Autonomous Region of the Azores
Regional Secretariat for the Environment and Climate Action

LIFE IP Azores Natura (LIFE17 IPE/PT/000010)

Progress Report

covering the project activities of action C8.1 in 2022/2023

Reporting Date

31/12/2023

Project: Coordinating Beneficiary: Associated beneficiaries:

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ha	Hectares
IAS	Invasive Alien Species

1. Technical part

Action C8 of the LIFE IP Azores Natura project (Implementation of IAS control works in terrestrial restored habitats) includes the implementation of works to control invasive species of plants (sub-action C8.1) and animals (sub-action C8.2). This report presents the second intermediate report for sub-action C8.1 up to the end of Phase II.

Sub-action C8.1 – Control and eradication of IAS plant species in terrestrial restored habitats

This sub-action specifies a set of flora control methods in the project's target areas and focuses on the main IAS species encountered in each area.

To combat the continued proliferation of ***Cortaderia selloana*** (pampas grass), it was decided to produce a set of information leaflets about this invasive species to alert different organisations such as parish councils, administrative institutions, and the public about the spread of this invasive species. **270 posters and 200 pamphlets were printed** (Figure 1), **and a letter was devised** to be sent to households where the species had been detected. However, this letter has not yet been signed by the management team's superiors.

Figure 1. Pamphlet printed to raise awareness about the spread of pampas grass.

Within the frame of the Regional Strategy for Invasive Alien Species Management (action A1.1), DRAAC's Fauna and Flora Division is currently preparing the **regional regulation** with an updated list of IAS.

In the following, the activities carried out up until 31 December 2023, specified separately for each island, including mapping of all interventions, will be described. An online database was created, where the Nature Wardens in charge of supervising the control works carried out by the Operational Assistants register all IAS control interventions.

In 2022 and 2023, the project's Operational Assistants spent a total of 275 days removing invasive species on all islands combined. At least **64,1 ha were intervened**, and a minimum of **29,9 tons of plant material removed** (the terms "at least" and "a minimum of" are utilized given that not all parameters were reported following removal activities; for example, in Santa Maria, mostly only the target species and date of the activity were registered in the database, whereas in São Jorge, the intervened area was reported, but not the amounts of plant material removed). The following table provides an overview of the total area intervened on each island in 2022 and 2023:

Table 1. Total intervened area (in hectares) per island in 2022 and 2023.

Island	ha	kg
Corvo	2,42	2.930
Faial	0,31	>5
Flores	0,03	4.285
Graciosa	1,14	3.998
Pico	0,05	800
Santa Maria	na	>50
São Jorge	8,36	na
São Miguel	13,68	17.811
Terceira	38,11	na
Total	**64,1**	**>29.879**

CORVO

In 2022 and 2023, Operational Assistants on Corvo Island spent a total of 18 working days removing foci of invasive species. Table 6 in Annex I details the invasive species removal activities carried out on Corvo Island in 2022 and 2023 (see also Figure 3).

The increased distribution of the invasive species *Plecostachys serpyllifolia* was communicated by Corvo's farmers in May 2022, who volunteered to accompany the control work on the most affected plots. In October 2022, May and August 2023 and February 2024, removal activities were therefore carried out in a collaborative effort between farmers and the project's Operational Assistants. Furthermore, an alert was issued, posters were hung up at the airport and other social meeting points on Corvo Island (Figure 2), and a public meeting was held with farmers and other land managers in which further species that should be eradicated, as well as invasive species at risk of possible introduction, were indicated. Regarding the control of *Plecostachys serpyllifolia*, an action protocol was elaborated within the frame of action C11, detailing the most effective control methods for this species.

Figure 2. Removal of *Plecostachys serpyllifolia* in May 2023, and poster distributed on Corvo Island.

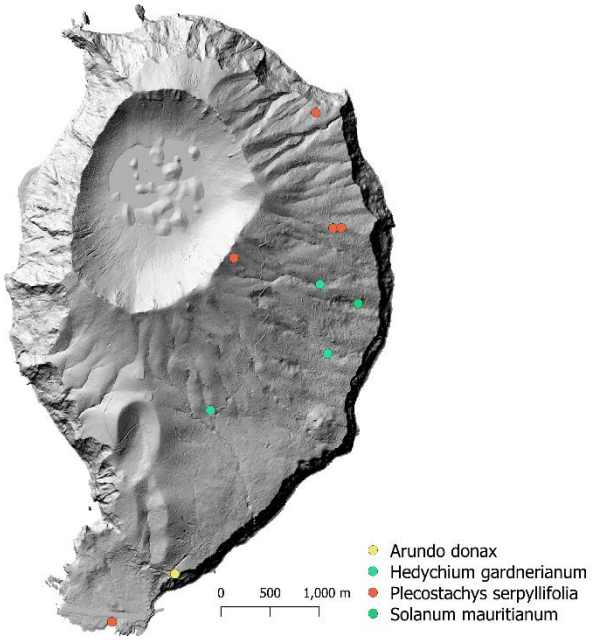

Figure 3. Map of IAS removal activities on Corvo Island in 2022 and 2023.

FAIAL

In June and July 2022, the project's Operational Assistants spent a total of 20 days mechanically removing 9,5 m^3 of regenerated *Hydrangea macrophylla* from the intervention area along the Ribeira da Lomba stream (Figure 4), in an area of 3.076 m^2. After an alert regarding the detection of a new invasive species, namely *Ipomoae pes-caprae*, in Porto Pim, removal was swiftly carried out. In 2023, no invasive species control took place on Faial Island, given that many Operational Assistants were on medical leave and large amounts of seaweed that was washed ashore in Porto Pim had to be dealt with. The continuation of the invasive species removal work is scheduled for the 1st of April 2024 in Ribeira da Lomba. Table 7 in Annex I details the invasive species removal activities carried out on Faial Island in 2022.

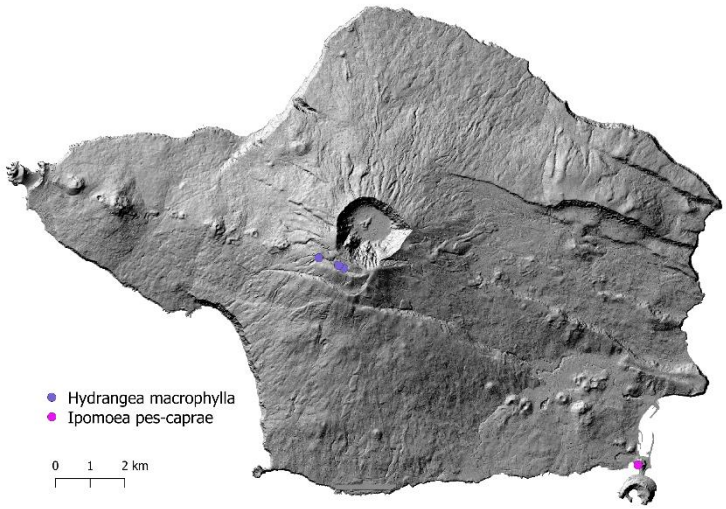

Figure 4. Map of IAS removal activities on Faial Island in 2022.

FLORES

Despite the general invasive species removal activities carried out within the frame of the LIFE IP Azores Natura project (Table 8 in Annex I), an external service, namely the company Rope Adventures, was contracted by SRAAC to remove invasive species from the natural monument Rocha dos Bordões. During this cleaning activity, the species *Hedychium gardnerianum*, *Pittosporum undulatum* and *Hydrangea macrophylla* were removed from the vertical part of the rock face. Of the entire area proposed for cleaning, only a small patch remained due to the instability of the area together with the adverse weather conditions experienced at the time, which prevented from executing the works in safety.

The removal activities in the project's intervention areas we mostly concentrated on the same area (Figure 5). Despite efforts to eradicate the highly proliferate ginger lily *Hedychium gardnerianum*, it continues to regenerate from the seed bank, rhizomes accidentally left behind in already intervened area, or root sections that have broken off during the removal of individuals, requiring frequent maintenance works.

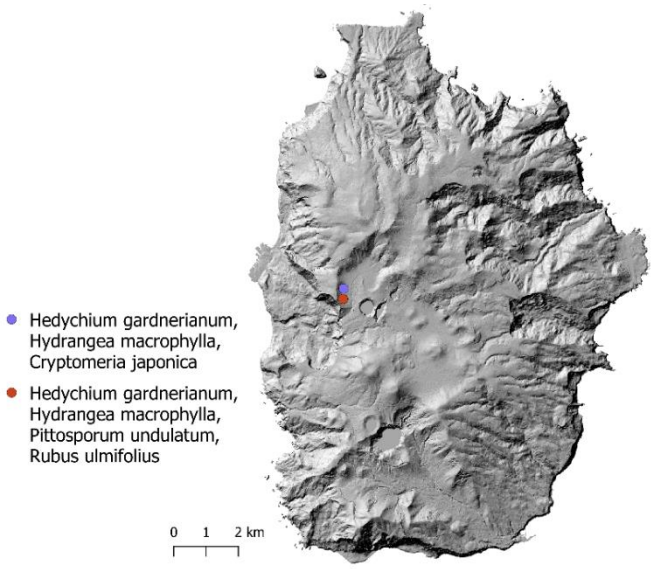

Figure 5. Map of IAS removal activities on Flores Island in 2022 and 2023.

GRACIOSA

On Graciosa Island, most invasive species removal was concentrated on the islets Praia and Baixo, and around the island's only *Ammi trifoliatum* population in Ponta Branca (Figures 6 and 7). In 2022, Operational Assistants spent a total of 15 days removing a total of 2.378 kg of the following species: *Tamarix africana*, *Tetragonia tetragonoides*, *Hedychium gardnerianum*, *Rubus ulmifolius*, *Pteridium aquilinum*, *Lantana camara*, *Arundo donax*, and *Galactites tomentosus*.

In 2023, 10 days were spent removing 1.620 kg of *Tamarix africana*, *Lantana camara*, *Hedychium gardnerianum*, *Rubus ulmifolius*, and *Galactites tomentosus*. In total, areas of 4.921 m^2 and 6.472 m^2 were intervened in 2022 and 2023, respectively, including areas that were intervened for the first time, and areas where maintenance was carried out (Table 9).

In Ponta da Barca and on Praia Islet, two types of control methods with glyphosate were carried out on *Tamarix africana*. The first technique involved cutting the tree and immediately brushing the cut with pure (undiluted) glyphosate. This technique did not prove efficient, and the trees resprouted. The second technique consisted of drilling a ring of holes around the trunk of the tree, towards the centre, and immediately injecting undiluted glyphosate. This technique has proved to be more, but not 100 per cent efficient, because although the branches dry, the trunk remains alive.

The two applied techniques may also be less efficient since the same process is not repeated on the same trees at shorter intervals. This in turn is due to the access to the islets being heavily conditioned by the weather, wherefore it is difficult to repeat the process more frequently.

Regarding the green waste, on Praia Islet, all removed plant material of *Tetragonia tetragonoides* was left to dry on the islet itself. The *Tamarix africana* plant material cut in 2021/2022 was also left to dry on the islet. In 2023, a shredder was transported to the islet, and all previously cut plant material was shredded. On Baixo Islet, *Tetragonia tetragonoides* plants that have been cut and uprooted were left to dry on the islet. In 2021, experiments were carried out to burn the plant material in controlled fires; however, it was decided that the risk of the fire spreading to the whole islet was too big.

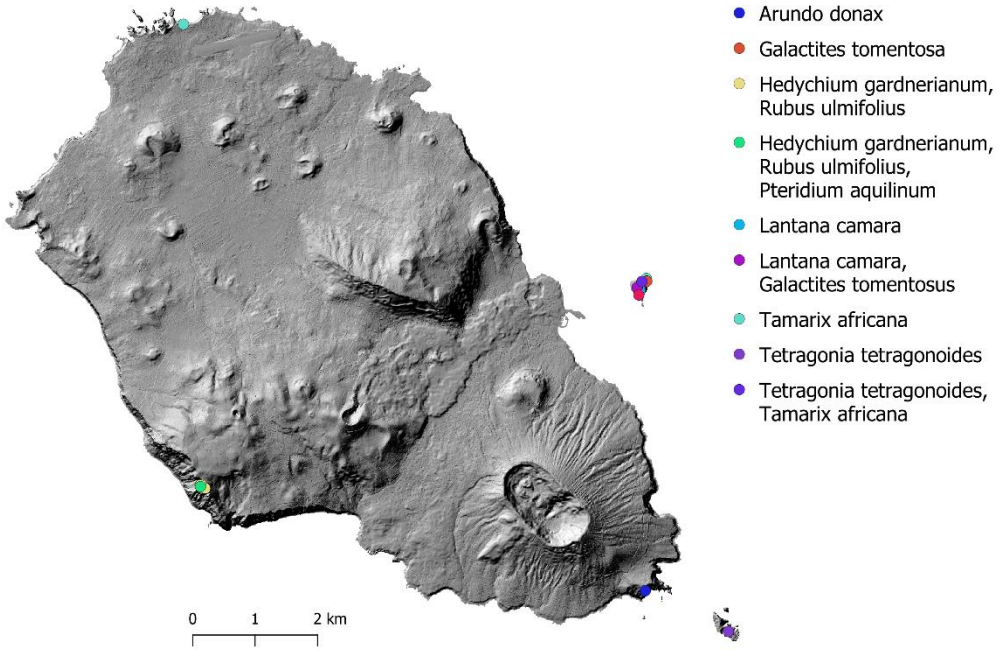

Figure 6. Map of IAS removal activities on Graciosa Island in 2022 and 2023.

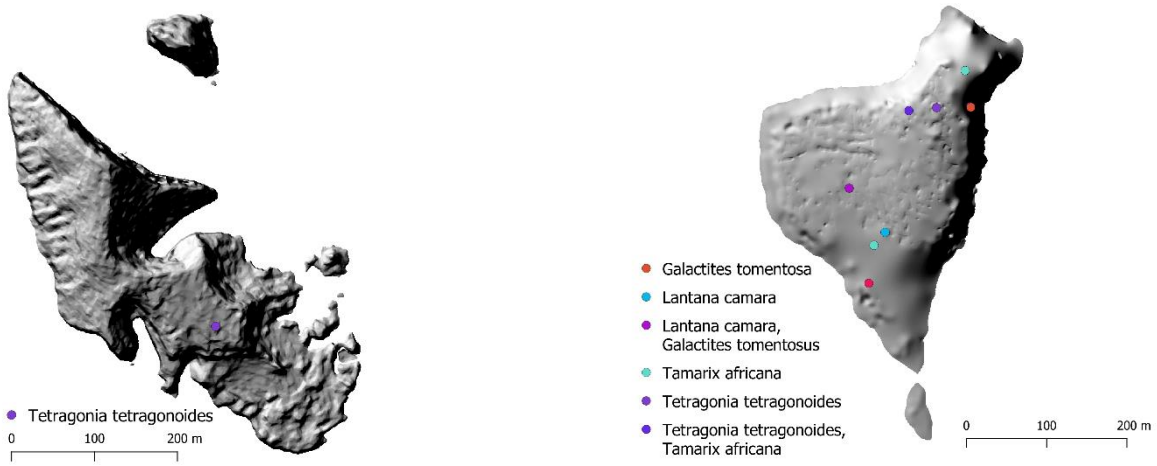

Figure 7. Close-ups of IAS removal activities on Baixo and Praia Islets, Graciosa Island, in 2022 and 2023.

PICO

On Pico Island, the intervention in a 4.3 ha *Cryptomeria japonica* stand in the Caveiro area continued intermittently. The aim is to remove the remaining seeding individuals that survived prior interventions in 2009, 2011 and 2012, and to remove natural regeneration. However, due to the extreme meteorological conditions in the area, only 5 were spent implementing the drill and inject method in an area of approximately 7500 m^2.

On a hiking trail close to the Capitão Lagoon, two new invasive species were discovered in August 2023, both carnivorous: *Drosera rotundifolia* and *Sarracenia purpurea*. Given that both were found in the same location, it is likely that they were placed there intentionally. All individuals were removed; however, as they had already been flowering, a seed bank is likely to be present, wherefore the area will continue to be monitored in the future.

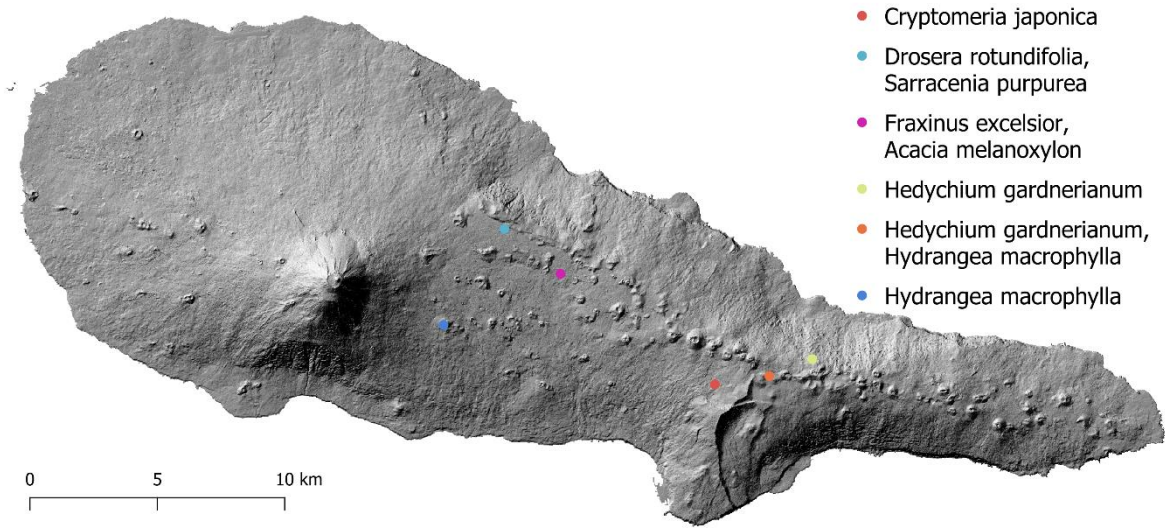

Figure 8. Map of IAS removal activities on Pico Island in 2022 and 2023.

SANTA MARIA

On Vila Islet, interventions to control the proliferating New Zealand spinach *Tetragonia tetragonoides* continued in 2022 and 2023 (Table 11). As the removal of New Zealand spinach caused elevated erosion rates, wooden palisades were installed to secure the loose substrate (Figure 9), and seeds of *Daucus carota* subsp. *azoricus*, *Festuca petraea*, *Lotus azoricus*, and *Plantago coronopus* were sown and *Ammi seubertianum*, *Azorina vidalii* and *Lotus azoricus* was planted in the cleared areas directly after IAS control works (see also the intermediate report on sub-action C6.1, deliverable D149; Figure 10).

Figure 9. New Zealand spinach removal on Vila Islet, Santa Maria, in April 2023.

Figure 10. Wooden palisade construction and planting in areas of IAS removal on Vila Islet, Santa Maria, in April 2023.

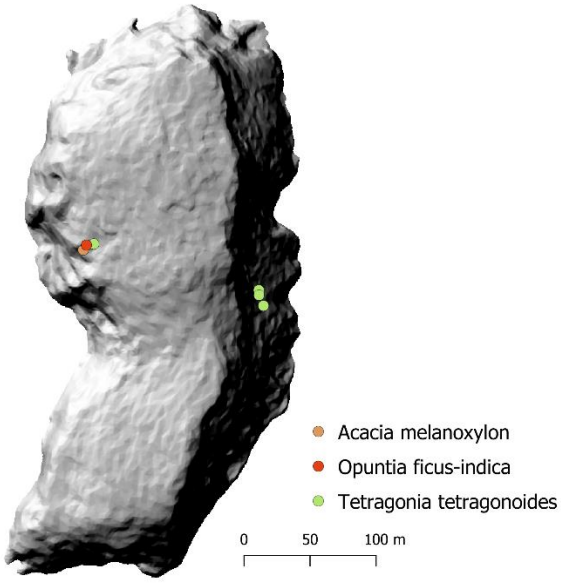

Figure 11. Map of IAS removal activities on Vila Islet in 2022 and 2023.

In the Ponta do Castelo area, significant progress has been achieved in controlling approximately 90% of the IAS *Agave americana*, with more than 42 m^3 of plant material removed in 2022 and 2023.

However, the continuity of these efforts faced an interruption due to a landslide within the intervention area in October 2023, triggered by heavy rains in Santa Maria during that month (Figure 12). There are still remaining specimens of Agave along the slope of Ponta do Castelo that need to be removed, requiring the implementation of wide-angle techniques to ensure a thorough cleaning of the entire area.

The subsequent phase involves the consolidation of the slope, incorporating endemic vegetation, such as *Festuca petraea*, through direct sowing. Additionally, measures will be taken to facilitate proper rainwater drainage.

Figure 12. View of the Ponta do Castelo intervention area in August 2023 (left), and the land slide in October 2023 (right).

SÃO JORGE

On São Jorge Island, most invasive species control takes place in the Fajã dos Cubres intervention area. Since the first intervention, several maintenance interventions have taken place to control the regrowth of the invasive species. After the discovery of a previously unknown *Asplenium hemionitis* population on the hiking trail to Fajã do Ouvidor, the proliferating IAS *Tradescantia fluminensis* that was threatening to smother the fern was controlled manually.

In 2022, commencing at the end of the summer season, a proliferation of filamentous algae occurred in the eastern section of the Cubres lagoon, characterised by its lower salinity levels. Approximately 90% of this area, encompassing around 11.600 m^2, was enveloped by this algal growth—an unprecedented extent compared to previous occurrences in preceding years (Figures 13 and 14).

With the support of the University of the Azores, the algae were identified as belonging to the *Chaetomorpha* genus. However, uncertainties persisted regarding the specific species, with both *Chaetomorpha tortuosa* and *Chaetomorpha capillaris* emerging as plausible hypotheses.

Recognizing the potential threat to the lagoon's ecosystem, attributed to the obstruction of sunlight penetration and the anticipated rise in organic load leading to potential eutrophication, a decision was made to manually remove the algae, aiming to restore equilibrium to the ecosystem.

Consequently, in October 2022, approximately one-fourth of the algae were removed in an initial phase, followed by the extraction of the remaining biomass in a second phase during November of the same year. The total volume of algae removed amounted to approximately 21 m^3. This labour-intensive undertaking involved a senior technician and six operational assistants, utilising two small boats, cables, a motorized winch, and a dumper.

In the subsequent year, 2023, no filamentous algae were detected in the lagoon. Consequently, beyond routine monitoring, no further intervention was deemed necessary in this area during that year.

Figure 13. Alga proliferating only in the eastern part of Cubres Lagoon after opening channels between the eastern and western part, October 2022.

Figure 14. Proliferation of filamentous algae in the eastern Cubres Lagoon, October 2022.

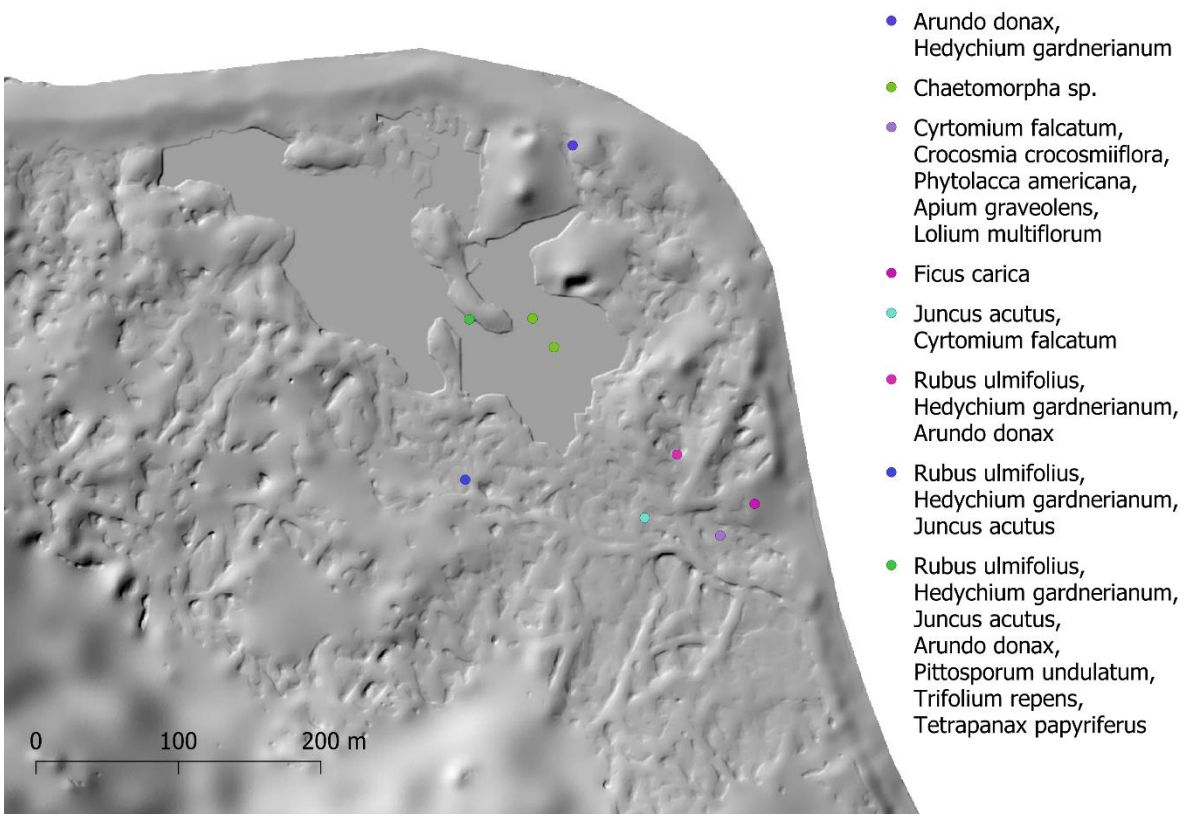

Figure 15. Map of IAS removal activities in Fajã dos Cubres on São Jorge Island in 2022 and 2023.

São Miguel

The island of São Miguel features the second biggest investment into invasive species control, with 13,7 ha intervened in 2022 and 2023. Besides the maintenance works carried out in the Lagoa do Fogo intervention area, localized IAS foci in populations of target species of action C3 have also been removed (Table 13, Figure 16).

No further foci of *Pueraria lobata* were discovered; however, two maintenance activities were carried out in Furnas after the initial removal of the newly detected invasive species, and the area continues to be monitored.

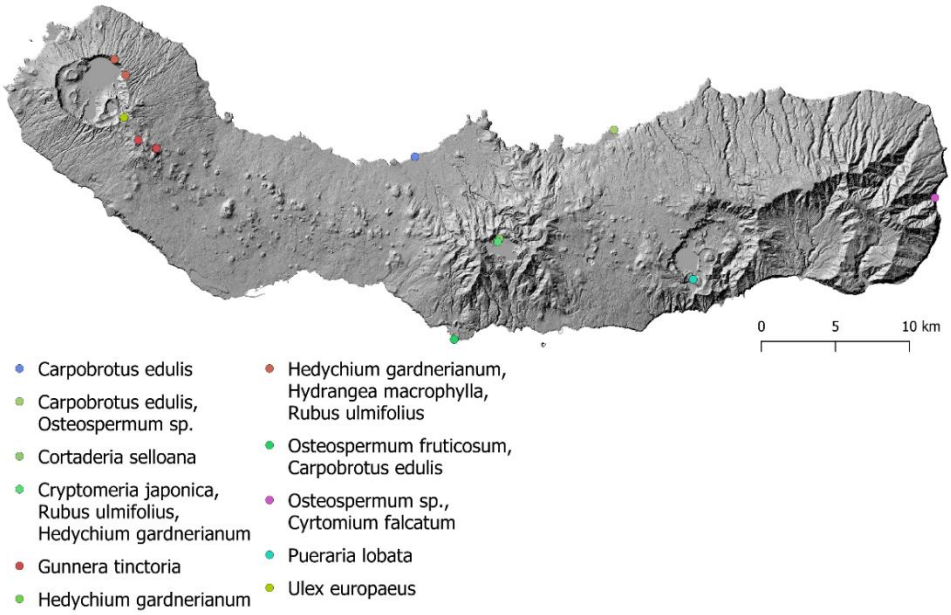

Figure 16. Map of IAS removal activities on São Miguel Island in 2022 and 2023.

SPEA intervention areas in São Miguel

Apart from those area, in the island of São Miguel, SPEA is promoting IAS eradication in project intervention areas of their responsibility (action C4.3 and C5) aiming at *Pittosporum undulatum*, *Hedychium gardnerianum*, *Clethra arborea*, *Acacia melanoxylon*, *Cyathea cooperi*, *Dicksonia antractica*, *Leycesteria formosa*, *Rubus ulmifolius*, *Ulex europaeus*, *Phyllostachys bambusoides* as well as other opportunistic species that could pose a threat to restoration actions. Total restored area up to the moment adds up to 17,35 hectares in Mata dos Bispos intervention area and 7,5 hectares in Pico Verde/Tronqueira with a total of 24,85 hectares fully controlled. Graminhais plateau area has not been started yet, it is foreseen to start in 2025.

Methods applied differed between species and areas depending on IAS characteristics, degree of invasion and sensitivity of the area. In sensible areas, i.e. surrounding water catchments and inside water lines, IAS control was carried out manually while in other areas best practices of chemical IAS control where applied to each species.

Control of the IAS ***Pittosporum undulatum*** in Mata dos Bispos area (action C4.3) along the margin of water streams took place from July to August 2019. *P. undulatum* control in the remaining areas was concluded in September 2020. The drill & inject technique was employed in these control interventions, in which the herbicide is injected directly in the tree stem. Leaving the dead trees standing reduces soil erosion, particularly on steeper slopes. A total of 1 909 *P. undulatum* trees were

successfully controlled. Localised chemical controls of sprouts have been carried out, as well as the manual control of seedlings naturally regenerating from the seed bank, during the annual maintenances. This species is now fully controlled in all the 29,1 hectares of this intervention area;

Hedychium gardnerianum has been controlled in 16,25 hectares out of the 29,1 in Mata dos Bispos (56% controlled) and in 7,5 hectares in Pico Verde/Tronqueira area, of which 6,4 hectares are located in the areas of degraded *Cryptomeria* plantations, using a motor-pump spraying system, and the remaining 0,8 hectares are in laurel forest with selective plant-by-plant application by cutting and brushing. The former *Cryptomeria* production areas have a high seed bank, and in some places two applications have already been made to prepare them for planting.

Clethra arborea has been controlled in 7,35 out of the 17,9 hectares occupied in Mata dos Bispos (41% controlled) as well as in the 7,5 hectares in Pico Verde/Tronqueira (9% controlled) with selective plant-by-plant application by cutting and brushing.

Acacia melanoxylon has been controlled in 8,2 hectares out of 17,7 in Mata dos Bispos (46% controlled) by cutting of larger specimens and using the wood for natural engineering and with selective plant-by-plant application by cutting and brushing.

Cyathea cooperi, Leycesteria Formosa and Ulex europaeus have been controlled in 4,2 hectares out of 11,4 in Mata dos Bispos (37% controlled) with selective plant-by-plant application by cutting and brushing. Also Leycesteria Formosa has been controlled in 7,5 hectares in Pico Verde/Tronqueira (9% controlled)

Dicksonia Antarctica is only present in Pico Verde/Tronqueira area and it has been also controlled in 7,5 hectares (9%)

Rubus ulmifolius has been controlled in 7,2 hectares out of 15,7 hectares in Mata dos Bispos (46% controlled) and in 7,5 hectares in Pico Verde/Tronqueira (9% controlled) with selective plant-by-plant application by cutting and brushing.

Phyllostachys bambusoides and other opportunistic species have been controlled in 3,3 out of 4,6 hectares of occupancy in Mata dos Bispos (72% controlled) with selective plant-by-plant application by cutting and brushing.

Table 2 summarizes the total area intervened per species and the percentage of the total occupation area that has already been controlled.

Table 2 - Area controlled of IAS in SPEA's intervention areas per species (NP = Not present)

	C4.3 Mata dos Bispos		**C5 Pico Verde/Tronqueira**	
	Controlled area by 31/12/2023	% controlled	Controlled area by 31/12/2023	% controlled
Pittosporum undulatum	29,1	100%	0	0%
Hedychium gardnerianum	17,35	60%	7,5	8%
Clethra arborea	8,45	47%	7,5	9%
Acacia melanoxylon	8,2	46%	NP	NP
Leycesteria formosa	4,2	37%	7,5	9%
Rubus ulmifolius	7,2	46%	7,5	9%
Dicksonia antarctica	NP	NP	7,5	9%
Cythaea cooperi	4,2	37%	0	0%
Ulex europaeus	4,2	37%	NP	NP
Phyllostachys bambusoides	3,3	72%	NP	NP
Other IAS	3,3	72%	NP	NP

Please note, that some intervention areas included more than one invasive species, and some species have been controlled independently, for example ***P. undulatum*** has been controlled in a larger area. Therefore, controlled areas per species do not add up to total area controlled. Table X summarizes the execution of IAS control in the intervention areas of the responsibility of SPEA.

Although it might look like a 19% is a low percentage, this is due to the need to encompass control and restoration to avoid reinvasion, and consequent need of a new intervention, and also to the fact that the intervention has started in most invaded and difficult areas. We are confident that all areas can be controlled by the end of the project.

Table 3 - Area controlled of IAS in SPEA's intervention areas per area

	Total area	**IAS control (C8.1) (ha.)**	**IAS present**	**% of IAS control concluded**	**NOTES**
Mata dos Bispos (C4.3)	29,1	17,35		60%	Pittosporum undulatum is fully controlled in the area
1. Cryptomeria buffer	4,5	2,25	Pit und; Hed gar; Cle arb	50%	
2. IAS control in native habitat	11,1	3,9	Pit und; Hed gar; Cle arb; Aca mel; Cya coo; Ley for; Rub ulm; Ule eur	35%	
3. River margin restoration	1,1	1,1	Pit und; Hed gar; Cle arb	100%	
4. Catchment protection area	0,7	0,7	Pit und; Hed gar; Cle arb; Aca mel;	100%	
5. Protective barrier with conifers	1,3	0,3	Pit und; Hed gar; Aca mel;	23%	
6. Rehabilitation of the Cryptomeria curtains	0,5	0,5	Pit und; Hed gar; Cle arb	100%	
7. Restauro de área Dominada Por Outras Exóticas	4,6	3,3	Pit und; Hed gar; Aca mel; Rub ulm; Phy bam	72%	
8. Landslides restoration	0,3	0,3	Pit und; Hed gar; Cyt coo; Ley for	100%	
9. Restoration of Pittosporum dominated area	5	5	Pit und; Hed gar	100%	
Graminhais (C4.3)	5,8	0		0%	To be started in 2025
Trilhos Novos (C5)	98,8	7,5		8%	
1. Degraded Cryptomeria Plantations	14,3	6,4	Hed gar; Cle arb; Ley for; Rub ulm; Dic ant;	45%	
2. Water lines	2,5	0	Hed gar; Cle arb; Ley for; Rub ulm; Dic ant;	0%	
3. Forestall access opening	0,3	0,3	Hed gar; Cle arb; Ley for; Rub ulm; Dic ant;	100%	
4. Natural areas at high altitude	35,9	0,8	Hed gar; Cle arb; Ley for; Rub ulm; Dic ant;	2%	
5. Natural areas at low altitude	27,5	0	Pit und; Hed gar; Cle arb; Ley for; Rub ulm; Dic ant; Cyt coo	0%	
6. *Pittosporum undulatum* domintated areas	17,1	0	Pit und; Hed gar	0%	
7. Catchment protection area	0,6	0	Pit und; Hed gar; Cle arb	0%	
8. Landslides restoration	0,6	0	Pit und; Hed gar; Cle arb; Dic ant	0%	
TOTAL	**133,8**	**24,85**		**19%**	

TERCEIRA

Terceira Island continues to have by far the biggest investment into invasive species control in terms of area (38,1 ha in 2022 and 2023; see Tables 1 and 12, and Figure 17).

In the Lagoa do Negro area, invasive species continued to be removed twice a year, in both 2022 and 2023, in an area of approximately 1,53 ha. The species removed were *Rubus ulmifolius*, *Crocosmia* spp., *Solanum mauritianum*, *Hedychium gardnerianum* and *Scrophularia sambucifolia*. A total of 35.958 individuals of *Cryptomeria japonica*, mostly juveniles, was also removed.

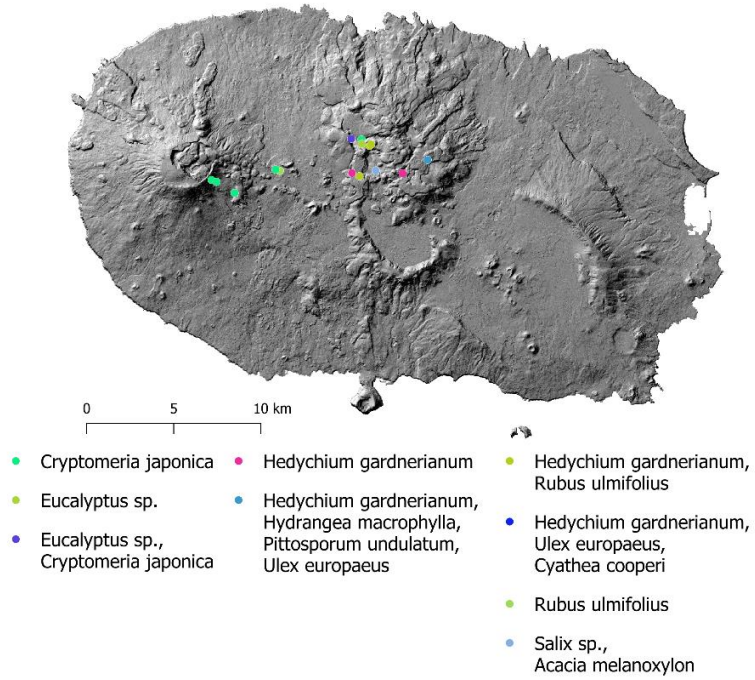

Figure 17. Map of IAS removal activities on Terceira Island in 2022 and 2023.

In Biscoito da Ferraria, Rocha do Juncal and Vale da Vinagreira, around 5,76 hectares were intervened between 2022 and 2023, removing *Rubus ulmifolius* and *Hedychium gardnerianum*, and subsequently, maintenance work was carried out twice a year. In total, 8.984 individuals of *Cryptomeria japonica* and more than 200 individuals of *Acacia melanoxylon* were removed using chainsaws or killed with the drill & inject method.

In 2022, the invasive tree species in Quinta da Madalena were removed or killed using the drill & inject technique, and maintenance work is carried out annually. In Furnas do Enxofre, *Rubus ulmifolius* was removed almost entirely from an area of 3,24 ha.

In 2023, a total of 1.871 individuals of *Eucalyptus melanophloia* were cut down and shredded locally in the Turfeira do Sanguinhal intervention area. Starting in the end of 2022, an area of 2,1 ha was cleaned of *Rubus ulmifolius* and *Hedychium gardnerianum*, and maintenance work takes place twice a year.

In the Pico do Sanguinhal intervention area, 2,48 ha were cleaned of *Rubus ulmifolius* and *Hedychium gardnerianum* in 2023.

2. Overall progress

Overall progress of the implementation of sub-action C8.1 is within the timeframe defined in the project. All but one milestone has been achieved (Table 4).

Table 4. Milestones for sub-action C8.1.

Milestone	Due date	Achieved
1st control intervention	31/12/2020	✓
1st interventions in all areas accomplished	31/12/2021	✓
Interventions in 50% of the project areas affected by IAS accomplished	31/12/2022	✗
No adult/mature individuals of IAS flora present in intervened areas	31/12/2027	

The present report constitutes the second intermediate report describing the developments in the implementation of this sub-action and the associated results in 2022 and 2023 (deliverable D154). So far, all due deliverables have been achieved (Table 5).

Table 5. Deliverables for sub-action C8.1.

Deliverable	ID	Due date	
Photos and maps evidencing the different implemented control techniques	D31	31/12/2020	✓
Sub-action report to be delivered together with Phase I report	D95	31/12/2021	✓
Sub-action report to be delivered together with Phase II report	D154	31/12/2023	✓
Sub-action report to be delivered together with Phase III report	D180	31/12/2025	
Final report	D252	31/12/2027	

Figure 18 illustrates the actual progress of the implementation of sub-action C8.1 in relation to the proposed timeframe.

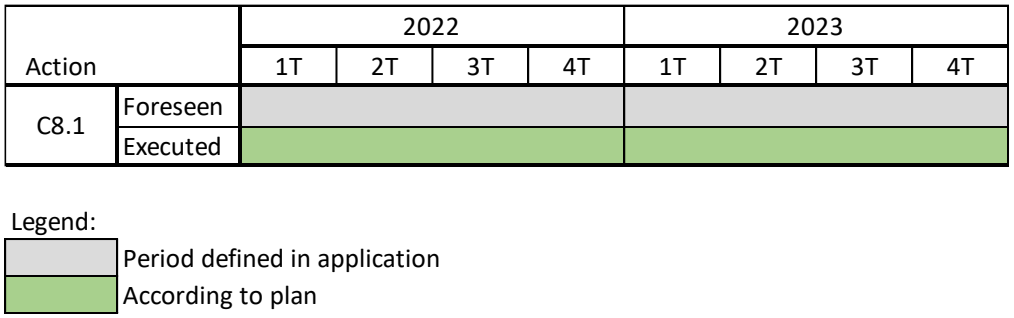

Figure 18. Gantt-chart illustrating overall progress of sub-action C8.1.

Annex I

Table 6. Invasive species removal activities on Corvo Island in 2022 and 2023.

Locality	Target species	Start date	Weight removed (kg)	Volume removed (m^3)	No. of individuals removed	Intervened area (m^2)	No. of working days
Casinha Velha	*Hedychium gardnerianum*	18/01/2022	-	-	20	714	1
Cantinho	*Solanum mauritianum*	20/01/2022	-	-	40	11.404	2
Entre as Cancelas	*Hedychium gardnerianum*	19/09/2022	1.200	-	-	70	5
Miradouro do Portão	*Arundo donax*	19/09/2022	600	-	-	3.000	3
Caldeirão (Cabouço)	*Plecostachys serpyllifolia*	4/10/2022	320	-	-	4.000	1
Estrada Leste	*Plecostachys serpyllifolia*	6/10/2022	410	-	-	5.000	1
Porto Novo	*Plecostachys serpyllifolia*	10/08/2023	300	-	-	0	1
Poço de Água	*Hedychium gardnerianum*	7/11/2023	100	-	-	10	1

Table 7. Invasive species removal activities on Faial Island in 2022.

Locality	Target species	Start date	Weight removed (kg)	Volume removed (m^3)	No. of individuals removed	Intervened area (m^2)	No. of working days
Ribeira da Lomba	*Hydrangea macrophylla*	20/06/2022	-	1,5	-	330	5
Ribeira da Lomba	*Hydrangea macrophylla*	25/06/2022	-	5	-	2.056	5
Ribeira da Lomba	*Hydrangea macrophylla*	4/07/2022	-	3	-	690	10
Porto Pim	*Ipomoea pes-caprae*	9/09/2022	5	-	-	1	1

Table 8. Invasive species removal activities on Flores Island in 2022 and 2023.

Locality	Target species	Start date	Weight removed (kg)	Volume removed (m^3)	No. of individuals removed	Intervened area (m^2)	No. of working days
Lagoa Branca	*Hedychium gardnerianum, Hydrangea macrophylla, Pittosporum undulatum, Rubus ulmifolius*	23/02/2022	2.785	119	-	296	29
Caldeira Branca	*Hedychium gardnerianum, Hydrangea macrophylla, Cryptomeria japonica*	16/01/2023	1.500	23	-	15	9

Table 9. Invasive species removal activities on Graciosa Island in 2022 and 2023.

Locality	Target species	Start date	Weight removed (kg)	Volume removed (m^3)	No. of individuals removed	Intervened area (m^2)	No. of working days
Ponta da Barca	*Tamarix africana*	8/02/2022	60	3	4	4	1
Ponta da Restinga	*Arundo donax*	12/04/2022	10	10	-	102	1
Ilhéu da Praia	*Galactites tomentosa*	3/05/2022	2	1	-	75	2
Ilhéu da Praia	*Tamarix africana*	3/05/2022	1.000	-	25	2.915	2
Ilhéu da Praia	*Tetragonia tetragonoides*	3/05/2022	50	5	-	75	2
Ponta Branca	*Hedychium gardnerianum, Rubus ulmifolius, Pteridium aquilinum*	17/06/2022	450	56	-	129	1
Ilhéu da Praia	*Lantana camara*	20/09/2022	15	10	20	552	1
Ilhéu da Praia	*Tamarix africana*	20/09/2022	15	5	2	267	-
Ilhéu de Baixo	*Tetragonia tetragonoides*	11/10/2022	550	25	-	150	1
Ilhéu da Praia	*Tetragonia tetragonoides*	13/10/2022	33	3	-	6	1
Ponta Branca	*Hedychium gardnerianum, Rubus ulmifolius*	9/11/2022	163	25	-	126	1
Ponta Branca	*Hedychium gardnerianum, Rubus ulmifolius*	15/12/2022	30	15	-	520	1

Locality	Target species	Start date	Weight removed (kg)	Volume removed (m^3)	No. of individuals removed	Intervened area (m^2)	No. of working days
Ponta Branca	*Hedychium gardnerianum, Rubus ulmifolius*	20/03/2023	100	10	-	100	1
Ilhéu da Praia	*Lantana camara, Galactites tomentosus*	31/05/2023	120	20	-	2.034	1
Ponta Branca	*Hedychium gardnerianum, Rubus ulmifolius*	26/07/2023	200	25	-	500	1
Ilhéu da Praia	*Tamarix africana, Lantana camara*	30/08/2023	1.000	500	-	1.786	5
Ponta Branca	*Hedychium gardnerianum, Rubus ulmifolius*	2/11/2023	200	25	-	2.052	2
Ilhéu da Praia	*Tetragonia tetragonoides, Tamarix africana*	27/02/2024	300	25	-	1.515	1

Table 10. Invasive species removal activities on Pico Island in 2022 and 2023.

Locality	Target species	Start date	Weight removed (kg)	Volume removed (m^3)	No. of individuals removed	Intervened area (m^2)	No. of working days
Meia encosta da Prainha	*Hedychium gardnerianum*	12/04/2022	300	-	-	400	1
Serra de Santa Bárbara	*Hedychium gardnerianum, Hydrangea macrophylla*	12/04/2022	30	-	-	50	-
Lagoa do Paúl	*Cryptomeria japonica*	24/07/2023	-	-	-	7500	5
Lagoa do Capitão	*Drosera rotundifolia, Sarracenia purpurea*	9/08/2023	80	-	-	700	1
Caminho das Lagoas	*Fraxinus excelsior, Acacia melanoxylon*	10/08/2023	-	-	56	-	1
Pico da Urze	*Hydrangea macrophylla*	17/08/2023	390	-	-	-	2

Table 11. Invasive species removal activities on Santa Maria Island in 2022 and 2023.

Locality	Target species	Start date	Weight removed (kg)	Volume removed (m^3)	No. of individuals removed	Intervened area (m^2)	No. of working days
Ponta do Castelo	*Agave americana, Carpobrotus edulis*	14/04/2022	-	30	-	-	5
Ponta do Castelo	*Agave americana*	4/09/2022	-	-	-	-	5
Ilhéu da Vila	*Tetragonia tetragonoides*	10/10/2022	-	-	-	-	1

Locality	Target species	Start date	Weight removed (kg)	Volume removed (m^3)	No. of individuals removed	Intervened area (m^2)	No. of working days
Ilhéu da Vila	*Acacia melanoxylon*	11/10/2022	-	-	3	-	1
Ilhéu da Vila	*Opuntia ficus-indica*	11/10/2022	-	-	7	-	-
Ilhéu da Vila	*Tetragonia tetragonoides*	11/10/2022	50	-	-	-	-
Ilhéu da Vila	*Tetragonia tetragonoides*	13/04/2023	-	-	-	-	1
Ponta do Castelo	*Agave americana*	26/06/2023	-	12	-	-	4
Ilhéu da Vila	*Tetragonia tetragonoides*	24/07/2023	-	-	-	-	1
Ponta do Castelo	*Agave americana*	28/08/2023	-	-	-	-	5

Table 12. Invasive species removal activities on São Jorge Island in 2022.

Locality	Target species	Start date	Weight removed (kg)	Volume removed (m^3)	No. of individuals removed	Intervened area (m^2)	No. of working days
Fajã dos Cubres	*Juncus acutus, Cyrtomium falcatum*	1/02/2022	-	-	-	4.381	2
Fajã dos Cubres	*Arundo donax, Hedychium gardnerianum*	25/02/2022	-	-	-	822	1
Fajã dos Cubres	*Rubus ulmifolius, Hedychium gardnerianum, Juncus acutus*	28/02/2022	-	-	-	1.735	1
Fajã dos Cubres	*Ficus carica*	10/03/2022	-	-	-	97	2
Trilho da Fajã do Ouvidor	*Tradescantia fluminensis*	11/05/2022	-	-	-	50	1
Fajã dos Cubres	*Rubus ulmifolius, Hedychium gardnerianum, Arundo donax*	19/05/2022	-	-	-	23.530	5
Fajã dos Cubres	*Chaetomorpha* sp.	12/10/2022	-	6	-	2.900	2
Fajã dos Cubres	*Chaetomorpha* sp.	18/11/2022	-	15	-	8.700	5
Fajã dos Cubres	*Rubus ulmifolius, Hedychium gardnerianum, Juncus acutus, Arundo donax, Pittosporum undulatum, Trifolium*	13/06/2022	-	-	-	40.210	5

Locality	Target species	Start date	Weight removed (kg)	Volume removed (m³)	No. of individuals removed	Intervened area (m²)	No. of working days
	repens, Tetrapanax papyriferus						
Fajã dos Cubres	*Cyrtomium falcatum, Crocosmia crocosmiiflora, Phytolacca americana, Apium graveolens, Lolium multiflorum*	28/07/2023	50	-	-	1.200	1

Table 13. Invasive species removal activities on São Miguel Island in 2022 and 2023.

Locality	Target species	Start date	Weight removed (kg)	Volume removed (m³)	No. of individuals removed	Intervened area (m²)	No. of working days
Lagoa do Fogo	*Cortaderia selloana*	24/01/2022	-	6	4	94.391	1
Lagoa do Fogo	*Cortaderia selloana*	25/01/2022	-	9	6	0	1
Fajã do Araújo - Nordeste	*Osteospermum* sp., *Cyrtomium falcatum*	22/02/2022	-	3	-	341	2
Lagoa do Fogo	*Cryptomeria japonica, Rubus ulmifolius, Hedychium gardnerianum*	24/02/2022	-	64,8	-	31.460	2
Cumeeira das Sete Cidades	*Hedychium gardnerianum*	28/02/2022	-	1.5	-	39	1
Lagoa do Fogo	*Cryptomeria japonica, Rubus ulmifolius, Hedychium gardnerianum*	3/03/2022	-	194,4	-	-	6
Furnas - Estrada Regional	*Pueraria lobata*	11/04/2022	3.535	0	-	150	1
Ponta da Galera - Caloura	*Osteospermum fruticosum, Carpobrotus edulis*	14/04/2022	-	1,5	-	395	1
Furnas - Estrada Regional	*Pueraria lobata*	7/07/2022	-	1,5	-	150	1
Furnas - Estrada Regional	*Pueraria lobata*	21/07/2022	-	2	-	150	1
Serra Devassa	*Gunnera tinctoria*	22/07/2022	3.000	-	-	9.050	6
Pico do Carvão	*Gunnera tinctoria*	29/10/2022	5.920	-	-	379	1
Miradouro do Frade	*Carpobrotus edulis, Osteospermum* sp.	16/02/2023	-	1	-	47	1
Pico do Carvão	*Gunnera tinctoria*	12/05/2023	2.400	-	-	80	1

Locality	Target species	Start date	Weight removed (kg)	Volume removed (m³)	No. of individuals removed	Intervened area (m²)	No. of working days
Cumeeira das Sete Cidades	*Hedychium gardnerianum, Hydrangea macrophylla, Rubus ulmifolius*	3/07/2023	-	4,5	-	40	1
Cumeeira das Sete Cidades	*Hedychium gardnerianum, Hydrangea macrophylla, Rubus ulmifolius*	3/07/2023	-	2	-	-	1
Pico do Carvão	*Gunnera tinctoria*	7/10/2023	2.956	-	-	110	1

Table 14. Invasive species removal activities on Terceira Island in 2022 and 2023.

Locality	Target species	Start date	Weight removed (kg)	Volume removed (m³)	No. of individuals removed	Intervened area (m²)	No. of working days
Pico Alto e Tamujal_3	*Eucalyptus* sp.	3/01/2022	-	-	500	88.813	17
Turfeira da Lomba	*Cryptomeria japonica*	5/01/2022	-	-	926	-	7
Pico Alto e Tamujal_3	*Eucalyptus* sp.	1/03/2022	-	-	630	182.000	21
Lagoa do Negro	*Rubus ulmifolius*	2/05/2022	-	-	-	14.000	5
Pico Alto e Tamujal_3	*Salix* sp., *Acacia melanoxylon*	2/05/2022	-	-	30	-	2
Pico Alto e Tamujal_7	*Hedychium gardnerianum*	21/06/2022	-	-	-	2.700	4
Quinta da Madalena	*Hedychium gardnerianum, Hydrangea macrophylla, Pittosporum undulatum, Ulex europaeus*	11/07/2022	-	-	1.500	5.000	10
Turfeira da Lomba	*Cryptomeria japonica*	27/07/2022	-	-	1.081	-	3
Turfeira da Lomba	*Cryptomeria japonica*	1/08/2022	-	-	1.183	-	6
Pico Alto e Tamujal_3	*Hedychium gardnerianum, Ulex europaeus, Cyathea cooperi*	3/02/2023	-	-	-	6.000	2
Quinta da Madalena	*Cryptomeria japonica*	7/03/2023	-	-	33	-	10

Locality	Target species	Start date	Weight removed (kg)	Volume removed (m^3)	No. of individuals removed	Intervened area (m^2)	No. of working days
Pico Alto e Tamujal_5	*Hedychium gardnerianum*	05/2023	-	-	-	2.476	na
Turfeira do Sanguinhal	*Hedychium gardnerianum, Rubus ulmifolius*	17/05/2023	-	-	-	24.939	7
Lagoa do Negro	*Rubus ulmifolius, Crocosmia crocosmiiflora, Solanum mauritianum, Hedychium gardnerianum, Scrophularia* sp.	11/09/2023	-	-	-	11.254	5
Pico do Sanguinhal	*Hedychium gardnerianum, Rubus ulmifolius*	11/2023	-	-	-	25.476	na
Furnas do Enxofre	*Hedychium gardnerianum, Rubus ulmifolius*	11/2023	-	-	-	18.485	na
Biscoito da Ferraria	*Cryptomeria japonica*, *Acacia melanoxylon*		-	-	8.984 + 200	-	na
Turfeira do Sanguinhal	*Eucalyptus melanophloia*		-	-	1.871	-	na
Lagoa do Negro	*Cryptomeria japonica*		-	-	35.958	-	na
Rocha do Juncal	*Eucalyptus* sp., *Cryptomeria japonica*		-	-	554 + 4.641	-	na