



Te hononga o
te āhuarangi
hurihuri ki a koe

KŌWAE AKO 2 NGĀ TŪĀPAPA O TE ĀHUARANGI HURIHURI

E whaihua ai te whakarite mō anamata, he whaitake ki te mārama ki ngā āhuatanga o te āhuarangi hurihuri. I tēnei kōwae ako ka whakatakotoria he whakarāpopoto whānui mō te āhua o te panoni haere o te āhuarangi i Aotearoa. Ko ngā pānga ā-rohe te aronga, ā, ka riro ēnei hei āwhina i a koe ki te ako i te korahi me te hiranga o ēnei panonitanga.

He aha te āhuarangi hurihuri?

E hāngai ana te āhuarangi hurihuri ki ngā nekehanga wāroa o ngā pāmahana me ngā huringa huarere. Ko ngā ngohe tāngata, pēnei i te tahu koranehe (arā, te waro, te hinu, te haurehu) me te whakarake ngahere, ngā take mātuatua e kōkiri ana i ēnei panonitanga. Ko tā ēnei mahi he whakapiki ake i te nui o ngā haurehu kati mahana ki te kōhauhau, pēnei i te hauhā me te mewaro, ko tā ēnei he pupuri wera nō te rā. Ka waihanga tēnei i te 'kati mahana' e whakamahana ana i a Papatūānuku.

I te mahana haerenga o te ao, e titiro ana tātou te tangata ki ngā panoni tūāpapa ki ngā pūnaha a Papatūānuku. Ina koa, kua tere ake te pāpātanga o te rewa o ngā awa kōpaka me ngā toka papa. He wāhi tō aua āhuatanga i te pikinga ake o te pae moana. Ko te otinga ake o te mahana haere o te kōhauhau ko ngā tūāhuatanga auau ake, taikaha ake hoki, pēnei i ngā waipuke me ngā tauraki.

Ka pāngia anō hoki ngā huringa ā-kaupēka e ēnei panonitanga. Ka rerekē te wā mō ngā tūāhuatanga māori pēnei i te puāwaitanga me te heke. Mō te roanga atu o ngā pārongo mō te panoni haere o te āhuarangi, tirohia ngā raraunga mōrearea āhuarangi (kei raro nei).



Ngā tūāpapa o te āhuarangi hurihuri



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Ngā mōrearea āhuarangi

He wāhanga kaikini o te whakamahere urutaunga te mārama ki te āhua o te panoni haere tonutanga o te āhuarangi tae noa mai ki tēnei wā, ā, haere ake nei. E kaha wātea ana ngā matapae ā-ao, ā-rohe hoki. Ka matapaengia ngā panonitanga i tō tātou āhuarangi.

Ko ngā mōrearea āhuarangi te ngako o ngā matapae, ā, ka whakaahuatia te panonitanga mā tōna rahi, tōna kaha, me tōna auau hoki o tētahi tūāhuatanga pā whakarere (pēnei i te āwhā, i te waipuke rānei), i tētahi tūāhuatanga pā pōturi (pēnei i te piki haere o te pae moana, o ngā pāmahana rānei).

I roto noa i te aromatawai i ngā tūraru whai hāngai ki te āhuarangi me ngā arawātea mō tō pakihī, me whakaaro koe ki ngā mōrearea āhuarangi pā whakarere, pā pōturi hoki tae atu ki ngā pakapaka, me ngā ahiniwha, me ngā waipuke, me ngā parawhenua ā-tai, me ngā āwhā, me ngā horowhenua (pā whakarere) me te piki (pā pōturi) o te pae moana.

Kua mahi tahi te Manatū Mō Te Taiao ki te taha o Taihoro Nukurangi (NIWA) hei whakarato i ngā matapae paetata huri noa i te motu. Mō ngā pārongo o te wā, me torotoro atu ki Te Manatū Mō Te Taiao.

Ko te āhuarangi hurihuri i Tāmaki Makaurau

I roto i te rautau i pahemo ake, he nui whakaharahara ngā panonitanga o te āhuarangi i pā ki Tāmaki Makaurau. Ki te mau tonu te nui o te tuku o te haurehu kati mahana, ka nui noa ake te kaha o ngā panonitanga.

Kua aro atu ngā whiriwhiringa o te wā i Tāmaki Makaurau ki ngā pānga o ngā tūāhuatanga huarere taikaha, pēnei i ngā waipuke o te Mutunga Wiki Huritau o Tāmaki Makaurau i te marama o Kohitātea i te tau 2023 me Huripari Gabrielle i te marama o Huitanguru i te tau 2023. Ko te kī a Taihoro Nukurangi, ko reira te wā mākū rawa atu nō te wā i tīmata ai ngā rekoata. I rekoatatia e 539 mm te tapeke o te uanga i Rangipuke i te raupapa ua i te Pokapū o Tāmaki Makaurau, ā, i wāhia e tērā te rekoata o mua o te 420 mm i rekoatatia i te marama o Huitanguru i te tau 1869.1

Ki te titiro whakamua, tērā te tūpono ka pāngia a Tāmaki Makaurau e te:



- **Pikinga ake o te nui o ngā rā wera:** I tēnei wā, tōna 20 rā i ia tau ka rongo tātou i ngā pāmahana e nui ake ana i te 25°C. Hei te mutunga o te rautau, ka piki ake pea tēnei ki te 70 rā mēnā ka noho te tukunga ki ngā taumata o te wā nei, ā, i roto i te 100 rā i raro i tētahi pūāhua tukunga tairanga.



- **Pikinga ake o te uanga taikaha:** Ka kaha ake tā te kōhauhau mahana pupuri ki te haumākū. Ko te otinga ake pea ko ngā tūāhuatanga uanga tātā ake, poto iho hoki. E matapaetia ana ka piki ake ēnei āwhā onge, ngoto hoki, mā te 14 ōrau mō ia tākiri, mō ia tākiri o te mahana haere.

Mā te mārama ki ēnei matapae koe e āwhinatia ai kia whakaneinei atu ki ngā uauatanga me ngā arawātea kei tua i te awe māpara mō tō pakihī, me te aha, ka āhei koe kia tōtika tō whakamahere. Heoti, kāore i te kaikini te mārama ki ngā taipitopito o ēnei matapae ina tahuri atu koe ki te tīmata i tō whakamahere urutaunga. Mehemea kei waho atu koe i Tāmaki Makaurau, ko tētahi wāhi tino pai ki te tīmata ko ngā matapae āhuarangi a Te Manatū Mō Te Taiao. [Ministry for the Environment's climate projections](https://niwa.co.nz/news/auckland-suffers-wettest-month-history)

¹ NIWA (2023). Auckland suffers wettest month in history: <https://niwa.co.nz/news/auckland-suffers-wettest-month-history>

Ngā tūāpapa o te āhuarangi hurihuri



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Ngā matapae āhuarangi mō Tāmaki Makaurau (i raro i ngā pūāhua tukunga tairanga)

Mōrearea āhuarangi	Wā pae tīmata ²	2040 ³	2090
 Ngā pakapaka (rā wera)	19.7 ngā rā wera. ⁴	47 ngā rā wera (>25°C)	100 ngā rā wera (>25°C)
 Ngā Ahi niwha⁵	Kāore e hāngai	- te pikinga o te Whakatauranga Pākaha ā-Kaupeka (SSR)⁶ - Tino tairanga, taikaha hoki - Ka piki ake mā te 40%-50% te mōrearea ahi nehenehe	- Ka piki ake te SSR mā te 10-30% - Tino tairanga, taikaha hoki - Ka piki ake te mōrearea ahi nehenehe mā te 50-100% i te rohe o Tāmaki Makaurau i te raki o te kūititanga o te whenua. Ka piki ake mā te 40-50% ki te tonga o te kūititanga o te whenua
 Te waipuke me te uanga taikah	100 tau te ARI (Wā Hohokitanga ā-Tau), hōhonu āwhā 24 haora, 176mm	100 tau te ARI, hōhonu āwhā 24 haora, 189mm	100 tau te ARI, hōhonu āwhā 24 haora, 215mm
 Piki pae moana (te kino haere ake o te whakaparahenua ā-tai)	Kāore e hāngai	Ka piki ake mā te 0.3 mita	Ka piki ake mā te 1.2 mita
 Ngā āwhā	E 9 ngā huripari i ia 10 tau	Ka piki ake te pakari, ka heke iho hoki te auau o ngā huripari pārūrū o mua	Ka piki ake te pakari, ka heke iho hoki te auau o ngā huripari pārūrū o mua
 Tauraki	- E 225mm- 375 mm mō ia tau te mauranga tōmiti pitomata (PED) 237⁷ ngā rā maroke i ia tau	60-100 mm te pikinga o te PED - E 3-9 rā maroke anō mō ia tau - Ka piki ake mā te 1% te pipīwai ā-pānga i ia tau	100-140 mm te pikinga o te PED 12-21 rā maroke mō ia tau - Ka heke iho te pipīwai ā-pānga i ia tau i te 2% makere iho mō te nuinga o te rohe
 Ngā Horowhenua	Kāore e hāngai	Mā te piki ake o te pakari o ngā tūāhutatanga uanga tāta ka piki ake te auau me te pākaha o ngā horowhenua	Mā te piki ake o te pakari o ngā tūāhutatanga uanga tāta ka piki ake te auau me te pākaha o ngā horowhenua

Hei whakamārama: I tīkina atu ngā raraunga matapae i te Auckland Economic Climate Change Risk Assessment⁸ me Te Tai Pari o Aotearoa⁹

² He toharite te wā pae tīmata, e whakawhirinaki atu ana ki te taurangi āhuarangi, e takea ana i ngā raraunga o mua. I te nuinga o te wā nō te tau 1995

³ He toharite ngā matapae o te 20 tau mai i 2031-2050

⁴ Ko ngā rā e neke ake ana te pāmahana i te 25°C

⁵ E whaipānga ana ngā matapae mō te ahiniwha ki te pae tīmata i 1980-1999, ā, e aro ana ngā wā 20 tau ki 2050 me 2080

⁶ He toharite te Whakatauranga Pākaha ā-Kaupeka (SSR) o te Whakatauranga Pākaha ā-Rā (DSR). Ka rekoata tēnei i ngā pānga o te maroke ā-hau, ā-korahinu ki te ngoto pitomata mō te kā mai o te ahi. Nō reira, e whakaawe ana ēnei i te uaua me te nui o te mahi e matea ana ki te tīnei ahi

⁷ Ngā rā ka iti iho i te 1mm te uanga

⁸ E takea ana te Arotakenga Tūraru mō te Āhuarangi Hurihuri mō Tāmaki Makaurau i te Aromatawai Tūraru Āhuarangi Hurihuri tōmua i mahia i 2020. He āpiti mātauranga tā te Aromatawai Tūraru Āhuarangi Hurihuri ki ngā tūraru āhuarangi hurihuri i oti kē te tautohu i te Kaunihera o Tāmaki Makaurau. Ka whakaarohia ngā tūraru me ngā arawātea ka hua ake i ngā mōrearea āhuarangi hurihuri ōkiko me ērā e hua ake ana i te whakawhitinga ki tētahi ohaoha waro iti. Kua whakaurutia ngā tūraru ōkiko huri noa i ngā rāngai ohaoha kai me te inu, me te hangahanga, tae atu ki te rāngai kiriata me te naumai

⁹ Te Tai Pari o Aotearoa (n.d.). Ngā mahere matapae piki pae moana: searise.nz/maps-2

Ngā tūāpapa o te āhuarangi hurihuri



Te hononga o
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He aha e whakahirahira nei te āhuarangi hurihuri ki a koe

He whaitake ki te whakamahere tōtika me te urutaunga te mārama ki te hiranga o te āhuarangi hurihuri ki a koe, ki tō whānau me tō pakihi.

Ka pāngia ngā wāhanga huhua o ō tātou tauoranga i te pae kiritahi me te hāpori, tae atu ki te taiao e noho ana tātou, me ngā pakihi e whakahaerengia ana e tātou.

Ko te kōwhiri i ngā tūraru whai hāngai ki te āhuarangi hei whakatika māu ka whakawhirinaki ki ngā āhuatanga e uaratia ana, e whakamātāmuatia ana hoki e tō pakihi. Hei wāhi tīmata pea mōu ki te mārama ki ngā āhuatanga e akiaki ana i a koe ki te urutau ki te āhuarangi hurihuri ko te arotake i tō rautaki pakihi, i tō tauākī uara rānei. Waihoki, mā reira pea e kitea ai mehemea ō tikanga mahi o te wā nei e tautoko kē ana i tō manawaroa.



Te Hauora me te Oranga

Ka pā atu te āhuarangi hurihuri ki ngā tāngata takitahi me ō rātou whānau mā te pā atu ki ō rātou kātū noho, panuku, noho haumarū, hauora me te oranga, me te wheako ki te taiao māori. Ka taea e ngā tūāhuatanga huarere taikaha te pākarukaru ngā kāinga. Ko ētahi tauira o ēnei momo tūāhuatanga ko ngā waipuke me ngā huripari. I ētahi wā, ko te tukunga iho ko te kāingakoretanga o ngā whānau, me te whakamōreatanga o tō rātou haumarū.

Ka pā anō hoki te āhuarangi whakarerekē ki te hauora o te tangata takitahi me te whānau. Nō te āhuarangi hurihuri, e tukipū haere ake ana ngā take hauora e pā ana ki ngā mate whai hāngai ki te wera, me ngā māuiui e kawea ana e ngā pere. Ka pā porowhāhengia hoki te hauora o ngā tāngata takitahi me ngā whānau e te tauraki, e ngā tūāhuatanga uanga tātā hoki. E rua, e rua ka pā i te wātea me te kōunga o ngā wai.

I tua atu i te hauora ā-tinana, ka auroa tonu pea ngā pānga o te whai wheako ki ngā aituā whai hāngai ki te āhuarangi ki te hauora hinengaro, me te manawaroa o ngā whānau. Waihoki, ka pēnei anō hoki mō te peinga o ngā tāngata i ngā taiao taunga. Hei āpitī, ka pāngia anō hoki ngā mahi a te rēhia me ngā tikanga ā-ahurea e whaitake ana ki ngā tuakiri o ngā tāngata i te ngaronga o te kanorau koiora me ngā nōhanga māori.¹⁰

¹⁰ Te Manatu mō te Taiao (2021). Arotakenga Tūraru mō te Huringa Āhuarangi o Aotearoa environment.govt.nz/publications/national-climate-change-risk-assessment-for-new-zealand-main-report

Ngā tūāpapa o te āhuarangi hurihuri



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Ngā hīraunga o te āhuarangi hurihuri

Mō ngā pakihi, ka whakatakoto te āhuarangi hurihuri i ngā whakatatara me ngā arawātea huri noa i te huhua noa o ngā rāngai. Tērā te tūpono ka tauwhatia ngā ara tukutuku e ngā tauwhatinga i ngā huringa huarere, ka piki ake ngā utu whakahaere, ka pāngia anō hoki te popono ā-kiritaki. Ka pā tokitokitia ngā SME e te pikinga ake o ngā putanga mai o ngā huarere taikaha.

Mai i te pākarukaru ki ngā tūāhanga mātuatua tae atu ki te pikinga o ngā utuhoko inihua te whānuitanga o ēnei pānga.¹¹

E tino whakaraerae ana ngā pakihi e whakawhirinaki ana ki ngā rauemi māori, pēnei i te ahuwhehenua, te mahi ngahere me te rāngai tāpoi, ki ngā tūraru whai hāngai ki te āhuarangi. Hei tauira, ka taea ngā panonitanga ki ngā huringa huarere te tauwhati i ngā mahi whakaputa ahuwhehenua. Ko tōna otinga ake ko te pāhekeheke o te kai me te pāhekeheke ohaoaha mō ngā SME e mahi ana i te rāngai ahumatua.¹²

Engari, ka taea e te āhuarangi whakarerekē te waihanga i ngā arawātea mākete hōu me te whakarei ake i te wairua whakataetae. Ka heke iho ngā tūraru āhuarangi i te whakawhanake i ngā tikanga pakihi toitū, pēnei i te whakapakari i ngā huarawa me te waihanga i te putuputunga ngao ringaora me te whakamahi i ngā hangarau pare raru āhuarangi. Ko tētahi atu huanga o ēnei ka whakamaneatia ngā kiritaki tūoho ki te taiao.

Te mahi tahi me te manawaroa ā-hapori

E matea ana te mahi tahi me te tū ā-kiritōpū i ngā taumata hapori, ā-motu, ā-ao hoki mō te whakatika i ngā uauatanga o te āhuarangi hurihuri.

Ka taea e ngā kaupapa ā-hapori, pēnei i ngā hōtaka whakarite mō te aituā me ngā whakamataaratanga mātauranga āhuarangi te whakamana i ngā tāngata takitahi me ngā whānau me ngā pakihi ki te whakapakari ake i tō rātou manawaroa, me te urutau ki ngā āhuatanga e panoni haere ana.

Hei āpiti, he whitake kia mahi tahi te ahumahi ina whakaaro ki ngā mahinga urutaunga ki te whakatika i ngā tūraru nui whakaharahara pērā i ngā tūraru ki ngā ara tukutuku.

I te taumata hapori, ka taea e ngā pakihi te whai wāhi atu ki tētahi tūnga whānui ake hei ārahi i te mahinga āhuarangi mā te pāhekoheko ki te hunga whaipānga me te kōkiri i ngā panonitanga ki ngā kaupapahere e tautoko ana i te manawaroa āhuarangi. Ka taea hoki e ngā pakihi te tū i tētahi tūnga whitake ki te ārahi i ngā mahinga āhuarangi mā te whakauru i te toitūtanga ki ā rātou whakahaerenga, te pāhekoheko ki te hunga whaipānga, me te kōkiri i ngā panonitanga ki ngā kaupapahere e tautoko ana i te manawaroa āhuarangi.

Mā te mahi tahi, ka taea e ngā tāngata takitahi me ngā whānau me ngā pakihi ki te waihanga i tētahi anamata toitū ake, manawaroa ake mō rātou ake anō me ngā uri whakaheke.



^{11,12} Tataki Auckland Unlimited (2021). Tāmaki Makaurau Economic Climate Change Risk Assessment: [knowledgeauckland.org.nz/publications/tamaki-makaurau-economic-climate-change-risk-assessment](https://www.knowledgeauckland.org.nz/publications/tamaki-makaurau-economic-climate-change-risk-assessment)

Ngā tūāpapa o te āhuarangi hurihuri



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Tēnā, āta huritaongia

Mā te whai whakaaro ki ēnei take ka nui tō mārama ki ngā kōrero i tēnei kōwae ako.

- Kua pā pēheatia koe e ngā tūāhuatanga whai hāngai ki te āhuarangi?
- Kua pā pēheatia tō pakihi me tō whānau?
- Ka taea e koe te mahara ki ētahi tauira i mahi tahi ai tō hapori ki te tūwhiti i tētahi uauatanga? Tērā pea he tūāhuatanga aituā, he tūāhuatanga rānei e whai hāngai ana ki te KOWHEORI-19. I pēhea tā koutou mahi tahi ki te tūwhiti i tēnei uauatanga? Ka pēhea ēnei akoranga e āwhina ki te whakapakari ake i te manawaroa o te hapori ki ngā tūāhuatanga āhuarangi?

Ka riro pea hei āwhina ki te āta matapaki i ēnei take katoa ki tō kāhui whakahaere, ki ō hoa ohu rānei. Nō te mea, e tinga ana kua rerekē te pā ake o ngā tūāhuatanga o mua ki a koutou, he rerekē nō ō koutou tūnga i tō pakihi. (Whakamahia ō whakautu ki konei hei āwhina ki te whakaoti i te taputapu tautohu i ngā tūraru me ngā arawātea whai hāngai ki te āhuarangi i a Kōwae Ako 5.)

Mō te roanga atu o ngā pārongo

Kei te hiahia ahau he pārongo anō e pā ana ki...	Rauemi	Whārangi
Te āhua o te panonitanga o te āhuarangi huri noa i Aotearoa	Arotakenga Tūraru mō te āhuarangi hurihuri o Aotearoa¹³	37
	Ngā mōrearea āhuarangi hurihuri ā-rohe kua whakapaetia¹⁴	Kāore e hāngai
Te āhua o te panonitanga o te āhuarangi huri noa i Tāmaki Makaurau	Tāmaki Makaurau Economic Climate Change Risk Assessment	8
	Ngā matapae mō te āhuarangi hurihuri o te rohe o Tāmaki Makaurau me ngā pānga¹⁵	Ngā whārangi katoa
Te āhua o te pā mai o te āhuarangi hurihuri ki a ngāi Māori	He huringa ā huarangi he huringa ao: a changing climate, a changing world	Ngā whārangi katoa
Ngā tūraru āhuarangi hurihuri tāpua tino 10 o Aotearoa	Arotakenga Tūraru mō te Huringa Āhuarangi o Aotearoa	9
Ngā tūraru ohaoha i te āhuarangi hurihuri o Tāmaki Makaurau	Tāmaki Makaurau Economic Climate Change Risk Assessment	Tipoka whānui mā te kāhui whakahaere

¹³ Ka whakaaturia e tēnei pūrongo ngā kitenga o te Arotakenga Tūraru mō te Huringa Āhuarangi o Aotearoa tuatahi (NCCRA). Ko tā te aromatawai tūraru he whakaatu i tētahi whakaahua ā-motu mō te āhua o te pā torohū o ngā mōrea whai hāngai ki te āhuarangi ki Aotearoa.

¹⁴ Auckland Council and Council-controlled organisations commissioned NIWA to analyse projected climate changes for the Auckland region and potential impacts of climate change on some of Auckland's environments and sectors. This report addresses expected changes for 21 different climate variables out to 2120 and draws heavily on climate model simulations from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report. Potential climate change impacts on important environments and sectors in the Auckland region are discussed

¹⁵ I tono te Kaunihera o Tāmaki Makaurau me ngā Kaiwhakahaere kaupapa kei raro i te maru o te Kaunihera i a NIWA ki te tātari i ngā panonitanga o te āhuarangi e matapaetia ana mō te rohe o Tāmaki Makaurau me ngā pānga pitomata o te āhuarangi hurihuri ki ngā taiao o Tāmaki Makaurau me ngā rāngai. I hāngai ngā kōrero o tēnei pūrongo ki ngā panonitanga e matapaetia ana mō ngā taurangi āhuarangi e 21 tae noa atu ki te tau 2120. Ka rahi tāna whakamahi i ngā whaihanga whakatauirā āhuarangi nō te Pūrongo Aromatawai Tuarima a Te Paewhiri Tāwhana Kāwanatanga mō te Āhuarangi Hurihuri (IPCC). Ka matapakihia ngā pānga āhuarangi hurihuri ka pā pea ki ngā taiao whai tikanga me ngā rāngai i te rohe o Tāmaki Makaurau

Ngā Tohutoro

Wāhanga	Kōwae Ako	Ngā Tohutoro
Kupu Whakataki		Te Tari Tiaki Pūngao (2021). Climate Change and New Zealand Business: Nov 2021: eeca.govt.nz/insights/eeca-insights/climate-change-and-new-zealand-business Sustainable Business Council (2024). SBC Guide: Measure, reduce and report on your business's carbon footprint: sbc.org.nz/wpcontent/uploads/2024/06/SBC-Guide-Measure-reduce-and-report-on-your-business-carbon-footprint.pdf Te Manatū Mō Te Taiao (2021). He kupu ārahi mō te aromatawai tūraru huringa āhuarangi ā-rohe Assessments: environment.govt.nz/publications/a-guide-to-local-climate-change-risk-assessments Te Manatū Mō Te Taiao (2022). National adaptation plan: environment.govt.nz/publications/aotearoa-new-zealands-first-national-adaptation-plan Te Manatū Mō Te Taiao (2022). Ngā mahi āhuarangi mō ngāi Māori: Te mahere urutaunga ā-motu: environment.govt.nz/publications/climate-action-for-maori-the-national-adaptation-plan
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