

Waikanae Ecological Monitoring: Aquatic Weed Survey 2025



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Prepared for:
Department of Conservation

29 July 2025

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Project/File:
310003386

Revision Schedule

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date
0	Draft	Steph Davis	01.07.25	Rom Ruiterkamp	07.07.25	David Cameron	29.07.25
1	Final	Steph Davis	29.07.25				

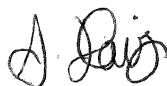
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1 Introduction

The Department of Conservation (DOC) has undertaken ecological monitoring in the Waikanae River catchment as part of its Nga Awa program since 2021. The Nga Awa program seeks to ‘work together with our communities towards healthy thriving rivers from source to sea’. The program partners with community members, Ātiawa ki Whakarongotai Iwi and local Government Agencies, including Kapiti Coast District Council (KCDC), and Greater Wellington Regional Council (GWRC) to form the Waikanae Ki Uta Ki Tai (WKUKT) project. As part of this project DOC engaged Stantec to complete aquatic weed surveys in the Kotuku whenua – the wetland area associated with the Mazengarb Stream, in the lower Waikanae Catchment. In addition to aquatic weed surveys, Stantec were also engaged to undertake inanga (*Galaxias maculatus*) spawning surveys in the lower catchment. This report summarises the work undertaken by Stantec in regard to aquatic weeds during the 2025 monitoring season. The inanga spawning survey has been described in a separate report (Stantec, 2025).

1.1 Background on Monitoring to Date

DOC began physical monitoring during the 2020/21 summer season. This monitoring established baseline information gathering with a long-term purpose of informing an integrated monitoring approach to be developed collaboratively with WKUKT. This first survey included a comprehensive suite of methods that enabled reporting on components of ecological integrity in the Waikanae Catchment. This work was conducted by Aquanet, who subsequently produced a report detailing the results (Heath, 2022)

Following the survey by Aquanet, DOC commissioned a comprehensive review of aquatic biodiversity for the Waikanae Catchment. EOS Ecology were engaged to complete this review and produced a report (Dewson, 2022). The goal of this report was to identify and summarise the biodiversity values and describe the main pressures impacting biodiversity within the catchment. The report collated existing scientific information and monitoring data but did not include customary knowledge of the aquatic biodiversity of the Waikanae River. Information gaps in fish and macroinvertebrate distribution were identified in this report, particularly in the catchment headwaters.

The gaps EOS Ecology identified were followed by recommendation to expand fish and macroinvertebrate surveys to previously understudied areas. These recommendations led to DOC developing a monitoring plan for the 2022/23 summer season that targeted the upper reaches of the Waikanae Catchment within indigenous forest. Nine sites were surveyed using a comprehensive suite of methods that aligned with DOCs national freshwater monitoring protocols. This monitoring was also used to engage and provide upskilling opportunities for Waikanae Job for Nature partners. Following monitoring, DOC engaged the Cawthron Institute to complete an analysis and produce a report on the data collected (Eveleens & Kelly, 2023). This report suggested future monitoring could examine the upstream extent of migratory fish distributions to determine the extent of available migratory species habitat within the Waikanae Catchment.

A monitoring plan for the 2023/24 summer season was developed based on information gathered from prior monitoring, and recommendations from Cawthron. The goal was to fill remaining information gaps to create a solid base to inform development of the integrated catchment plan. Two monitoring efforts were planned, one for the upper catchment, and one for the lower catchment. This monitoring was carried out between December 2023 and May 2024. This work is detailed in the Stantec (2024) report.

The monitoring plan for 2024/25 was developed following revision of all data to date. Following the establishment of a comprehensive baseline set of data, more targeted monitoring was proposed. This



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included surveying aquatic weeds in the wetland area surrounding the Mazengarb Stream (Kotuku whenua). Weeds have been recorded in the area previously, but not formally surveyed. The presence of weeds could hamper future restoration efforts through incursions and expansions, therefore it is important to understand the threat they currently pose.

1.2 Monitoring Scope 2025

Restoration work in the lower Waikanae catchment is currently underway, especially around the DOC managed Kotuku whenua. Aquatic weed surveys were proposed to formally understand the threat posed by weeds in the area. This survey is intended to aid in developing a management plan to minimize their impact.

Stantec was engaged to undertake the following:

- eDNA surveys in the main Mazengarb Stream, and the unnamed tributary on the true left.
- Complete visual assessments in the wetted areas of the wetland.
- Provide a report detailing the current state of aquatic weeds in the kotuku whenua

2 Methodology

2.1 eDNA

Environmental DNA (eDNA) is genetic material such as saliva, faeces, scales, skin, and gametes, that is shed by organisms as they interact with their environment. This material can be sampled using filtering techniques and laboratory analysis. Thousands of different plant, fungi, bacteria, fish, macroinvertebrate and mammal species can be identified. eDNA sampling was utilized to gain understanding of what aquatic weeds are present in the area.

eDNA sampling was completed at the downstream extent of the main Mazengarb Stream channel, and the downstream extent of the tributary on the true left (Figure 2-1). Sampling was conducted at low tide, to minimize the amount of DNA being washed upstream on an incoming tide. Samples were taken approximately 5 metres upstream of the Mazengarb/tributary confluence to minimize the amount of mixing between the two sites.

Samples were sent to Wilderlab for comprehensive laboratory analysis

NIWA recently created a guide to interpreting eDNA results (Melchior & Baker, 2023). This guideline suggests considering sequence counts >100 in at least 2 out of 6 replicates as indicative of 'true detection'. Counts that fall below this threshold should therefore be counted as 'trace' and 'tentative' records with further interpretation required.

Trace results could be false positives. False positive occur through contamination, environmental disturbances, and data analysis error. However, it could also be the result of a species being rare or in low abundance in the area, therefore having low detection limits. For the purpose of this report only species with "true detection" results were used to comment on the current threat posed by aquatic weeds. It is considered likely, however, that those with trace results are present in the area but are in low abundance or further upstream and require further investigation to determine the threat.

2.2 Visual Assessments

Visual surveys were conducted in the channels, and other wetted areas of the wetland. The protocol described by Collier et al, 2007, was utilised. This included completing 5 transects in each channel



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and estimating the percentage of macrophyte cover across a 1 metre band. This protocol assesses macrophytes growing in and emerging from the wetted channel. From these transects, Macrophyte Total Cover (MTC), Macrophyte Channel Cloginess (MCC), and Macrophyte Native Cover (MNC) can be calculated. It is designed as a rapid habitat assessment to provide a general picture of reach scale cover (Collier, Kelly, & Champion, 2007).

Surveys were conducted at low tide, to ensure both channels were totally accessible to be surveyed. Low tide exposed several pools, isolated from the main channel. These pools were assessed for the presence of weeds during a site walkover.



Figure 2-1: Location of eDNA sampling, and visual weed assessments

3 Results

3.1 eDNA

Many common native and exotic plants were detected through eDNA analysis. Table 3-1 below summarises the exotic weeds detected. Not all exotic plants are considered weeds in New Zealand, therefore only those included in the 2024 list of environmental weeds prepared by DOC have been included (McAlpine & Howell, 2024). A full list of plant species detected can be found in Appendix A. Each site had similar results, indicating that the weeds are spread across the wetland, or upstream of



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the wetland. The DNA replicate counts were high for each species, suggesting they may be well established.

The weeds present are commonly found in wetlands across New Zealand, and can out compete native species, and contribute to water quality decline. A brief description of each species is provided below.

Table 3-1: Exotic weeds detected at each site in the Kotuku whenua

Species	Common name	Mazengarb Stream	Unnamed Tributary	Description
<i>Helosciadium nodiflorum</i>	Water celery	✓	✓	First recorded in New Zealand in the 1940's, it was highlighted as a problematic aquatic weed in 2021. It can contribute to water quality decline as it traps nutrients and depletes dissolved oxygen. This is especially problematic in streams receiving farm drainage such as the Mazengarb Stream. It is fast growing, and can outcompete native wetland species, especially in slow flowing areas (Landcare Research, 2024)
<i>Gymnocoronis spilanthoides</i>	Senegal tea	✓	✓	An aggressive aquatic weed that can block channels and form dense mats that quickly cover waterways. It can quickly outcompete native aquatic plants. Large infestations can deplete dissolved oxygen, harming fish and other aquatic organisms (Greater Wellington Regional Council, 2021).
<i>Myriophyllum aquaticum</i>	Parrot's feather	✓	✓	Common across New Zealand, it spreads very quickly and outcompetes native wetland and aquatic plants. It forms dense mats, shading out existing plants, and replacing species that normally grow on the margins of waterbodies. Large clumps of detached, rotting vegetation can stagnate water, depleting oxygen (Greater Wellington Regional Council, 2025).
<i>Cenchrus clandestinus</i>		✓	✓	Common across New Zealand, it is not specifically an aquatic weed but is often found in wetland environments. It forms dense mats, out competing native plants.
<i>Paspalum distichum</i>	Knotgrass	✓	✓	Common in the North Island, usually in wetland areas, but can survive in non-wetland environments (New Zealand Plant Conservation Network, 2025)



3.2 Visual Surveys

3.2.1 Mazengarb Stream

No aquatic weeds were growing in the main channel of the Mazengarb Stream. The channel is clear of vegetation, with only that growing on the riparian margins occasionally overhanging. Exotic plants are present on the banks but are not part of this assessment as they do not classify as aquatic weeds.



Figure 3-1: Looking upstream from downstream end of assessment reach



Figure 3-2: Looking downstream from upstream end of assessment reach

3.2.2 Unnamed Tributary

Aquatic weeds were observed growing in the unnamed tributary. Weeds were apparent in the upstream half of the channel, where it became narrower. The downstream half of the channel was clear of weeds, much like the main channel. Parrots feather and Senegal tea were both captured in 2 out of five transects. They were growing among native aquatic plants, like *Persicaria decipiens* (Figures 3-1, 3-2).

Based on the visual assessment, the unnamed tributary has an approximate macrophyte coverage of 20% and this coverage is dominated by weed species. This is intended as a guide only and should be more thoroughly investigated before management plans are developed. Table 3-2 below summarises the results of the visual assessment.



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Table 3-2: Summary of unnamed tributary visual assessment

Transect	Total Cover	Submergent	Emergent
A	0	0	0
B	0	0	0
C	0	0	0
D	40%	0	<i>Persicaria decipiens</i> : 30%
			Senegal tea: 10%
E	55%	Parrots feather: 50%	<i>Persicaria decipiens</i> : 5%
Macrophyte Total Cover (MTC)			19%
Macrophyte Channel Cloginess (MCC)			19%
Macrophyte Native Cover (MNC)			7%



Figure 3-3: Transect D



Figure 3-4: Transect E

3.3 Wetland Walkover

Where accessible, the wetted areas surrounding the main channels were assessed. Wetted areas were considered areas of water separate to the main channels. This was primarily in the form of pools



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that formed adjacent to the channels. At low tide, these pools had very low water levels, and in some cases became completely isolated from the channels. No weeds were growing in any of these pools (Figures 3-5, 3-6).

The vegetated areas of the wetland were not formally assessed. However, a variety of plants were observed growing in these areas (Figures 3-9, 3-10).



Figure 3-5: Isolated pool near the unnamed tributary



Figure 3-6: Isolated pool near the unnamed tributary



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Figure 3-7: Isolated pool near the upstream end of Mazengarb Stream



Figure 3-8: Tidally influenced area on the true right of the Mazengarb Stream



Figure 3-9: Example of plants in the vegetated area of the wetland



Figure 3-10: Example of plants in the vegetated area of the wetland



4 Conclusions and recommendations

A variety of common aquatic weeds are present within the Kotuku whenua. The estuarine reach of the Mazengarb Stream is currently not experiencing direct impacts of these weeds, as they are not growing in the channel. The unnamed tributary on the true left has started to become directly impacted, with some aquatic weeds growing in the channel. The tributary is much smaller than the Mazengarb Stream, and has much less flow, therefore it is likely more susceptible to weed colonisation. The higher flows in the Mazengarb Stream have likely prevented weeds from establishing in the channel. In saying that, the pools and other wetted areas of the wetland are also currently not impacted by weeds. This could be due to the tidal nature of these areas creating unfavourable conditions.

The weeds present are all species that are known to outcompete native aquatic plants, and many form dense mats that can deplete dissolved oxygen in the water, causing harm to aquatic fauna. The tributary is a slow flowing channel, that becomes shallow during low tides, likely with naturally fluctuating levels of dissolved oxygen. The proliferation of aquatic weeds may worsen this.

While aquatic weeds have yet to proliferate through the stream channels in the Kotuku whenua, active management is likely needed to ensure this remains true.

It is recommended that:

- a) A formal survey of the vegetated areas of the entire wetland be undertaken to get a more comprehensive understanding of the situation. This will require identification of hotspots within the wetland, and identify which species are most likely to garner a foot hold first.
- b) A targeted management plan be created following these additional surveys.



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Appendix A eDNA Results

Scientific Name	Common Name	Unnamed Tributary						Mazengarb Stream					
		743631	743632	743633	743634	743635	743636	743641	743642	743643	743644	743645	743646
Nasturtium officinale	Watercress; wātakirihi; kōwhitiwhiti	39291	9710	12930	13167	11264	10757	1921	2239	3186	2249	3185	1996
Helosciadium nodiflorum	Water celery	2544	6503	11785	9331	11101	9424	2711	3118	5287	2585	3133	2473
Gymnocoronis spilanthoides	Senegal tea	2976	6954	2974	5407	5852	6903	365	141	40	137	242	142
Myriophyllum aquaticum	Parrot's feather	443	716	590	2617	1351	1373	3086	4353	6172	4630	3937	2615
Cotula coronopifolia	Bachelor's buttons; brass buttons; buttonweed	4095	2085	2124	2435	2708	2098	409	188	554	207	396	269
Persicaria decipiens	Willow-weed; slender knotweed	333	217	357	602	228	507	2190	2297	3176	2551	2689	1779
Isolepis prolifera	Budding club-rush	1350	1504	2225	1375	1735	1326	206	494	716	234	359	1081
Goodenia radicans	Swampweed; bonking grass; remuremu	375	3540	1688	403	637	561	0	19	0	0	0	0
Cenchrus clandestinus		135	91	221	84	293	659	906	787	1296	1303	600	790



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Scientific Name	Common Name	743631	743632	743633	743634	743635	743636	743641	743642	743643	743644	743645	743646
Potamogeton amplifolius	Broad-leaved pondweed	304	163	166	190	237	243	627	538	1036	441	535	290
Rubus armeniacus	Himalaya blackberry	53	33	137	228	97	135	544	405	250	544	450	173
Ranunculus sceleratus		0	404	266	397	349	90	0	0	0	0	0	26
Paspalum distichum	Knotgrass	157	48	37	41	230	6	72	83	342	90	60	185
Salix alba	White willow	58	51	97	94	53	201	34	112	93	220	55	144
Calystegia soldanella		680	0	0	242	6	42	44	8	26	0	13	38
Carpodetus serratus	Putaputaweta; putaputawētā	20	146	0	286	146	366	43	29	0	0	0	0
Calystegia sepium	Hedge bindweed	595	22	0	48	28	26	20	15	13	25	35	16
Isolepis cernua	Low bulrush; Fiberoptic grass	192	129	182	47	22	166	0	49	0	0	0	0
Potamogeton ochreatus	Blunt pondweed	0	0	0	0	0	0	67	162	107	0	121	176
Ruppia polycarpa	Ruppia	48	0	0	60	178	99	0	0	0	0	0	0
Holcus lanatus	Yorkshire fog	0	14	36	0	23	0	44	41	90	32	60	0
Eleocharis acuta	Common spikerush; Small spikerush	82	24	35	49	57	84	0	0	0	0	0	0
Aristotelia serrata	Wineberry; makomako	34	0	0	100	0	108	22	0	0	0	0	0



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Scientific Name	Common Name	743631	743632	743633	743634	743635	743636	743641	743642	743643	743644	743645	743646
Lemna minor	Common duckweed; lesser duckweed	0	74	0	0	0	0	55	0	104	0	0	0
Ripogonum scandens	Supplejack; kareao; pirita	22	26	0	0	0	141	0	0	0	0	18	0
Zantedeschia aethiopica	Calla lily; Arum lily	0	0	0	0	0	0	145	0	8	0	36	0
Nothofagus menziesii	Silver beech; tawhai; tahina	0	15	0	73	0	90	0	0	0	0	0	7
Leptinella serrulata		0	0	0	0	116	51	0	0	0	0	0	0
Lotus pedunculatus	Big trefoil	27	7	0	0	0	0	18	0	36	32	0	39
Plantago lanceolata	Ribwort plantain; narrowleaf plantain; English plantain; ribleaf; lamb's tongue; buckhorn	0	0	0	0	0	0	6	14	68	19	37	6
Bidens pilosa	Black-jack; daisy	0	0	142	0	0	0	0	0	0	0	0	0
Polycarpon tetraphyllum	Fourleaf allseed	0	0	0	82	0	0	0	0	0	55	0	0
Achillea millefolium	Yarrow	0	0	0	0	0	0	0	122	0	0	0	0



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		Unnamed Tributary						Mazengarb Stream					
Scientific Name	Common Name	743631	743632	743633	743634	743635	743636	743641	743642	743643	743644	743645	743646
<i>Ulex europaeus</i>	Gorse; Furze	0	0	0	72	49	0	0	0	0	0	0	0
<i>Schoenoplectus pungens</i>	Common threesquare; common three-square bulrush; sharp club-rush	27	0	0	0	39	48	0	0	0	0	0	0
<i>Lolium perenne</i>	Perennial ryegrass	0	0	0	0	0	0	0	56	55	0	0	0
<i>Pennantia corymbosa</i>	Kaikomako; kaikomako	0	0	0	0	0	111	0	0	0	0	0	0
<i>Fortuynia bungei</i>		0	0	0	0	0	0	0	0	93	0	0	0
<i>Kleinia petraea</i>		0	0	0	0	91	0	0	0	0	0	0	0
<i>Poa trivialis</i>	Rough bluegrass	0	0	0	0	0	0	9	14	7	15	0	43
<i>Leptospermum scoparium</i>	Manuka; mānuka	0	0	0	0	78	0	0	0	0	0	0	0
<i>Juncus articulatus</i>	Jointleaf rush	76	0	0	0	0	0	0	0	0	0	0	0
<i>Coriaria arborea</i>	Tutu; tutu	15	0	0	17	0	41	0	0	0	0	0	0
<i>Arrhenatherum elatius</i>		0	0	0	8	19	30	0	6	0	0	0	9
<i>Paspalum dilatatum</i>	Dallisgrass	0	0	0	0	0	0	0	0	0	0	67	5



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Scientific Name	Common Name	743631	743632	743633	743634	743635	743636	743641	743642	743643	743644	743645	743646
Populus angustifolia	Willow cottonwood	0	0	0	72	0	0	0	0	0	0	0	0
Trifolium repens	Creeping white clover	0	0	17	0	0	0	0	0	0	0	0	54
Pittosporum bracteolatum		0	0	69	0	0	0	0	0	0	0	0	0
Ludwigia palustris		0	0	0	0	0	6	0	0	6	20	28	5
Pectinopitys ferruginea	Miro; miro	63	0	0	0	0	0	0	0	0	0	0	0
Phormium tenax	NZ flax; harakeke	0	0	0	0	0	0	15	0	43	0	0	0
Tetragonia implexicoma		0	31	0	0	0	25	0	0	0	0	0	0
Plantago coronopus		54	0	0	0	0	0	0	0	0	0	0	0
Dactylis glomerata	Catgrass; cocksfoot	0	0	0	51	0	0	0	0	0	0	0	0
Geniostoma rupestre	Hangehange; Privet leaf; pāpā	0	45	0	0	0	0	0	0	0	0	0	0
Elodea canadensis	Pondweed; waterweed	0	0	0	0	0	0	0	0	0	44	0	0
Dicksonia squarrosa	NZ tree fern	0	0	0	24	16	0	0	0	0	0	0	0
Myriophyllum propinquum	Water milfoil	14	0	0	0	0	0	0	0	0	23	0	0



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Schefflera digitata	Seven-finger; patē; patatē; patete; kōtētē	0	0	0	18	19	0	0	0	0	0	0	0
Metrosideros diffusa	White rata; akakura	0	0	0	0	34	0	0	0	0	0	0	0
Prunus pseudocerasus	Chinese sour cherry	0	0	0	0	0	24	0	0	10	0	0	0
Cedrus deodara	Deodar cedar	0	0	0	0	0	0	0	26	0	0	0	0
Passiflora tenuifila		0	11	0	0	0	15	0	0	0	0	0	0
Weinmannia silvicola	Tawhero; tōwai; tawhero	0	0	0	0	0	24	0	0	0	0	0	0
Humulus lupulus	Common hop	0	0	0	23	0	0	0	0	0	0	0	0
Veronica arvensis	Field speedwell; corn speedwell	0	0	0	0	0	0	0	0	0	0	0	23
Vallea stipularis		0	0	0	0	23	0	0	0	0	0	0	0
Colocasia esculenta	Taro; taro	0	0	0	0	0	0	0	0	22	0	0	0
Daucus carota	Wild carrot; Queen Anne's lace	0	0	21	0	0	0	0	0	0	0	0	0
Prunus sargentii	Sargent's cherry; North Japanese hill cherry	0	0	0	0	0	0	0	0	0	0	0	21



Waikanae Ecological Monitoring: Aquatic Weed Survey 2025

Appendix A eDNA Results

		Unnamed Tributary						Mazengarb Stream					
Scientific Name	Common Name	743631	743632	743633	743634	743635	743636	743641	743642	743643	743644	743645	743646
Griselinia littoralis	New Zealand broadleaf; pāpāuma; kapuka	0	5	0	0	0	15	0	0	0	0	0	0
Corynocarpus laevigatus	Karaka	0	0	0	0	0	0	0	0	0	17	0	0
Trifolium subterraneum	Subterranean clover	0	0	0	0	0	0	0	5	11	0	0	0
Ascarina lucida	Hutu	0	0	0	0	0	0	0	0	0	0	0	16
Cryptomeria japonica	Japanese cedar	0	0	0	0	0	0	0	15	0	0	0	0
Sphaeralcea coccinea	Scarlet globemallow	0	0	0	0	0	15	0	0	0	0	0	0
Delairea odorata	German-ivy	0	0	0	0	0	0	0	0	0	13	0	0
Populus alba	Abele	0	0	0	0	0	13	0	0	0	0	0	0
Allium triquetrum	Onion weed; Three-cornered leek; Angled onion	0	0	0	0	0	0	0	0	11	0	0	0
Cyperus insularis		0	0	0	11	0	0	0	0	0	0	0	0
Anthoxanthum sp. MP-2014		0	0	0	0	0	0	11	0	0	0	0	0
Setaria parviflora	Knotroot foxtail; Marsh	0	0	0	0	0	0	10	0	0	0	0	0



Waikanae Ecological Monitoring: Aquatic Weed Survey 2025

Appendix A eDNA Results

		Unnamed Tributary						Mazengarb Stream					
Scientific Name	Common Name	743631	743632	743633	743634	743635	743636	743641	743642	743643	743644	743645	743646
	bristlegrass; Bristly foxtail												
Veronica macrocarpa		0	0	0	0	0	0	0	9	0	0	0	0
Ulmus parvifolia	Chinese elm	0	0	0	0	0	0	0	0	0	0	0	8
Anthoxanthum odoratum	Sweet vernal grass	0	0	0	0	0	0	0	0	6	0	0	0
Washingtonia robusta		0	0	0	0	0	0	0	0	0	6	0	0
Berberis trigona		0	0	0	0	0	5	0	0	0	0	0	0



With every community, we redefine what's possible.



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