coasts to the steep and rugged volcanic highlands which rise to 300 m a.s.l. at Te Paki and Unuwahao.

ENVIRONMENTAL FORCES

The climate ranges between sub-tropical and temperate but can be harsh and extreme. Being almost totally surrounded by sea, most of the Park is very exposed. The western coast and highlands are buffeted almost constantly by wind - mainly the prevailing westerlies. At the eastern end of the Park the North Cape massif is exposed to winds from all directions and consequently it has a very harsh climate. Erosion there is very severe.

Rainfall is moderate, with occasional heavy falls. Many steep and exposed hills exhibit areas devoid of vegetation. The Park is also prone to drought during the long, hot summers - and this makes recolonisation of the eroded areas slow.

ACCESS

Other than the Te Paki and Spirits Bay Roads, access to the Park is restricted mainly to 4wd and off-road vehicles.

SURVEY METHODS

The initial foray (March) was to identify habitat suited to orchids and from this to select representative habitat types in the differing geographical, geological and climatic areas, for revisiting on the subsequent surveys.

Unfortunately, funding by DoC for the remainder of the entire Flora Survey was discontinued after this initial investigation. Fortunately grants from the Ministry for the Environment and the N.Z. Lottery Board enabled completion of the survey during 1989.

ORCHID FLORA

Due to suspected inaccuracies by various earlier observers, some previous identifications required verification. Name changes and recent

clarification of entities within some species also necessitated the re-appraisal of a number of earlier records.

Prior to the beginning of this survey, 27 species had been identified in the Park. The list has now increased to 41, comprising 27 endemic species and 14 species shared with Australia. 40% of the country's orchid flora is represented.

As would be expected, the sub-tropical climate and the 'dust-trap' effect of the Northland Peninsula combine to produce an orchid flora with a high Australian content. The exposed, disturbed and leached soil types suit Thelymitra which is the genus represented by the largest number of species (10). Corybas (6 species) is the second largest genus recorded. The warm, dry climate and restricted forest cover are not so conducive to Pterostylis - only 5 species were observed, three shrubland and two forest dwellers. Caladenia (3 species) was the other major component of the Park's orchid flora. Most of these and the remainder of the terrestrials are common species in Northland, with a wider distribution throughout the country.

The natural forces of climate together with the geology and geography of the area dictate the composition of the orchid flora and, in this respect, the survey produced no real surprises.

The names of taxa used in this paper follow Molloy and Hatch's interim list of orchid names.

SURVEY

In March, the three-week habitat survey uncovered little evidence of the previous season's orchids. Although the more recent botanical accounts indicate a fairly diverse orchid flora, my impression was that many of those recorded must be present only in small numbers.

Seven subsequent visits from July 1988 to December 1989 dispelled that view. The flora proved to be even more diverse than anticipated and only a few species were found to be poorly represented in the Park.

FOREST ORCHIDS

Mokaikai S.R.

Whareana Bush is a coastal remnant in the drier eastern area of the Park. Lying in a small eroded valley, protected at its head and on both sides by steep to sheer rock faces, it contains typical coastal species and associations. Access is by pig-tracks that run near the base of both hillsides from the beach and a drop from the ridge track on the northern flank is possible. Best access to the upper part is via the stream bed. Some agility is required to clamber over the tumble of enormous conglomerate boulders that stretch for some distance downstream. At the head, an impressive waterfall descends the broken rock face, over a lower ledge and then across the open face of a cave. This cave has an interesting Maori history and is well worth venturing into for the sensation of the view from behind the fall.

A result of the dry nature of this remnant is the almost total lack of epiphytic growth (e.g. CollospERMUM, Astelia) on even the old and large trees. No epiphytic or terrestrial orchids were noted on the March visit.

Hauptoto bush, a semi-coastal remnant is set in an eroded conglomerate gully below the Taumatara Flat. Run-off from the gumland above descends a 30 metre, two-tiered fall at the head of the Ponaki Stream. A ledge on the second level leads back into a cave, larger than that at Whareana. Cooking stones, shells and ash suggest earlier Maori

occupation. A full day was spent exploring this little-known remnant - the largest in the Mokaikai Reserve. Not a single orchid of any kind was noted during the March visit.

The following day, another south-facing remnant near Poroiki Hill, Parengarenga catchment, was investigated. Although quite small, this remnant was much damper than the others visited in the Mokaikai Reserve. Dominant species included taraire (Beilschmiedia tarairi), puriri (Vitex lucens) and rewarewa (Knightsia excelsa), with much epiphytic growth evident. Three orchid species were sighted. Dendrobium cunninghamii was not uncommon in the heads of large rewarewa and puriri. Bulbophyllum pygmaeum was not uncommon and one specimen of Drymoanthus adversus was noted on rewarewa.

Te Paki R.R.

Again in March, a steep, south-facing clay slope off Darkies Track (near Pandora) was surveyed. Along the forest margins, bordering the kauri (Agathis australis) on the valley floor and stream sides, large kanuka (Kunzea ericoides) up to 15 m dominate. An unusual sub-dominant species here is the lancewood (Pseudopanax crassifolius) which is found in groves of very large specimens reaching up to 15 m. Their trunks occasionally support Drymoanthus adversus. Where the kanuka merges with the forest species, Bulbophyllum pygmaeum is not uncommon on kauri and rewarewa. Dendrobium cunninghamii was also not uncommon in the trunks of rewarewa. The kauri forest itself was not explored.

That botanical cornucopia - Radar Bush, supports the greatest representation of epiphytic and terrestrial forest orchids encountered during the survey. Four separate visits were made (Mar., Jul., Sept., Nov. 1988) with nine terrestrial and four epiphytic species being recorded in the forest proper.

On the northerly slopes near the end of the access track Bulbophyllum pygmaeum is not uncommon on the trunks of monoao (Halocarpus kirkii) and taraire. Dendrobium cunninghamii is not uncommon on the taller taraire bordering the stream and is occasionally found on monoao on the eastern slopes. Only one sighting of Earina autumnalis was made during the forest surveys - high in an unidentified tree on the eastern stream bank. On the slopes above, a few specimens of Drymoanthus adversus were found on monoao.

Back on the clay slopes below the access track a number of terrestrial species were observed. Acianthus sinclairii (fls. Jul., seed Nov.) is common, as is Cyrtostylis oblonga (fls. Jul., seed Sept-Nov.). This species was, until recently, considered synonymous with C. reniformis. C. oblonga is predominantly a kauri forest species which rarely turns up in shrubland communities (North Cape, Rangitoto). C. reniformis has not been noted in Northland forests, preferring shrubland that is often dry and seemingly inhospitable to orchids.

One small colony of Corybas trilobus (lvs. Sept.) was located near the track. The only other Corybas sighted was C. oblongus (bud Sept., fls. Nov.) which is common on slopes on both sides of the stream and uncommon on the western bank.

Pterostylis trullifolia (seed Nov.) is common in scattered colonies throughout. Pterostylis graminea var. rubricaulis (fls. Sept., fls. seed Nov.) is not uncommon in its usual habitat - under rikker kauri.

Two species of Caladenia were recorded on the slopes below the track - the pink C. minor (seed Nov.) and the taller greenish-white C. "green column" (seed Nov.). Both were not common there, but the latter was locally more common on the slopes and ridge across the stream.

Numerous other species were recorded on the access track and on the

open ridges along the forest margins. These are included in the heathland orchid section.

Disturbing features of all the remnants surveyed was the severe damage to the forest floor caused by pigs and cattle. The various subspecies of the land snail (Placostylus) are at risk. Large areas in the Mokaikakai remnants had been turned-over. The entire floor of Whareana Bush had been disturbed. Occasional cattle browsing ensured that any surviving seedling was regularly pruned. The palatable Pratia physaloides appeared to be a favoured delicacy. The recent arrival of the opossum in the Far North adds another dimension to the risk to the flora of the area. It is hoped that the type of vandalism recently experienced at Kaimaumu and Whangamarino does not extend to the North Cape area.

HEATHLAND ORCHIDS

Te Paki R.R.

Scott Point & Cape Reinga

Scott Point is an outcrop of uplifted, consolidated dunes reaching 120 m a.s.l., lying at the northern end of Ninety Mile Beach. The weathered sand and sandy loams support a dominant cover of manuka (Leptospermum scoparium) with Cyathodes juniperina, Leucopogon fasciculatus, Hakea sericea and H. gibbosa sharing sub-dominance. Bare ground can extend from 40-60% with plants in the upper and more exposed situations dwarfed to less than 0.5 m.

At the northern end, Thelymitra aff. longifolia (bud Sept.) and Microtis unifolia (fls. Sept) are abundant. T. carnea (fls. Sept.) and T. pauciflora (bud Sept.) are common throughout. In hot, dry bare sand, the most difficult conditions possible for orchids, Cyrtostylis reniformis (seed Sept.) and Acianthus sinclairii (seed Sept.) were unusually abundant. Except occasionally under the protection of manuka, these orchids were stunted and flowering was sparse. The fern ally, Phylloglossum drummondii (sporangia) was common and widespread in open ground.

On the trackside (part of the Cape Reinga to bluff walkways system) Caladenia minor (spike Sept.) appeared in occasional colonies under manuka. Prasophyllum pumilum (seed Sept.) was not uncommon throughout. A few specimens of T. sp. "rough-leaf" and T. sp. "darkie" were noted on a damp section of the track.

Orchids were less common on the ridge extending southward towards Ninety Mile Beach. T. carnea, T. aff. longifolia, T. pauciflora and M. unifolia were not common. Just one specimen of both C. minor and Orthoceras novae-zeelandiae were sighted.

Hiriki Pa trig, 240 m a.s.l. is the highest point on the west coast of the Park. This exposed basalt, volcanic uplift has an overlay of eroded, stony clay soils. On the northern side, access is via the track leading from the Cape Reinga Road. On the saddle and flatter ground, a short distance from the road, T. aff. longifolia and T. pauciflora are common among the stunted manuka, flax (Phormium tenax) and Corokia cotoneaster. Near the top of the hill and along the southern ridge, the track is almost completely overgrown. Only occasional specimens of the Thelymitra spp., already noted, were sighted.

The second spur, leading down to the back of the high dunes, provides access to Te Werahi beach. On this windswept slope, M. unifolia join the two Thelymitra spp. as the only orchids noted.

An investigation was made of the damp soaks immediately behind the

unstable dunes towards the wetland outflow. M. unifolia was common in some soaks but no other orchid was seen.

As observed earlier on Tom Bowling, Waikuku and Whareana beaches, wind erosion had exposed human skeletons and bones. The numerous heaps of hangi stones and old middens attest to the significant population of the area in earlier times.

From the northern end of the beach the 'Walkway' track climbs steeply up the razorback ridge to Tarawamao Pt. The narrow track leading along the high cliff edge can be dangerous in windy conditions. The ubiquitous T. aff. longifolia and M. unifolia were common here and T. pauciflora was occasionally noted.

Shrubland near the Tapotupotu Rd. exhibited a similar flora to that on nearby Hiriki Pa.

Shenstone Block

Rising to 113 m a.s.l. this area is geologically similar to the Scott Point uplift further to the north.

Lying behind the extensive dune area at the northern end of Ninety Mile Beach, the block is further inland and more sheltered. A number of steep sandstone outcrops, dissected by ravines, form an interesting landscape. The higher slopes contain a number of sink-holes - perfect sand basins with honeycombed, jagged sandstone outcrops forming the perimeters. These most unusual features rival those of the Ohao area. Prior to purchase by the Dept. of Lands and Survey, cattle had rough-grazed the area but with little feed available, disturbance does not appear to be great. There is minor evidence of pigs. The vegetation is old and the abundance of saprophytic orchids is unrivalled anywhere else in the Park.

Below the north-western slopes there are a couple of shallow enclosed lakes, draining into the Te Paki Stream which runs near the north-western boundary. Plant cover is dense up to the water line.

The vegetation throughout the block is predominantly manuka. Sedges and Hakea sericea are dominant in places, sometimes forming impenetrable thickets. The gullies often support a dense cover of ferns along the streamsides. Some of the best groves of Sticherus flabellatus and Todea barbara are to be found below the waterfall alongside the access track and along the stream to well past the bridge at the entrance.

Visits were made in November and December 1989.

Access track (from the Te Paki Stream Road).

On the track through the stand of sparse old pines Microtis parviflora (fls.) and Thelymitra pauciflora (bud) were common. Under the pines there were extensive colonies of Corybas cheesemanii (seed) and occasional, small colonies of Gastrodia sesamoides (bud, fls.).

Along the track between the pines and the waterfall T. carnea (seed) and T. pauciflora (bud) were not uncommon. M. parviflora and T. aff. longifolia were common. Caladenia sp. (cf. alata) (seed) was occasionally noted. From the waterfall, for c. 1 km to the upper ridge where tracks cross, orchids were sparse. Two specimens of Thelymitra "darkie" (fls. just finishing) were sighted on the trackside and Microtis unifolia (fls.) was occasionally noted. Corybas cheesemanii (seed) was uncommon under tall Kunzea.

Microtis in this area appears to be intermediate between M. unifolia and M. parviflora. Some flowers exhibit the broad labellum of M. unifolia but lack the 'frills' and are not bilobed.

The track and surrounds leading east from the "crossroads" up to the

high ridges in the centre of the block produced the most interesting orchid flora. Near the start of the track was a colony of 30 plants of Thelymitra aemula (fls. just finishing). Growing with these were several Gastrodia sesamoides (buds, fls.). This association continued for c. 70 m down the track, with occasional sightings made of C. cheesemanii, T. carnea and T. aff. longifolia. Orthoceras novae-zeelandiae was locally common and M. unifolia abundant.

The uplands were very dry and parched. Orchids were few, with Thelymitra aemula and T. aff. longifolia occasionally sighted.

Dense thickets of Hakea sericea made the traverse to the eastern side of the block impossible by this route, so a retracing of steps was required. Time was spent investigating the tall manuka stands in the vicinity of the Gastrodia noted near the "crossroads". The habitat here is a sandy, clay loam supporting manuka (3 m, dominant) with bracken, Coprosma rhamnoides, gorse and Leucopogon fasciculatus forming the sparse understorey and margins. There is a relatively deep litter in which G. sesamoides (buds, fls.) Corybas cheesemanii (seed) and C. cryptanthus (seed) thrive in large numbers. On a second trip (December) this area and the track on the western side of the "crossroads" were investigated more thoroughly. More than 300 flower stem of C. cryptanthus were counted. Corybas cheesemanii was abundant and c. 50 stems of Gastrodia sesamoides were observed. From herbarium specimens collected, it is possible that leafless forms of C. cheesemanii could be present and hybridisation may also occur. In the same locality small colonies of Caladenia "green column" were noted under tall manuka. Further investigation of this block is required.

Rubbish Dump Hill

This term was coined to describe a hill, 1 km south of the Tapotupotu Rd junction, on which is sited the camp ground tip. It is also used to dump surplus building, fencing materials &c and is recognised from the main road by the two redundant concrete loos on the top. Stunted manuka is dominant on the top and western slopes, where run-off has gouged a number of small gullies. On these red/brown clay soils Hakea sericea is dominant. T. aff. longifolia is so common that it almost takes a (seasonally) subdominant role on the ridge and southern slopes. Many plants had huge, wide, strapped leaves of more than 20 mm x 30 cm and tall inflorescences with up to 25 fls. T. carnea (pink and yellow forms) (fls. Sept.) is common everywhere, especially on the eroded, north-facing slope. Orthoceras novae-zeelandiae, M. unifolia and T. pauciflora are common throughout.

Caladenia minor (spike Sept.) is not uncommon on the edge of the taller Hakea, at the base of the eroded slopes. Prasophyllum pumilum (fls., seed July) occurs in colonies in the damper and shaded areas.

One small colony of Pterostylis alobula (fls. July) was found under stunted manuka on the track down to the tip.

An interesting find here was a small colony of Calochilus herbaceus (fls. Nov.) growing in and along the edge of a drain in the damp conditions it prefers.

Darkies Track (Tapotupotu - Pandora gate)

Recently upgraded, this 6 km track is part of the Spirits Bay-Cape Reinga walkway and provides some of the best views of the western end of the Park. Orchids are found frequently along the track, with all the species common in the Park well represented. M. unifolia, M. parviflora, T. pauciflora, T. aff. longifolia, T. carnea, T. aemula and

Orthoceras novae-zeelandiae are common. One of the few sightings of T. tholiformis (fls. Nov.) was made not far from the Tirikawa Pa. Pterostylis plumosa was reported from a slashed track leading toward the coast 400 m + from Pandora gate. (P. Mayhill, pers.comm.)

Inland track (Tapotupotu - Pandora gate)

Near the Pandora gate, an overgrown track runs along the eastern ridge above the Tapotupotu Stream. The clay soils are eroded for much of the track, with cover often only 20-50%. Manuka is dominant, with Hakea sericea and H. gibbosa subdominant. Other common plants are Lycopodium cernuum and Dracophyllum sp. T. aff. longifolia and T. pauciflora are common and most other species that occur on Darkies Track are present. Two orchids not sighted on Darkies were T. aff. pulchella (spike Sept.) and Caladenia minor (lvs. Sept.). Both were not common. T. aff. pulchella, a common and widespread orchid in other areas of the far north prefers damper conditions than those prevailing in the Park and was found to be relatively uncommon there.

Track to Pandora and Te Paki Trig

All the common orchids of the western end of the highlands were recorded. Another sighting here of Pterostylis alobula (fls. July) in two small colonies under manuka on the trackside between the Radar Bush access and Pandora gate. Thelymitra aemula (fls. Nov.) is uncommon on the trackside from below the Radar Bush access up to the Trig. The dominant species along most of the track is again manuka; sub-dominant in places are tutu (Coriaria sarmentosa), Coprosma robusta and the tangle fern (Gleichenia dicarpa).

Late in 1989, Anthony Wright and Ewen Cameron reported Chiloglottis cornuta, Corybas cheesemanii and Gastrodia sesamoides from under tall Kunzea ericoides below Kohuronaki.

Radar Bush access track and nearby ridges

Until reaching the bush margin, for the most part the track is bare clay to 20% cover, with manuka (dominant) and Dracophyllum sp. (sub-dominant). Thelymitra carnea is common; T. pauciflora, T. aff. pulchella, T. aemula and Prasophyllum pumilum are occasional to not uncommon. Acianthus sinclairii (seed Sept.) and Caladenia minor (lvs. Sept.) are occasionally encountered. The last of three sightings of T. tholiformis was on this track.

Across the stream, at the end of the Radar Bush access, the track leads up the ridge to the Pandora gate. T. aemula, T. pauciflora, M. parviflora and Caladenia "green column" are uncommon. Pterostylis trullifolia is common in scattered colonies. T. "darkie" was observed occasionally above the groves of sapling monoao and kauri.

Spirits Bay Road and catchment areas

Tracks on both sides of the Spirits Bay Road between the quarry and Te Hapua Rd turnoff were surveyed in July. Thelymitra aemula, T. aff. longifolia and T. pauciflora were common in the vicinity of both tracks. Prasophyllum pumilum (seed) was common on the track above the road. Manuka (0.5-3 m) dominates on the heavy clay soils. Uncommon species in the area include T. carnea, T. "rough-leaf", Acianthus sinclairii and C. alata. Pterostylis alobula and P. trullifolia were both in flower in small, localised colonies.

On the disturbed clay roadside bank at the base of the hill below the Te Hapua turnoff, all the above Thelymitra spp. were present. An additional record was T. aff. pulchella.

Earth Wall track

The wall was built c. 1900 by gumdiggers as a water diversion for gum sluicing. Constructed with earth sods, the wall has a height of 1.2 m and is almost 1 km in length. The outlet is into Waitahora stream, just above the head of the Paranoa swamp.

Leading from the Spirits Bay Road, the access track follows a ridge through gumland for 3.5 km. Typical podzolised fine sandy and silty clay loams overlay the mudstone and sandstone pans. These acidic, poorly drained soils suit terrestrial orchids.

Some interesting orchids are found growing in the shelter and shade of the manuka (dominant) along the tracksides. Dracophyllum sp., Pomaderris kumeraho, Hakea and sedges are locally sub-dominant. The endangered Calochilus herbaceus (fls. Nov.) was rare near a damp section of the track. A few specimens of a small green form were noted some distance further on. T. aff. ixioides (fls. Nov.) is found occasionally along the ridge. Other Thelymitra spp. uncommon in the Park were T. "rough leaf", T. aff. pulchella, T. tholiformis and T. "darkie". Common orchids include M. unifolia, P. pumilum, C. alata, C. minor, T. pauciflora, T. aff. longifolia, T. carnea, T. aemula and Orthoceras novae-zeelandiae. One small colony of Pterostylis alobula (seed Nov.) was sighted.

Vegetation has been removed for 4 m each side of the section of wall to the west of the track. Adjacent to the track Acianthus sinclairii and O. novae-zeelandiae were in small numbers. C. alata is common on the wall, as is P. trullifolia which also spreads along the cleared areas in fairly large colonies. One small colony of C. aff. unguiculatus (seed Sept.) was also found in the clearing. Previously, the northernmost record for this orchid was Kaimaumau.

Along the roadsides between the Earth Wall track and Spirits Bay, Microtis parviflora (fls. Nov.) is abundant and large specimens of T. carnea are not uncommon in and near the roadside drains. One plant had an inflorescence measuring 30 cm with a raceme of 7 flowers. In the damp sand and grassy areas near the cattle stop at Spirits Bay, T. aff. longifolia, T. pauciflora, T. carnea and T. "darkie" (fls. Nov.) were not uncommon.

The gumland catchment area has a rich orchid flora, including a number of rare and endangered species and warrants further investigation.

Mokaikai S.R.

Taumataroa Flat and other gumlands in vicinity

Taumataroa Flat is an upland gumland sand plateau 1 km² + at the head of the Mokaikai catchment. Typical sandy and peaty sand loam soils overlie sandstone and ironstone pans. The predominant cover is fairly dense manuka (0.5-3 m) and sedges. Dracophyllum and Leucopogon fasciculatus are usually the sub-dominant species. Corybas oblongus, a shade-loving orchid, is common in damper areas. On the plateau and adjacent roadsides, P. trullifolia is not uncommon under the taller manuka. Common on the drier, northern edge and nearby tracksides are T. aff. longifolia, T. pauciflora, T. carnea, T. aff. pulchella and Microtis unifolia. Less common are Orthoceras novae-zeelandiae, Prasophyllum pumilum, T. "rough-leaf" and Acianthus sinclairii.

In taller manuka (near the fire reservoir on the "short cut" track that leads to North Cape) a few small colonies of Caladenia alata were noted and C. minor was quite common. On the same track, 100 m from the Money Tree, a solitary specimen of Pylloglossum drummondii (sporangia Sept.) was noted growing in sandy humus.

Thelymitra carnea, T. aff. longifolia, T. pauciflora, M. unifolia and A. sinclairii are all common on the seaward side of the road as it descends the highlands towards the Waikuku Flat. The habitat here is gumland scrub with a cover predominantly of manuka (0.5-2 m).

A ridge of the northern flank of the Ponaki wetland was investigated in March. Spent inflorescences of T. aff. longifolia and other T. spp. were not uncommon. A return to this habitat later in 1988 was not possible.

Few orchids were noted on the gumlands in the Mokaikai catchment. Overlying the highly siliceous mudstone pan are sandy and peaty sand loams. P. pumilum, T. aff. longifolia, T. pauciflora and T. carnea are occasionally encountered.

Ohao S.R.

Ohao plateau

The same species noted in the Mokaikai catchment extend into the upper part of the Ohao plateau. The plateau consists of unconsolidated dunes with sandy and soft clayey sand soils. In March a few small wet depressions were also searched without success.

This area would enthuse any landscape photographer. The wind-eroded, symmetrically honeycombed sandstone outcrops are an amazing sight. Ancient kauri stumps and roots protrude from the sandstone pan which is littered in places with nuggets of gum. Manuka bushes, dwarfed by exposure to wind, struggle to maintain a tenuous hold on the eroding sand hillocks, their disproportionately large root systems often extending over bare ground in many directions for more than six metres. Magnificent views of the glistening Kokota silica sandspit, the clear blue waters of the Parengarenga harbour and Mokaikai beach add to the delight of this south-eastern extremity of the Park.

Waikuku Flat

The Waikuku sand tombolo, about 3 km at its widest and a little more than 2 km at its narrowest point, links the Unuwahao highlands with the North Cape massif. Rising little above sea level on the east coast, this fixed, unconsolidated dune spit rises gradually to 10 m + a.s.l. behind Tom Bowling Bay on the northern coast. The Flat once supported a kauri forest which was drowned by rises in sea levels in earlier times. Fires through the area during Maori habitation and gumdigging activities have assisted in impeding forest regeneration. For the most part the soils are soft, clayey sand interspersed with peaty fresh water swamps and depressions. Manuka is dominant over almost the whole gumland area.

In some parts, the cover is less than 1 m with some bare ground at intervals. Occasional stands of manuka reach 3-4 m in the damper areas.

Baumea juncea and Gleichenia dicarpa are often sub-dominant. The tracks through the area were investigated and T. pauciflora, T. carnea and Microtis unifolia were found to be common. T. aff. pulchella was rare.

North Cape S.R.

Once an island, the North Cape massif rises from the Waikuku sandspit to 230 m + a.s.l. at its highest point (trig). After ascending the steep rise over eroded stiff red clay soils a broad tableland (180 m a.s.l.) is reached. On the northern coast the Surville Cliffs stretch for 3 km, intersected by a number of deeply eroded ravines, but for the most part, falling abruptly to the sea far below. The cliffs and adjacent areas consist of serpentinite rock with highly mineralised laterite soils. The flora here has adapted a number of unique variants in response to the low calcium - high mineralisation. It is conceivable that orchids could have evolved in a similar manner to the dicots, however none of the species noted displayed any obvious differentiation.

At the Kerr Point end of the cliffs one specimen of Pterostylis plumosa (seed Nov.) was sighted on a small bank in association with stunted manuka and Baumea juncea. Thelymitra aff. longifolia is common here and is indeed the most common orchid on the entire promontory.

Along the roadsides to the west of the serpentine quarry Microtis unifolia (fls. Nov.) is common. T. pauciflora (fls. Nov.) and Acianthus sinclairii occur in lesser numbers under the taller manuka.

The vegetation between the road and the cliffs is stunted (less than 1 m) but is quite dense for the most part. T. aff. longifolia, T. pauciflora and T. carnea are common and frequently found growing within 0.5 m of the cliff edge. T. aemula (fls. Nov.) is found on the cliff edge and near the taller rewarewa and Phyllocladus 'serpentine' on the perimeters of the eroded gullies. M. unifolia is common along the cliffs and bluffs. A small colony of A. sinclairii (lvs. Nov.) was found on a northerly slope under stunted manuka. The first of a number of sightings of T. "darkie" was made here - a single, pink flowered plant.

A. sinclairii was noted on the plateau, completely hidden under a sprawling Leucopogon fasciculatus bush and appears to be not uncommon there. One colony (c. 40 plants) of Cyrtostylis oblonga (seed Sept.) was observed on the edge of the plateau. A few specimens of T. aff. longifolia were the only orchids observed along the track leading towards North Cape (Murimotu Island) before the descent from the plateau. T. aff. longifolia and T. pauciflora were abundant in the areas where the dense Baumea juncea of the tops becomes more sparse.

The areas west and south-east of the quarry were investigated and a surprising number of orchids were found - mostly in the damp areas where erosion had disturbed the soil. The largest number of T. "darkie" seen on the survey can be located west of the quarry. T. aemula is not uncommon here also. On the eroded slopes and ridges to the south-east of the quarry, the two previously mentioned species are joined by good numbers of O. novae-zeelandiae and T. carnea.

One of the most interesting finds of the survey was made in the Scientific Reserve - one specimen of Thelymitra matthewsii (seed Nov.). My identification was later confirmed by Dr Brian Molloy and Dr Nigel Clunie, who had been in another part of the Reserve when the observation was made. A thorough search of the area was impossible due to the lateness of the day and necessity to return to our base at Cape Reinga. This species had not been observed for almost seventy years and was considered to be extinct in New Zealand. It is interesting to note that the original location of T. matthewsii is 100 km further south.

Motuopao Island N.R.

This small island near Cape Maria van Diemen was the original site of

the lighthouse which now stands on Cape Reinga. Although just a few hundred metres from the headland, the treacherous waters of the channel make access difficult to the only landing point. Largely covered with grasses, the island supports little shrubland habitat suitable for orchids. Thelymitra aff. longifolia and Microtis unifolia were the only orchids recorded during 1988. (L. Forester pers.comm.)

WETLAND ORCHIDS

Representative areas in the three major wetlands were surveyed in December 1989.

Ponaki wetland - Mokaikai Scenic Reserve

From the North Cape road, the ridge track on the northern flank provides the best access. Flowering of the heathland orchids in this area was finished. Only Thelymitra aff. longifolia, T. pauciflora and Microtis could be identified with any certainty. Fresh water soaks behind the dunes at the lower end of the track were the habitat of Microtis parviflora (fls., seed). This wetland is very wet with a number of lakes stretching from the headwaters almost to the outfall into Mokaikai beach. Margins suitable for orchids are few and usually quite small. A likely-looking habitat in the southern lower end of the swamp was investigated. After what appeared would be a fruitless search, a small colony of Spiranthes 'Motutangi' (3 plants in bud and 1 juvenile) was found, hidden among tall sedges. No other orchids were sighted in the general area.

Paranoa wetland - Te Paki R. R. (Spirits Bay)

Along the narrow margin of an arm behind the dunes a scattered colony of c. 50 plants of Thelymitra "darkie" (seed) were noted. The only other orchids seen in this area were two Thelymitra sp. seedlings. The habitat here had a peaty-sand soil with 70% cover of manuka to 1.5 m.

The Waitahora arm proved heavy going as the slow trudge was made out from the coast to the running water. The search was for Spiranthes, Prasophyllum and Pterostylis. No sightings of orchids were made during a series of arcs through the dense cover of raupo and sedges. On reflection, perhaps a survey of this wetland in the month of January would yield better results.

Te Werahi wetland - Te Paki R. R.

One solitary specimen of Prasophyllum aff. patens was recorded in this swamp in 1984 by E.K. Cameron. The area where this had been found was searched to no avail. A more open section of the swamp margin further to the east produced two flowering plants of Spiranthes 'Motutangi'. In association, on small peat hummocks a colony of c. 20 plants of an odd-looking Thelymitra pauciflora (fls., seed) were noted. Flowers all exhibited a deeply cleft post-anther lobe. Some flowers had no or few cilia on the column arms. These characteristics are also to be found in Thelymitra "sanscilia". Although close, the Te Werahi plants did not match the typical form of T. sanscilia. The conclusion was that this is a self-perpetuating colony of an aberrant form of T. pauciflora. No other orchids were noted in this section of the wetland.

Another part of this extensive wetland, the catchment between Twilight beach and Te Werahi, was investigated. In recent times the main stream

had obviously changed course and what would have been suitable orchid habitat had disappeared under a heavy cover of silt. Manuka and raupo were the predominant cover species. No orchids were sighted in this area.

SUMMARY

The study of other sections of the flora has already indicated the high botanical significance of the North Cape area. With 40% of the New Zealand orchid species represented - many of them endangered, rare and endemic to Northland - the botanical importance is further heightened.

As with other areas of the Northland peninsula, there is a significant representation of 'Australian' orchids. Together with earlier, casual surveys of forests, heathlands and wetlands north of Waipoua, the Te Paki survey assists in producing a more complete picture of the unique and diverse orchid flora of northern Northland. The northernmost limits of the distribution of a number of orchids have been ascertained.

The Park, much modified by grazing, fire and erosion, is still under threat from animals and mammals. Perhaps the greatest threat to the flora is the recent arrival of the opossum. The small remaining forest remnants contain some unique species and plant associations. There are very few coastal remnants of any size and these are comprised mainly of species that the opossum finds palatable.

In recent times wild cattle and horses have been removed and there are attempts being made to reduce the pig population. The land snail (Placostylus spp.) is under threat from pigs and rats. In the forest remnants visited during 1988 there was evidence of snail damage caused by rats.

The only significant remaining population of Placostylus (ssp. michiei) is found on the North Cape promontory. Rat traps placed throughout the Park and bated initially, have been neglected in recent years.

In conclusion, there can be little doubt that the Te Paki Farm Park contains the most important orchid habitat in Northland, if not New Zealand.

Table 1. List of species - Te Paki Farm Park - 14 December 1989

Key: * = New Zealand endemic

! = new record for Park

* <i>Acianthus sinclairii</i>	<i>M. unifolia</i>
* <i>Bulbophyllum pygmaeum</i>	* <i>Orthoceras novae-zeelandiae</i>
! <i>Caladenia alata</i>	* <i>Prasophyllum</i> aff. <i>patens</i>
! <i>C. minor</i>	<i>P. pumilum</i>
*! <i>C. "green column"</i>	* <i>Pterostylis alobula</i>
! <i>Calochilus herbaceus</i>	* <i>P. banksii</i>
(+ green form)	* <i>P. graminea</i> var. <i>rubricaulis</i>
! <i>Chiloglottis cornuta</i>	! <i>P. plumosa</i>
* <i>Corybas acuminatus</i>	* <i>P. trullifolia</i>
*! <i>C. cheesemanii</i>	* <i>Spiranthes "Motutangi"</i>
*! <i>C. cryptanthus</i>	*! <i>Thelymitra aemula</i>
* <i>C. oblongus</i>	<i>T. carnea</i>
* <i>C. trilobus</i>	* <i>T. aff. longifolia</i>
*! <i>C. aff. unguiculatus</i>	! <i>T. matthewsii</i>
*! <i>Cyrtostylis oblonga</i>	<i>T. pauciflora</i>
<i>C. reniformis</i>	<i>T. aff. pulchella</i>
* <i>Dendrobium cunninghamii</i>	*! <i>T. "darkie"</i>

- | | |
|-------------------------------|---------------------------|
| * <i>Drymoanthus adversus</i> | * <i>T. tholiformis</i> |
| * <i>Earina autumnalis</i> | * <i>T. aff. ixioides</i> |
| * <i>E. mucronata</i> | *! <i>T. "rough leaf"</i> |
| <i>Gastrodia sesmoides</i> | |
| <i>Microtis parviflora</i> | |

Table 2. Rare, endangered and Northland endemic species

A significantly high number of rare, endangered and Northland endemic species are to be found in the Park. Among the more noteworthy are *Calochilus herbaceus* and *Thelymitra matthewsii*.

Both went unobserved for decades and were presumed extinct in New Zealand. *C. herbaceus* was re-discovered in Northland at Kaimaumau in 1986 and noted on Tauroa Peninsula in 1987. During the survey, *C. herbaceus* s.s. was observed near Cape Reinga. A second observation was made in the Spirits Bay catchment, where a "green form" was also noted.

All suitable habitat in the area was destroyed after R.H. Matthews discovered *Thelymitra matthewsii* near Ahipara in 1910. A chance observation of this elusive little orchid was made in the Park in November 1988. Its recent re-discovery in the Far North is not surprising. The early botanists and naturalists Colenso (1839), Dieffenbach (1840-41), Buchanan (1865-66), Kirk (1867) and Cheeseman (1896), were somewhat limited to coastal tracks and other regularly used routes. Like many of the more recent botanical forays, their visits would generally have been timed to take advantage of the more favourable summer weather. As the majority of Northland's terrestrial orchids flower in spring and are deciduous through summer, only the later-flowering species would have been evident during their visits. This would account for the paucity of early records. *T. matthewsii* flowers in September/October - a time when few botanists have ventured into the farthest North.

Corybas cryptanthus

This species has been occasionally recorded from Warkworth to Stewart Island. The Shenstone Block is home to an extensive colony of this imperfectly known saprophyte. Together with *Thelymitra matthewsii* and *Calochilus herbaceus* this ranks as one of the more significant finds of the survey and demonstrates how little is known about orchid distribution in New Zealand. Voucher specimens in AK (188386) and CHR.

Corybas aff. *unguiculatus*

Was also known only as far north as Kaimaumau. During the September survey, one small colony of fruiting plants was sighted in the Spirits Bay catchment. This winter-flowering species tends to grow in comparatively small, localised colonies.

Prasophyllum aff. *patens*

One specimen noted in the Te Werahi wetland by E.K. Cameron (1985). This species has not been sighted (previously or subsequently) in the far north and constitutes an important record.

Pterostylis plumosa

Previously not seen north of Kaimaumau, it was observed (in seed) near Kerr Point in November. A second observation in 1988 was made near Pandora by Pauline Mayhill (pers.comm.)

Spiranthes "Motutangi"

The Northland form appears to be different from other Australasian

forms. It was observed in Paranoa (Spirits Bay) and Ponaki (Mokaikai) wetlands by McLean, Enwright, Mitchell and Braggins (1985), observed on this survey in Ponaki and Te Werahi wetlands.

Thelymitra aff. longifolia

In Northland, T. longifolia s.s. has not been found north of a line between Matauri Bay on the east coast and Tauroa Peninsula in the west. This Northland endemic, insect pollinated form, coloured white, light to deep pink and blue, is common to abundant throughout the Park.

Thelymitra "darkie"

Another Northland endemic, discovered in the Kaitaia district, 1987. This orchid occurs in small numbers sporadically throughout the Park. The largest populations are to be found on the North Cape plateau and in the Paranoa wetland.

Thelymitra "rough leaf"

Discovered at Motutangi, 1986, this species is widespread but uncommon in many areas of the Far North. In the Park this Northland endemic is uncommon and local.

Table 3. Other orchids of interest

Caladenia

No representatives of this genus had been reported previously in the Park. During the survey one Australasian species, in N.Z. confined to Northland (C. alata) and two, more widespread species, C. minor and C. "green column" were observed.

Gastrodia sesamoides

Sighted in the Park, Te Werahi wetlands (Braggins 1985); near North Cape (Beever 1987); Te Pahi highlands (Cameron & Wright 1989); Shenstone Block (McCrae 1989).

Pterostylis graminea var. rubricaulis

Wheeler (1963) recorded this species in the North Cape area. It is present in Radar Bush where it is not uncommon. It is surprising that there are no other recent records from the Park. Gardner and Bartlett (1980) and Mitchell (1984) recorded P. banksii from Radar Bush and Kohuronaki but do not record P. graminea var. rubricaulis. P. banksii was not sighted during the survey.

Thelymitra tholiformis

Formerly known as Thelymitra intermedia (sensu L.B. Moore), T. tholiformis was found in small numbers in only three localities in the Park - two in the Te Pahi highlands and one in the Spirits Bay catchment. It has also been found in the Auckland and Mangonui districts and is considered rare in all known locations. This is not T. intermedia Bergg. which upon examination of Berggren's Type and notes was found to be T. pauciflora (Dr B. Molloy, pers.comm.).

Thelymitra aff. ixioides

This species is of sporadic occurrence in Northland and is nowhere common. Noted in the Spirits Bay catchment. Previously recorded by Clunie (1985a) from the Mokaikai S.R.

ACKNOWLEDGEMENTS

The writer is indebted to John Beachman, Lisa Forester, Don McKenzie, Bill McLeod and Dick & Pam Gillett of the Department of Conservation (Northland Region) for their most helpful assistance in many ways; Lisa Forester for drawing the maps; Dr Nigel Clunie and Dr Brian Molloy for their assistance with research and grant applications; Anthony Wright, John Braggins and Ewen Cameron for information and access to herbaria; and the private landowners for allowing access to all parts of the Park; to my wife for typing the report and to Jack Mackinder for review and helpful comment on the text.

REFERENCES

- Beever, R.E. & Jane, G.T. 1967. Additional plant records from North Cape. Tane 13: 147-148.
- Beever, R.E. 1987. Farthest north - botanical notes on the North Cape area. Auckland Botanical Society Newsletter 42(2): 49-52.
- Cheeseman, T.F. 1896. On the flora of the North Cape district. Transactions of the New Zealand Institute 29: 333-385.
- Cheeseman, T.F. 1925. Manual of the New Zealand flora. Second edition.
- Clunie, N.M.U. 1987. Reference of vascular plants recorded for Te Pahi ecological region. DSIR, unpl.
- Department of Lands and Survey. 1984. North Cape, NZMS 260 sheet M02, N02, 1:50 000. New Zealand topographical map.
- Druce, A.P. Bartlett, J.K. and Gardner, R.O. 1979. Indigenous vascular plants of the serpentine area of Surville Cliffs and adjacent cliff tops north-west of North Cape, New Zealand. Tane 25: 187-205.
- Given, D.R. 1981. Rare and endangered plants of New Zealand.
- Gravatt, D.J. 1966. Establishment of permanent quadrats in plateau scrub at North Cape. Tane 12: 87-91.
- Johns, J. and Molloy, B.P.J. 1983. Native orchids of New Zealand.
- Jones, D.L. 1988. Native orchids of Australia.
- Moore, L.B. and Edgar, E. 1976. Flora of New Zealand, Vol. II.
- Petty, D.R. 1982. "North Cape - Houhora" NZMS 290 sheet N02/03 part sheet M02, 1:100 000. New Zealand Land Inventory, Rock Types. Department of Lands and Survey.
- Rae, W.J. 1970. North Cape quadrats. Tane 16: 53-60.
- Sutherland, C.F., Cox, J.E., Taylor, N.H. and Wright, A.C.S. 1970. soil map of North Cape - Houhora area (sheets M02, N02/03), North Island, New Zealand. Scale 1:100 000. N.Z. Soil Bureau Map 180.
- Wheeler, J.M. 1963. The vegetation of the North Cape area. Tane 9: 63-66.

Received 17 March 1989, amended 6 May 1990.