

# IMPLEMENTATION OF THE RESCUE AND RELOCATION PLAN FOR AMPHIBIANS AND REPTILES PFV GRAN TENO 200MW



Prepared by





## CONTENTS

<b>1. SUMMARY.....</b>	<b>1</b>
<b>2. INTRODUCTION .....</b>	<b>2</b>
<b>3. OBJECTIVES.....</b>	<b>3</b>
3.1 General objective .....	3
3.2 Specific objectives .....	3
<b>4. MATERIALS AND METHODS .....</b>	<b>3</b>
4.1 Target species .....	3
4.2 Estimated number of individuals to be captured and relocated .....	4
4.3 Capture site.....	6
4.4 Relocation site.....	6
4.4.1 Amphibian relocation site (Site A) .....	8
4.4.2 Reptile relocation site .....	9
4.5 Enrichment of reptile habitats .....	10
4.6 Campaign effort .....	15
4.7 Capture and handling methodology .....	15
4.8 Biometric measurements.....	15
4.9 Transport conditions.....	16
4.10 Relocation of amphibians.....	18
4.11 Relocation of reptiles .....	18
<b>5. RESULTS.....</b>	<b>18</b>
5.1 Rescue and relocation progress .....	18
5.2 Specific richness and abundance of rescued and relocated individuals .....	19
5.3 Biometrics .....	22
5.3.1 Amphibians: .....	22
5.3.2 Reptiles .....	24
5.4 Rescue and relocation of amphibians.....	27
5.5 Reptile rescue and relocation .....	28

6. DISCUSSION .....	30
7. CONCLUSIONS.....	32
8. BIBLIOGRAPHY.....	33
9. APPENDIX .....	34
9.1 Rescue and relocation points for target species .....	34
9.2 Catch permits.....	42

## TABLE INDEX

Table 1. Target species of the Amphibian and Reptile Rescue and Relocation Plan. ....	3
Table 2. Estimation of the number of potential individuals to be caught. ....	5
Table 3. Snout to cloaca length (SNL) in millimetres by amphibian species.....	23
Table 4. Weight in grams per amphibian species. ....	23
Table 5. Snout to cloaca length (SNL) and total length (TL) in millimetres by reptile species. 25	
Table 6. Weight in grams per reptile species.....	25
Table 7. Occupation of rock clusters by target species in rescue and relocation .....	29

## INDEX OF FIGURES

Figure 1. Amphibian and Reptile Rescue and Relocation Plan relocation site. ....	7
Figure 2. Capture site quadrants .....	8
Figure 3. Location of reptile relocation site habitat enrichment.....	14
Figure 4. Transportation of <i>Pleurodema thaul</i> larvae.....	16
Figure 5. Sex ratio recorded by amphibian species .....	22
<b>Figure 6. Graph of average snout-vent length (SNL) and standard deviation by amphibian species</b> .....	23
Figure 7. Graph of mean weight in grams and standard deviation by amphibian species.....	24
Figure 8. Sex ratio recorded by reptile species.....	25
Figure 9. Graph of average snout to cloacal length (SNL) and standard deviation of reptiles in millimetres.....	26
Figure 10. Graph of average total length (TL) and standard deviation of reptiles in millimetres.....	26
Figure 11. Graph of mean weight in grams and standard deviation by reptile species. ....	27

Figure 12. Rescue and relocation sites of *Calyptocephalella gayi*.....35

Figure 13. <i>Pleurodema thaul</i> rescue and relocation points.....	36
Figure 14. Rescue and relocation sites of <i>Galvarinus chilensis</i> .....	37
Figure 15. Rescue and relocation points of <i>Liolaemus chiliensis</i> .....	38
Figure 16. Rescue and relocation points of <i>Liolaemus lemniscatus</i> .....	39
Figure 17. Rescue and relocation points of <i>Liolaemus schroederi</i> .....	40
Figure 18. Rescue and relocation points of <i>Liolaemus tenuis</i> .....	41

## INDEX OF PHOTOGRAPHS

Intermittent flood meadow within the amphibian relocation site. (A).....	9
Photograph 2. Environments recorded at the reptile relocation site (Site B).....	10
Photo 3. Pircas made for the relocation of species of the genus <i>Liolaemus</i> .....	11
Photo 4. Rock clusters prepared for the relocation of snakes. ....	11
Photo 5. Vegetation mounds prepared for the relocation of reptiles of the genus <i>Liolaemus</i> .....	12
Photograph 6. Photographic records of biometric measurements. ....	16
Photograph 7. Record of <i>Philodryas chamissonis</i> (pseudomelanic) specimen disposition in herpetological bag. ....	17
Photograph 8. Recording of boxes for reptile specimens from measurement to release .....	18
Photograph 9. Amphibian specimens rescued and relocated. ....	20
Photograph 10. Reptile specimens rescued and relocated. ....	21
Photograph 11. Amphibian specimens relocated at site A. ....	28
Photograph 12. Photographic record of relocation of reptiles in habitat enrichment. .....	30

## 1. SUMMARY

The PFV Gran Teno 200MW project, as part of its sectoral environmental permits, processed PAS146 for the implementation of an amphibian and reptile rescue and relocation plan. Prior to the execution of the plan and simultaneously (in coordination with the rescue and relocation), habitat enrichment was carried out at the relocation site for reptiles, through the creation of pyramids, rock piles and vegetation mounds. With the corresponding authorisation from the Agricultural and Livestock Service of the Maule Region, an amphibian rescue and relocation campaign was carried out between 11 October and 11 November 2022, with the participation of 25 people grouped in crews of 5, each with at least 2 wildlife specialists. The campaign effort was a total of 8,000 person-hours. As a result of the campaign, the rescue and relocation of 600 specimens of amphibians and

1,406 reptiles. The species *Batrachyla taeniata* was not recorded. On the other hand, one additional reptile species, *Liolaemus schroederi*, was recorded, captured and relocated from the capture site. Six specimens of *Calyptocephalella gayi*, 594 specimens of *Pleurodema thaul*, 9 specimens of *Galvarinus chilensis*, 51 specimens of *Liolaemus chiliensis*, 1,006 specimens of *L. lemnsicatus*, 21 specimens of *L. schroederi*, 239 specimens of *L. tenuis* and 80 specimens of *Philodryas chamissonis* were rescued and relocated. Although this result represents a higher number of specimens than the total number of specimens estimated as the minimum to be rescued and relocated, the values are based on a different abundance to that expected in the previous estimate. This is explained by the fact that the number of specimens to be rescued and relocated is estimated on the basis of the population densities recorded in the environmental characterisation, the results of which are usually less precise than those obtained in a rescue and relocation campaign of the effort used in the execution of this plan (similar to the results of micro-route abundance). Therefore, it is estimated that the implementation of the rescue and relocation plan for amphibians and reptiles is close to and/or exceeds the expected results.

## 2. INTRODUCTION

The PFV Gran Teno 200MW project, hereinafter "the Project", consists of the construction and operation of a Photovoltaic Park for the generation of electricity, which will be located in the Maule Region, Province of Curicó, commune of Teno. Specifically, the Project contemplates the construction of a photovoltaic park consisting of 576,576 photovoltaic panels of 415 Wp each, which together will have a nominal power generation of 200 MW to be injected into the National Electric System (SEN). It also includes the construction and operation of the 33/154 kV Teno Elevating Substation (ES) and a 154 kV Switching Substation in accordance with the provisions of the Technical Standard for Safety and Clarity of Service. It will also require a High Voltage Line (HVL) with a length of 99.63 metres, located inside the Project area, specifically in the South Polygon of the Project, which will allow the connection between the projected Electrical Substation and the existing High Voltage Line called Itagüe - Tinguiririca 154 kV, which crosses the South Polygon of the Project.

Given that within the Area of Influence of the Project, particularly within the area where the interventions of the construction phase are contemplated, during the environmental characterisation of terrestrial vertebrate fauna, the presence of species of low mobility and in conservation category was recorded, the environmental assessment of the Project determined the need for the Sectorial Environmental Permit 146, for the execution of a Rescue and Relocation Plan for Amphibians and Reptiles.

After the environmental qualification of the Project through the RCA N°6/2021 of 8 January 2021, the sectoral processing of PAS146 continued, since at the end of the environmental assessment, pronouncements issued by the State administration body with environmental competence, the Agricultural and Livestock Service (SAG) of the Maule Region, were maintained. The sectoral processing of the PAS146 led to an update of the PAS permit, in which modifications were directed to respond to the requirements of the authority. Therefore, this document reports on the implementation of the Amphibian and Reptile Rescue and Relocation Plan **processed sectorially**, and authorised for implementation by Res. Ex. N°1463/2022 and N°1464/2022 (Appendix 9.2), and **not** Annex 5.1 of the Supplementary Addendum to the EIS of the project. It should be noted that the new background information submitted by the sector was updated in Annex 2 of the relevance consultation whose Exempt Resolution is No. 20227101251.

The implementation of the Rescue and Relocation Plan was carried out between 11 October and 11 November 2022, within the capture site and relocation sites defined in the Project's PAS146 update.



### 3. OBJECTIVES

#### 3.1 General objective

Rescue amphibian and reptile specimens found at the capture site and relocate them to the defined relocation sites, as described in the PAS146 of the PFV Gran Teno 200MW project.

#### 3.2 Specific objectives

- Implement habitat enrichment at the reptile relocation site in coordination with rescue and relocation activities.
- Rescue amphibian and reptile specimens in coordination with the progress of construction activities.
- Collect biometric information on the populations of the rescued species.
- Relocate amphibian and reptile specimens to the defined relocation sites.

### 4. MATERIALS AND METHODS

#### 4.1 Target species

Table 1 shows the species of amphibians and reptiles, respectively, to be captured that have some degree of conservation according to the Species Classification Regulation (RCE) and that were identified in the Project's Area of Influence according to the results set out in the Terrestrial Fauna Characterisation developed as part of the EIS and Addendum (see Annex 4.4 of the Addendum) and in the Supplementary Terrestrial Fauna Characterisation Report developed as part of the Supplementary Addendum (see Annex 4.1 of the Supplementary Addendum). It should be noted that if other native or endemic species of the Amphibia and Reptilia class were recorded, they were considered within the rescue and relocation activities.

**Table 1. Target species of the Amphibian and Reptile Rescue and Relocation Plan.**

CLASS	ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME	CONSERVATION CATEGORY	REFERENCE
Amphibia	Anura	Leiuperidae	<i>Pleurodema thaul</i>	Four-eyed toad	NT	DS 41/2011 MMA
		Calyptocephalellidae	<i>Calyptocephalella gayi</i>	Large Chilean frog	VU	DS 50/2008 MINSEGPRES
		Ceratophrydae	<i>Batrachyla taeniata</i>	Mask frog	NT	DS 41/2011 MMA

CLASS	ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME	CONSERVATION CATEGORY	REFERENCE
Reptilia	Squamata	Liolaemidae	<i>Liolaemus chiliensis</i>	Weeping lizard	LC	DS 19/2012 MMA
			<i>Liolaemus lemniscatus</i>	Lizard lemniscata	LC	DS 19/2012 MMA
			<i>Liolaemus tenuis</i>	Slender lizard	LC	DS 19/2012 MMA
		Colubridae	<i>Galvarinus chilensis</i> (ex <i>Tachymenis chilensis</i> )	Short-tailed snake	LC	DS 16/2016 MMA
			<i>Philodryas chamissonis</i>	Long-tailed snake	LC	DS 16/2016 MMA

Source: TEBAL, 2023.

## 4.2 Estimated number of individuals to be captured and relocated

The number of individuals to capture and relocate was estimated based on the highest densities recorded during the wildlife characterisation campaigns in the Project's environmental assessment process, associated with the surface area of each environment within the capture site. The PAS146 update indicated that the number of individuals to be captured and relocated corresponds to 70% of the estimated number of individuals present at the capture site. In total, the number of amphibians and reptiles to be captured and relocated is 185 and 1,865 respectively.

Table 2. Estimation of the number of potential individuals to be caught.

Species	Very light forest of A. caven with C. alba		Irrigated cereal		A. caven light hawthorn with dense grassland		Sparse thicket of A. caven with dense grassland		Vega		N° of specimens present in the IM	Minimum number of specimens to be caught (70%)
	Area: 14 ha		Surface area: 57.21		Surface area: 98.04		Surface area:210,24		Surface area: 2.2			
	Density	N°	Density	N°	Density	N°	Density	N°	Density	N°		
<i>Pleurodema thaul</i>	-	0,00	0,3	17,16	0,6	58,82	0,2	42,05	5,5	12,10	<b>130,14+2</b>	<b>91,09+2</b>
<i>Calyptocephalella gayi</i>	-	0,00	0,3	17,16	-	0,00	-	0,00	-	0,00	<b>17,16+1</b>	<b>12,01+1</b>
<i>Batrachyla taeniata</i>	0,9	12,60	-	0,00	-	0,00	0,5	105,12	-	0,00	<b>117,72+3</b>	<b>82,40+3</b>
<i>Liolaemus tenuis</i>	0,9	12,60	2,8	160,19	2,7	264,71	1,3	273,31	5,5	12,10	<b>722,91</b>	<b>506,04</b>
<i>Liolaemus lemniscatus</i>	-	0,00	-	0,00	1,6	156,86	3,02	634,92	-	0,00	<b>791,79</b>	<b>554,25</b>
<i>Liolaemus chiliensis</i>	2,7	37,80	9,9	566,38	1,9	186,28	0,5	105,12	5,5	12,10	<b>907,68</b>	<b>635,37</b>
<i>Tachymenis chilensis</i>	-	0,00	0,3	17,16	-	0,00	0,1	21,02	-	0,00	<b>38,19</b>	<b>26,73</b>
<i>Philodryas chamissonis</i>	0,9	12,60	0,8	45,77	0,2	19,61	0,6	126,14	-	0,00	<b>204,12</b>	<b>142,88</b>

Source: Tebal, 2023. Based on average densities in the wildlife characterisation campaigns (spring 2019, autumn, winter and spring 2020) plus a correction factor.

### **4.3 Capture site**

The place of capture of the species corresponds to the effective areas of intervention of the Project, especially those sectors where the activities of construction of photovoltaic panels or other constructions associated with the Project will be carried out and where there are records of the species. This area is made up of a southern polygon and a northern polygon, with a total surface area of 381.74 ha (Figure 1). For the purposes of the organisation of the campaign and the progress of the intervention of the capture site, the site was divided into 59 quadrants of between 5 and 7 ha each, as shown in Figure 2.

### **4.4 Relocation site**

In the PAS146 update, the relocation site foreseen in the environmental assessment of the Project was modified, increasing its surface area and forming two different polygons: Relocation Site A and Relocation Site B, for amphibians and reptiles respectively. The final relocation site has an area of 38.11 ha for Site A (amphibians) and 207.45 ha for Site B (reptiles). In total it has an area of 245.56 ha (Figure 1). Prior to obtaining the capture permit, both relocation sites were characterised through field campaigns to determine the richness (presence of the target species), abundance and population density of the herpetofauna.

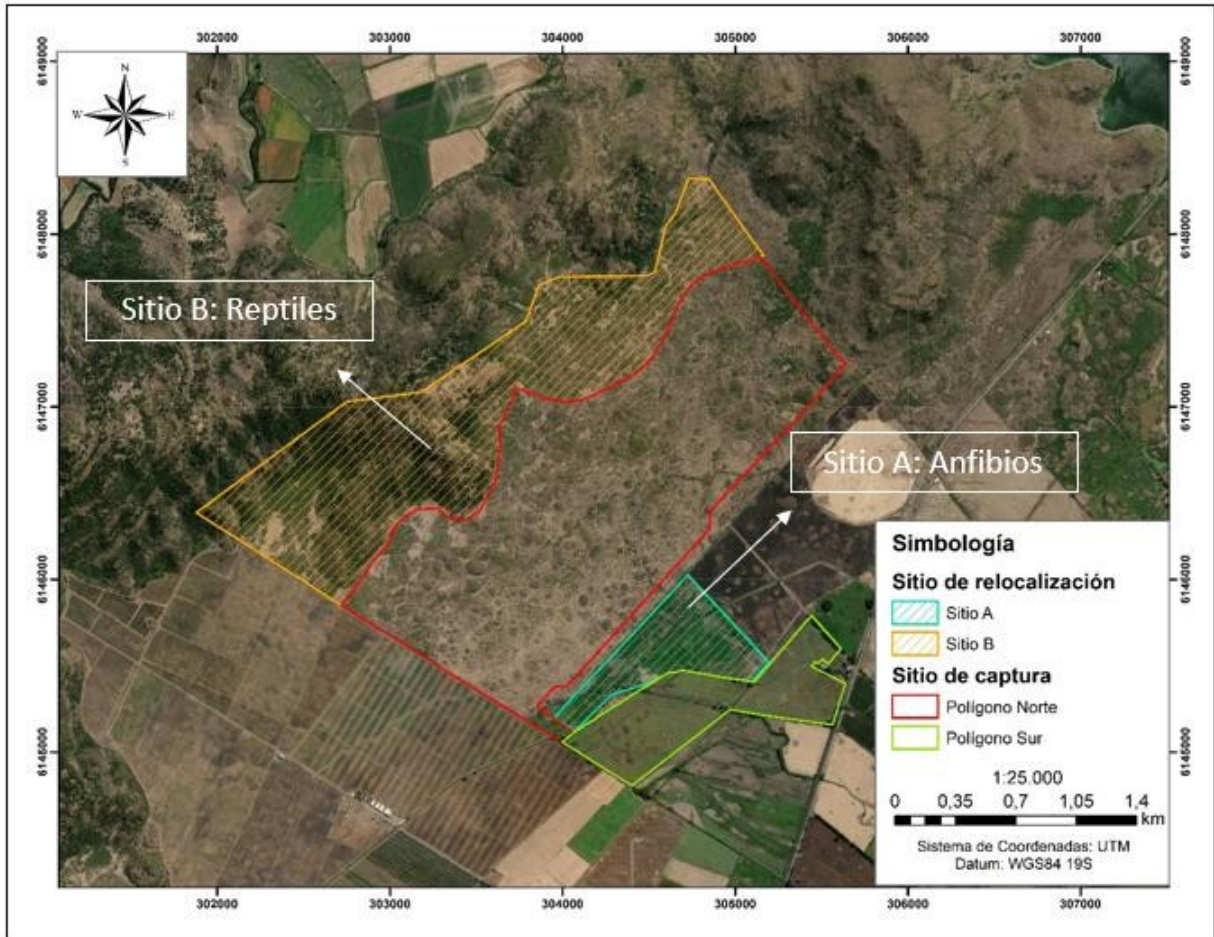
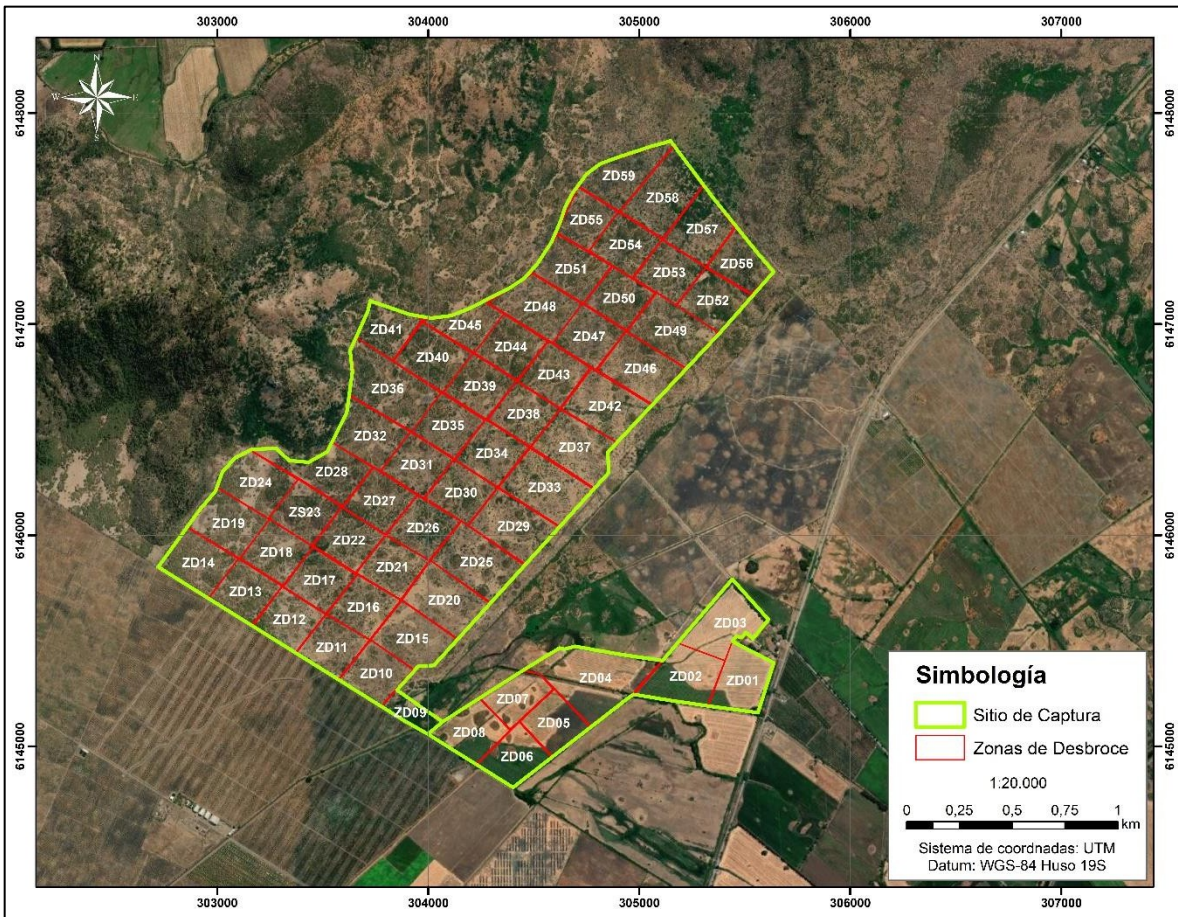


Figure 1. Amphibian and Reptile Rescue and Relocation Plan relocation site.

Source: TEBAL, 2023.





**Figure 2. Capture site quadrants.**

Source: TEBAL, 2023.

#### 4.4.1 Amphibian relocation site (Site A)

It corresponds to an environment dominated by meadows of feral exotic species, but also has *Acacia caven* woodland. There are environments conducive to the development of amphibians, such as watercourses (irrigation channels) and areas with pools, with the presence of amphibian species such as *Pleurodema thaul*, *Calyptocephalella gayi* and *Xenopus laevis*. The area with puddles has a mirror of water with the presence of aquatic plant species and muddy soil. As for the watercourses, riparian plant species were also recorded. The meadow also recorded sectors which, although they did not contain water, did have aquatic plant species, suggesting that part of the meadow is flooded at some time of the year.



**Intermittent flood meadow within the amphibian relocation site (A).**

Source: TEBAL, 2023.

#### **4.4.2 Reptile relocation site**

This site has a predominantly wooded vegetation, where the flat sectors register a hawthorn forest (*Acacia caven*), with areas with open forest and others with a closed forest of low altitude (4 to 6 metres), while the sloping sectors register a sclerophyllous forest, also dominated by *Acacia caven*, but with the presence of tall sclerophyllous species, such as *Cryptocarya alba*, *Quillaja saponaria*, *Peumus boldus*, among others.

Areas of open woodland recorded an almost absolute dominance of *Acacia caven*, and there were also areas where the hawthorn forest changed to grassland with trees as the hawthorn cover was considerably reduced. These sites had abundant burrows and crevices in the ground, which provided a refuge for reptiles. In these areas, *Liolaemus lemniscatus* was recorded using mainly the crevices as shelter.

Areas with closed forest, also dominated by *A. caven*, recorded less reptile activity, however, the presence of *Liolaemus tenuis* was recorded and a moult of *Philodryas chamissonis* was found. Logs and rocks were recorded representing reptile shelter. Finally, the site also records areas with grassland, although in a low proportion. It is also worth noting the presence of a pirca with an extension of 830 metres in length.





**Photograph 2. Environments recorded at the reptile relocation site (Site B).**

Source: TEBAL, 2023.

## 4.5 Enrichment of reptile habitats

Prior to the implementation of the Amphibian and Reptile Rescue and Relocation Plan, habitat enrichment was carried out at the reptile relocation site (Site B). This was done in order to ensure the sheltering capacity of the captured and relocated reptiles.

Habitat enrichment was carried out through the elaboration of pircas and vegetation mounds for the target species belonging to the Liolaemidae family, and rock piles for the species of the Colubridae family. For the pircas, a total surface area was considered that would allow the establishment of 1 individual of the target reptile species every 2 m<sup>2</sup> of pirca (with a width of 0.7 m, a variable length of more than 4 m, and a height of approximately 0.4 m).

For the elaboration of shelters, the recommendations of Lobos *et al.* (2021) were followed. Thus, stones with a minimum length of approximately 20 centimetres each and soil from the same site were used for the pircas. For each vegetation mound, a trunk at least 1 metre long was installed and surrounded by branches from the vegetation cut at the capture site (its preparation was coordinated with the progress of the rescue and relocation and the cutting activities after the release of the plots). For the rock piles, a circular area with a diameter of at least 80 centimetres was prepared, excavated to a depth of at least 10 centimetres, and covered with stones at least 30 cm long and soil from the same site, with a height of at least 30 centimetres approximately.





**Photo 3. Pircas made for the relocation of species of the genus Liolaemus.**  
Source: TEBAL, 2023.



**Photograph 4. Rock clusters prepared for the relocation of snakes.**  
Source: TEBAL, 2023.



**Photo 5. Vegetation mounds prepared for the relocation of reptiles of the genus *Liolaemus*.**

Source: TEBAL, 2023.

The activities associated with shelter development at the relocation site were carried out by groups of workers, supervised by professional herpetologists.

Regarding the material used, in particular rock boulders, the purchase of the input from authorised sources through a contractor company was considered. As for the vegetation to be used, for the species for which vegetation mounds were considered as a measure, they were relocated in areas of site B with more vegetation. The vegetation mounds were made from the vegetation from the felling carried out after the clearing areas were released.

In general, for the implementation of the measures (rock piles, rock piles, vegetation mounds, raschel mesh), the least intervention of the relocation area was considered in order not to affect the fauna of the site.

According to the estimated number of individuals to be captured (at least 70% of the estimated individuals present at the capture site) of the reptile species and their habits, refuges were prepared as follows:

- For *Liolaemus tenuis*, whose estimated number of individuals to be captured and relocated is 506 individuals, pyramids and vegetation mounds were created adjacent to arboreal ecosystems, with favourable solar exposure. In order to have a capacity to host this number of individuals, considering the establishment of 1 individual every 2 m<sup>2</sup> of pircas and 2 individuals per vegetation mound, different pircas were built for a total length of 1332 metres and 20 vegetation mounds.
- For *Liolaemus lemniscatus*, whose estimated number of individuals to be captured and relocated is 555 individuals, pyramids and vegetation mounds were created near edges of

scrubland, espinal and grassland, with favourable solar exposure. In order to have a capacity to host this number of individuals, considering the establishment of 1 individual every 2 m<sup>2</sup> of pyramid and 2 individuals per vegetation mound, different pyramids were built for a total length of 995 metres, and 103 vegetation mounds.

- For *Liolaemus chiliensis*, whose estimated number of individuals to be captured and relocated is 636 individuals, pircas and vegetation mounds were created adjacent to ecosystems near the edges of scrubland, espinal and grasslands, with favourable solar exposure. In order to have a carrying capacity for this number of individuals, considering the establishment of 1 individual every 2 m<sup>2</sup> of pirca, and 2 individuals per vegetation mound, different pircas were built for a total length of 1446 metres, and 61 vegetation mounds.
- For *Philodryas chamissonis*, whose estimated number of individuals to be captured and relocated is 143 individuals, refuges were created by means of rock clusters, considering the establishment of 1 individual per cluster, in a number equal to the estimated abundance to be captured (143).
- For *Tachymenis chilensis*, whose estimated number of individuals to be captured and relocated is 27 individuals, refuges were also created by means of rock clusters, considering the establishment of 1 individual per cluster, in a number equal to the estimated abundance to be captured (27).

In total, 14 pircas with a total length of approximately 3,770 metres, 170 rock piles and 184 vegetation mounds were made.



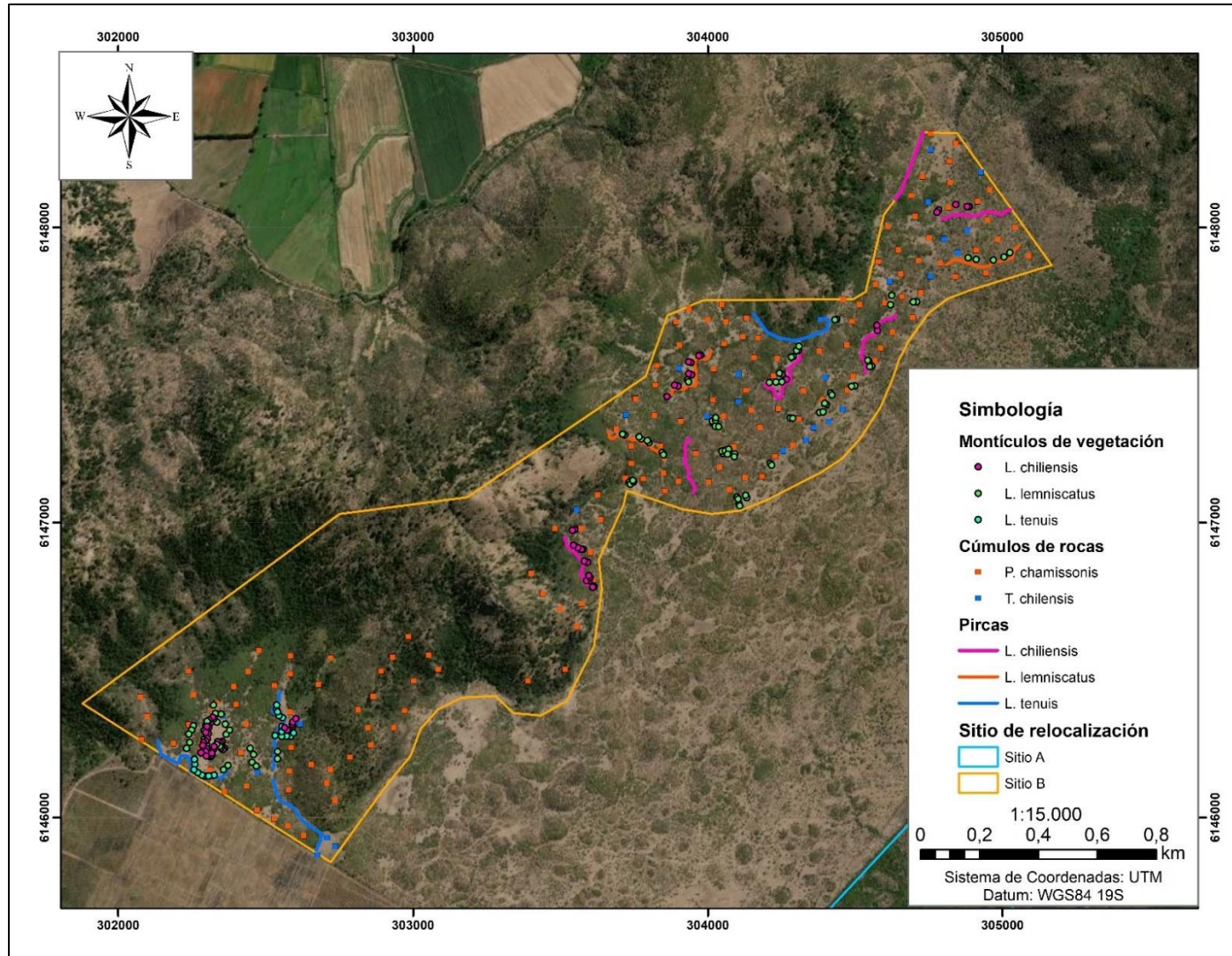


Figure 3. Location of habitat enrichment of the reptile relocation site.

Source: TEBAL, 2023.

## 4.6 Campaign effort

The rescue and relocation campaign was carried out continuously between 11 October and 11 November 2022, totalling 32 days, including both day and night work (see capture and handling methodology). Throughout the campaign, a constant staff of 25 people was maintained for the rescue and relocation work, of which 10 were wildlife specialists, 9 were professional assistants, and 6 were field assistants. The daily effort averaged 10 hours per person per day, for a total campaign effort of 8,000 person-hours.

## 4.7 Capture and handling methodology

Field staff (wildlife specialists) with experience and training in the management of the target species, including the handling of basic biosecurity concepts, were available.

**Amphibians:** this was carried out through manual capture (post-metamorphic) and by hand (pre-metamorphic), by means of active walks and/or directed searches for the target species, in the habitats where this group is present in the area of direct intervention of the Project. The capture tasks were carried out between 20:00 and 02:00 hours, a time coinciding with the increase in activity according to the literature (Vidal & Labra, 2008).

**Reptiles:** this was carried out by manual capture, with a sliding snare and/or hand nets, by means of active walks and/or directed searches for the target species, in the habitats where this group is present in the area of direct intervention of the Project. The capture work was carried out during daylight hours between 09:00 am and 17:00 pm, the time when the individuals are most active.

## 4.8 Biometric measurements

For the execution of the biometric measurement activities, the necessary biosecurity measures were in place for the handling of the individuals. By means of scales, containers to dispose of the individuals (tared), tape measures and spreadsheets, biometric measurements were recorded according to the taxonomic class of the captured individuals. For amphibians, the length from snout to cloaca (LHC) in millimetres, weight in grams, sex, stage, the clearing area in which they were captured and additional observations when available were recorded. For reptiles, snout-to-cloacal length (SNL) and standard length (SL) in millimetres, weight in grams, sex, age range, area where the reptile was caught and additional observations when available were recorded.



**Photograph 6. Photographic records of biometric measurements.**

Source: TEBAL, 2023.

## 4.9 Transport conditions

For amphibians, captured individuals were placed in 15-litre wenbox containers, aerated and conditioned with water from water bodies at the point of capture, as well as artifacts such as pieces of bark and mud. After their biometric measurements were determined, they were taken to the relocation site to be released within 2 hours of capture.



**Figure 4. Transport of *Pleurodema thaul* larvae.**

Source: TEBAL, 2023.



For reptiles, the captured individuals were initially placed in herpetological bags by species, and according to their sex they were arranged individually or in pairs, taking into account the behavioural characteristics of each species.<sup>1</sup> After their biometric measurements, they were placed in 15-litre wenbox containers, aerated and conditioned with artifacts to simulate their habitat. Inside these containers, the individuals were transported by van, at a maximum speed of 20 km/hour and with good ventilation conditions to the relocation site, to finally be released in the shelters prepared for each target species (pyramids, clusters of rocks, vegetation mounds), generally no more than 2 hours after their capture.



Photograph 7. Record of *Philodryas chamissonis* (pseudomelanic) in herpetological bag.

Source: TEBAL, 2023.

---

<sup>1</sup> For male individuals of *Liolaemus tenuis* the factor of territoriality towards other male conspecifics was considered.



**Photograph 8. Recording of boxes for reptile specimens from measurement to release.**

Source: TEBAL, 2023.

#### **4.10 Relocation of amphibians**

Amphibian relocation was carried out no later than 2 hours after capture, for both day and night captures. According to the species, the release point corresponded to suitable habitats within relocation site A (canals, intermittent flood meadows). For each relocation point per individual (or group in case of larvae) the position was marked by GPS.

#### **4.11 Relocation of reptiles**

The relocation of reptiles was carried out exclusively in the enriched habitat, which consisted of rocky outcrops, rock piles and vegetation mounds. For each relocation point per individual, the position was marked by GPS. Relocation was carried out no more than two hours after the capture of each individual.

### **5. RESULTS**

#### **5.1 Rescue and relocation progress**

Teams of 5 people were appointed, composed of at least 2 wildlife specialists. Four teams were constantly deployed in quadrats per day to capture specimens, while one team was mainly dedicated to processing the biometric measurements of the captured individuals. In the quadrants that presented the conditions of



amphibian habitat teams were designated for night work (8:00 PM to 02:00 AM), both capture (rescue), biometric measurements and relocation.

For the release of quadrants, an estimated value of individuals to be rescued and relocated was considered, associated with an approximation of what was estimated to be present in each environment based on the population densities indicated in point 2.2 of this report, and the surface area of each environment per quadrant. The above, considering some flexibility in that these estimates may not be accurate or close to actual abundance.

During the first week, release was achieved from clearing zones ZD01 to ZD08. In the second week it was released from ZD09 to ZD20, in the third week from ZD21 to ZD32, in the fourth week from ZD32 to ZD48, and in the fifth week from ZD49 to ZD59.

## **5.2 Wealth specific y abundance of individuals rescued and relocated**

The following species were observed during the rescue and relocation campaign:

- Amphibians: *Callyptocephalella gayi*, *Pleurodema thaul*.
- Reptiles: *Liolaemus chiliensis*, *Liolaemus lemniscatus*, *Liolaemus schroederi*, *Liolaemus tenuis*, *Philodryas chamissonis*, *Galvarinus chilensis*.

It is important to note that of the PAS146 target species, *Batrachyla taeniata* was not recorded. It is presumed that the baseline record, based on vocalisations, is possibly erroneous and confused with vocalisations of the species *Pleurodema thaul* in a post-metamorphic state. As for reptiles, there was a record of *Liolaemus schroederi*, which had not been recorded in the environmental characterisation during the environmental assessment of the Project (possibly confused with *L. chiliensis*). This species had only previously been recorded in the characterisation of the updated PAS146 relocation site. Although *L. schroederi* was not among the target species, it was rescued and relocated in order to reduce its impact on the Project's construction activities.



**Photograph 9. Amphibian specimens rescued and relocated.**

Source: TEBAL, 2023. a) *Pleurodema thaul*, b) *Calyptocephalella gayi*, c) *P. thaul*, d) *P. thaul*,



**Photograph 10. Reptile specimens rescued and relocated.**

Source: TEBAL, 2023. a) *Liolaemus tenuis*, b) *Liolaemus chiliensis*, c) *Liolaemus schroederi*, d) *Liolaemus lemniscatus*, e) *Galvarinus chilensis*, f) *Philodryas chamissonis*.

The number of individuals rescued and relocated by species was as follows:

Amphibians (600 specimens in total):

- *Batrachyla taeniata* (Masked frog): this species was not recorded during the rescue and relocation campaign. It is presumed that the baseline record, based on vocalisations, is possibly erroneous and confused with vocalisations of the species *Pleurodema thaul* in a post-metamorphic state.
- *Calyptocephalella gayi* (large Chilean frog): 2 juveniles and 4 larval specimens (6 in total) were rescued and relocated.
- *Pleurodema thaul* (four-eyed toad): 284 adult and juvenile specimens and approximately 310 larval specimens (594 in total) were rescued and relocated.

Reptiles (1,406 specimens in total):

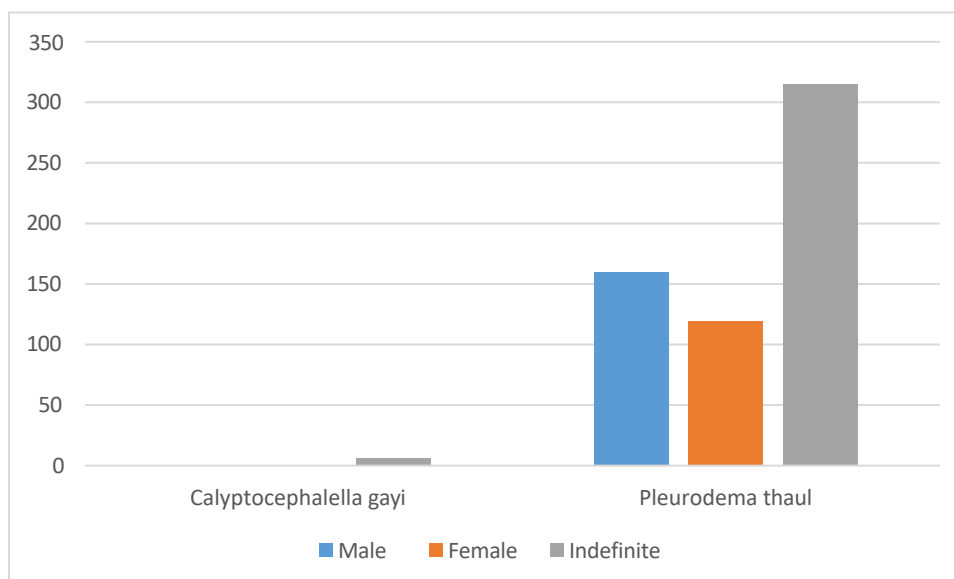
- *Galvarinus chilensis*: 9 specimens were rescued and relocated.

- *Liolaemus chiliensis*: 51 specimens were rescued and relocated.
- *Liolaemus lemniscatus*: 1,006 specimens were rescued and relocated.
- *Liolaemus schroederi*: 21 specimens were rescued and relocated. It should be noted that this species was not described in the environmental characterisation of wildlife (Annex 4.1 of the Complementary Addendum, PFV Gran Teno 200MW project), but it is considered in the count since it is not possible to rule out that the estimated number of individuals to be captured of *L. chiliensis* may have included this species by mistake.
- *Liolaemus tenuis*: 239 specimens were rescued and relocated.
- *Philodryas chamissonis*: 80 specimens were rescued and relocated.

## 5.3 Biometrics

### 5.3.1 Amphibians:

- *Calyptocephalella gayi*: of the 6 specimens of *C. gayi* rescued and relocated, 2 were juveniles (post-metamorphic) and 4 were larvae. Sex was undefined for all of them (Figure 5). Biometric measurements were carried out only on non-larval specimens (2). Therefore, there was no average of their measurements or standard deviation. Their biometric measurements are shown in Table 3 and Table 4.
- *Pleurodema thaul*: of the 594 specimens of *P. thaul* rescued and relocated, 280 are adults, 4 are juveniles and 310 are larvae. Regarding their sex, 160 are males, 119 are females, and 315 are of undefined sex (Figure 5). Their biometric measurements are shown in Table 3 and Table 4.



**Figure 5. Sex ratio recorded by amphibian species.**

Source: TEBAL, 2023.

**Table 3. Snout to cloaca length (SNL) in millimetres by amphibian species.**

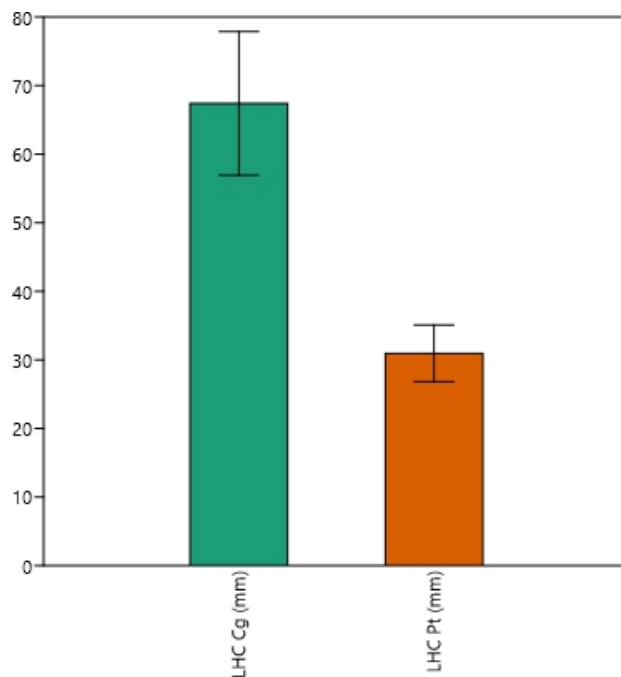
SPECIES	LHC AVERAGE (MM)	LHC MAX (MM)	LHC MIN (MM)	LHC DEV EST (MM)
<i>Calyptocephalella gayi</i>	65,2*	70,4	60	N.A
<i>Pleurodema thaul</i>	30,94	40,7	16,2	4,13

Source: TEBAL, 2023. \*: based on 2 specimens measured.

**Table 4. Weight in grams per amphibian species.**

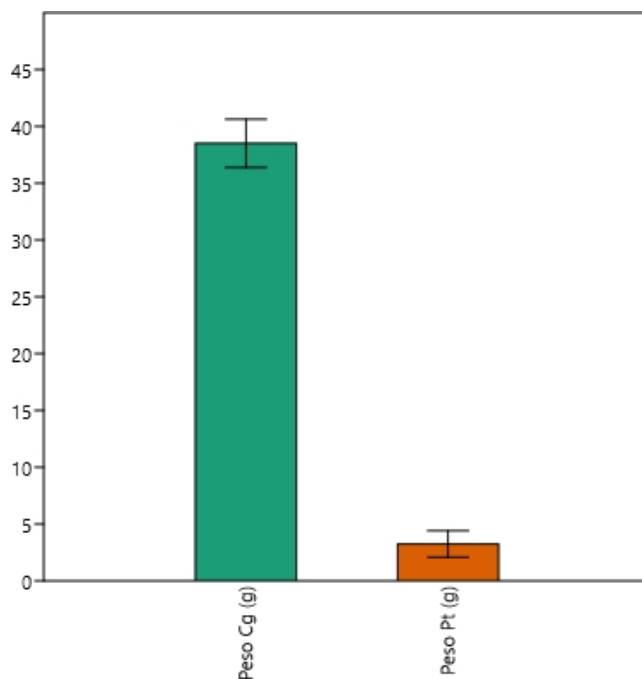
SPECIES	AVERAGE WEIGHT (G)	MAX WEIGHT (G)	MIN WEIGHT (G)	WEIGHT DESV EST (G)
<i>Calyptocephalella gayi</i>	38,5*	40	37	N.A
<i>Pleurodema thaul</i>	3,24	7,4	0,5	1,16

Source: TEBAL, 2023. \*: based on 2 specimens measured.



**Figure 6. Graph of mean snout-vent length (SNL) and standard deviation by amphibian species.**

Source: TEBAL, 2023.



**Figure 7. Graph of mean weight in grams and standard deviation by amphibian species.**

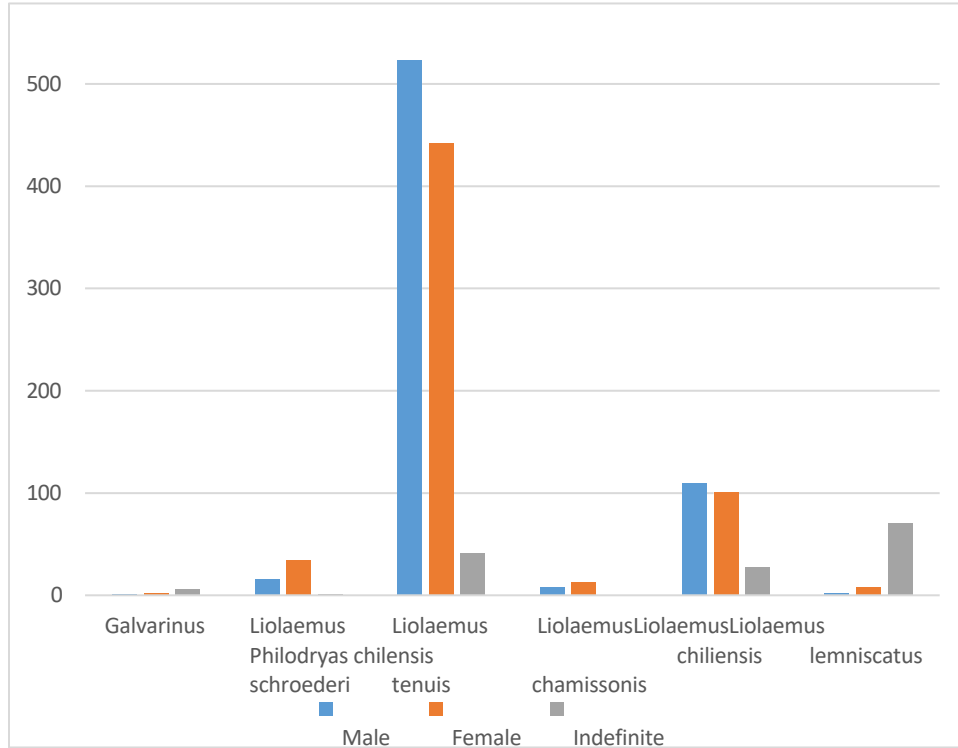
Source: TEBAL, 2023.

### 5.3.2 Reptiles:

- *Galvarinus chilensis*: of the 9 specimens rescued and relocated, 6 are adults, 1 is sub-adult and 2 are juveniles (Figure 8). Regarding their sex, 1 is male, 2 are females and 6 are of undefined sex. Their biometric measurements are shown in Table 5 and Table 6.
- *Liolaemus chiliensis*: of the 51 specimens rescued and relocated, 38 are adults, 3 sub-adults and 10 juveniles (Figure 8). Regarding their sex, 16 are males, 34 are females and 1 is of undefined sex. Their biometric measurements are shown in Table 5 and Table 6.
- *Liolaemus lemniscatus*: of the 1,006 specimens rescued and relocated, 793 are adults, 55 are sub-adults, and 158 are juveniles (Figure 8). Regarding their sex, 523 are males, 442 are females and 41 are of undefined sex. Their biometric measurements are shown in Table 5 and Table 6.
- *Liolaemus schroederi*: of the 21 specimens rescued and relocated, 13 are adults and 8 are juveniles (Figure 8). Regarding their sex, 8 are males and 13 are females. Their biometric measurements are shown in Table 5 and Table 6.
- *Liolaemus tenuis*: of the 239 specimens rescued and relocated, 164 are adults, 10 are sub-adults and 65 are juveniles (Figure 8). Regarding their sex, 110 are males, 101 are females and 28 are of undefined sex. Their biometric measurements are shown in Table 5 and Table 6.



- *Philodryas chamissonis*: of the 80 specimens rescued and relocated, 55 are adults and 25 are juveniles. Regarding their sex, 2 are male, 8 are female and 70 are of undefined sex (Figure 8). Their biometric measurements are shown in Table 5 and Table 6.



**Figure 8. Sex ratio recorded by reptile species.**

Source: TEBAL, 2023.

**Table 5. Snout to cloaca length (SNL) and total length (TL) in millimetres by reptile species.**

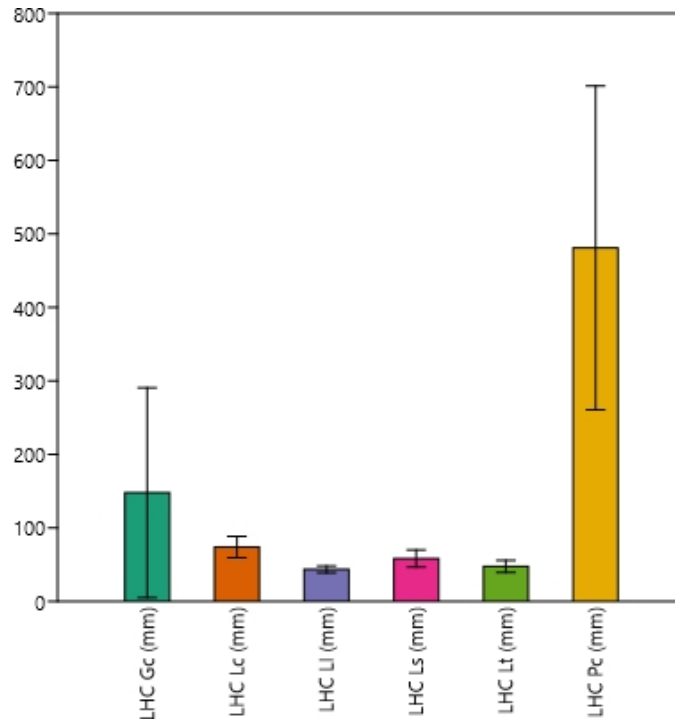
SPECIES	LHC AVERAGE (MM)	LHC MAX (MM)	LHC MIN (MM)	LHC DESV EST (MM)	AVERAGE LT (MM)	LT MAX (MM)	LT MIN (MM)	LT DEV EST (MM)
<i>Galvarinus chilensis</i>	147,77	360	34	142,74	177,72	425	39,5	172,19
<i>Liolaemus chiliensis</i>	73,95	99,9	50,9	14,55	202,29	293,5	89,4	8,08
<i>Liolaemus lemniscatus</i>	43,56	80,2	22,4	4,68	100,5	168,5	40,2	0,64
<i>Liolaemus schroederi</i>	58,23	77,3	40,3	11,62	167,31	224,3	69,6	40,92
<i>Liolaemus tenuis</i>	47,43	64,2	24,3	8,18	118,37	215,9	32,2	34,01
<i>Philodryas chamissonis</i>	480,87	1.040	41,5	220,38	667,93	1.330	65	68,76

Source: TEBAL, 2023.

**Table 6. Weight in grams per reptile species.**

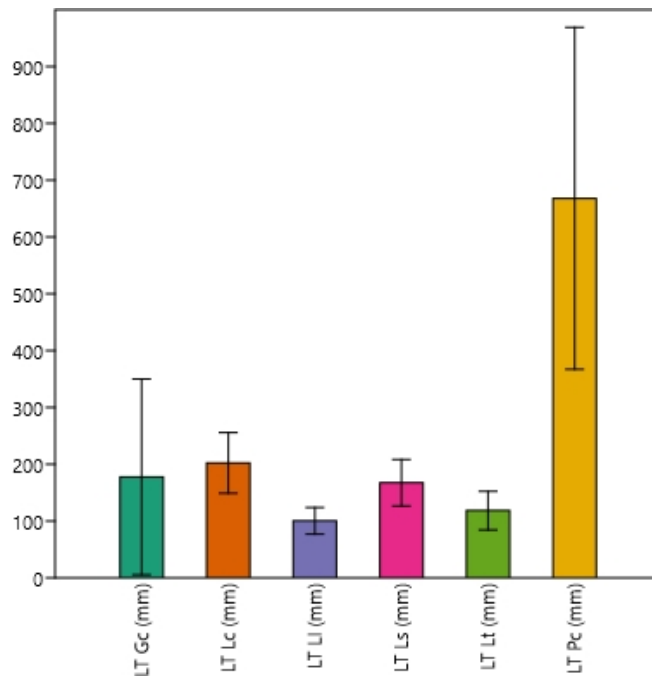
SPECIES	AVERAGE WEIGHT (G)	MAX WEIGHT (G)	MIN WEIGHT (G)	WEIGHT DESV EST (G)
<i>Galvarinus chilensis</i>	25,15	41,4	3,1	12,12
<i>Liolaemus chiliensis</i>	12,93	31	3,9	8,08
<i>Liolaemus lemniscatus</i>	2,48	4,2	0,6	0,64
<i>Liolaemus schroederi</i>	6,17	13	1,7	3,71
<i>Liolaemus tenuis</i>	3,53	19,2	0,7	1,73
<i>Philodryas chamissonis</i>	77,34	493	3,4	68,76

Source: TEBAL, 2023.



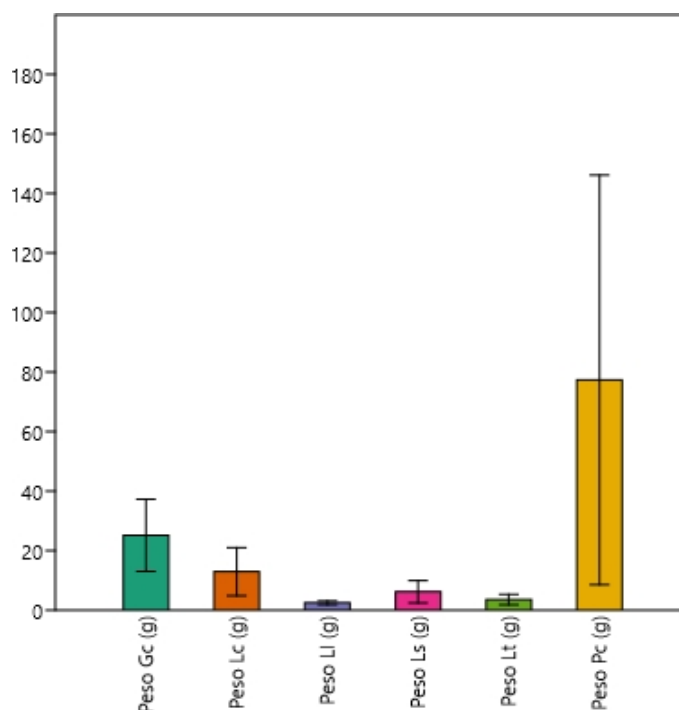
**Figure 9. Graph of the average snout to cloaca length (SNL) and standard deviation of reptiles in millimetres.**

Source: TEBAL, 2023. Gc: *galvarinus chilensis*; Lc: *Liolaemus chiliensis*; Li: *Liolaemus lemniscatus*; Ls: *Liolaemus schroederi*; Lt: *Liolaemus tenuis*; Pc: *Philodryas chamissonis*.



**Figure 10. Graph of average total length (TL) and standard deviation of reptiles in millimetres.** Source: TEBAL, 2023. Gc: *galvarinus chilensis*; Lc: *Liolaemus chiliensis*; Li: *Liolaemus lemniscatus*; Ls: *Liolaemus schroederi*; Lt: *Liolaemus tenuis*; Pc: *Philodryas chamissonis*.





**Figure 11. Graph of mean weight in grams and standard deviation by reptile species.**

Source: TEBAL, 2023. Gc: *galvarinus chilensis*; Lc: *Liolaemus chiliensis*; Ll: *Liolaemus lemniscatus*; Ls: *Liolaemus schroederi*; Lt: *Liolaemus tenuis*; Pc: *Philodryas chamissonis*.

## 5.4 Rescue and relocation of amphibians

Amphibian rescue days were determined by recording the presence of suitable habitats and direct recording of specimens on daytime reptile rescue days. Individuals recorded on daytime days were also rescued and relocated. The amphibian-specific days were conducted between 8:00 PM and 2:00 AM.

The capture was mainly carried out in quadrants that presented favourable conditions, such as the ZD09 clearing zone where a body of water is located, and other areas where irrigation canals cross in espinal and forest environments. Capture was carried out by hand and by jigging, initially placing the specimens in buckets for subsequent biometric measurement, transport in conditioned boxes and their final relocation.

Relocation was carried out in areas of site A where wet conditions were recognised, such as in and around irrigation canals. For *Calyptocephalella gayi*, specimens were relocated exclusively in canals.



**Photograph 11. Amphibian specimens relocated at site A.**

Source: TEBAL, 2023.

## 5.5 Reptile rescue and relocation

The relocation of reptiles was carried out exclusively in habitat enrichment. In order to determine the target species for the pircas, the estimation of the number of individuals to be rescued and relocated was considered. Considering the desired surface area per individual released, 4 pircas of *Liolaemus tenuis*, 4 pircas of *L. lemniscatus* and 6 pircas of *L. chiliensis* were considered necessary. However, the composition of the total number of these target species was different from the estimate, with a higher number of *L. lemniscatus* and a lower number of *L. tenuis* and *L. chiliensis*. In addition, there was the presence of a lizard species that had not been foreseen in the habitat enrichment, namely *L. schroederi*. However, this species shares habits (arboreal) with *L. tenuis*, so they were relocated on pircas intended for the latter. On the other hand, given the high abundance of *L. lemniscatus*, individuals of this species were released in pircas of *L. chiliensis* that had not reached their full capacity.

For the rock clusters, a capacity of 80 out of 143 *Philodryas chamissonis* rock clusters (55.94%), and 9 out of 27 *Galvarinus chilensis* rock clusters (33.33%) was achieved. The occupied capacity of rock clusters is presented in the following table:

**Table 7. Occupation of rock clusters by target species in rescue and relocation.**

<i>Philodryas chamissonis</i> (Pc)									
Pc01	Pc02	Pc03	Pc04	Pc05	Pc06	Pc07	Pc08	Pc09	Pc10
Pc11	Pc12	Pc13	Pc14	Pc15	Pc16	Pc17	Pc18	Pc19	Pc20
Pc21	Pc22	Pc23	Pc24	Pc25	Pc26	Pc27	Pc28	Pc29	Pc30
Pc31	Pc32	Pc33	Pc34	Pc35	Pc36	Pc37	Pc38	Pc39	Pc40
Pc41	Pc42	Pc43	Pc44	Pc45	Pc46	Pc47	Pc48	Pc49	Pc50
Pc51	Pc52	Pc53	Pc54	Pc55	Pc56	Pc57	Pc58	Pc59	Pc60
Pc61	Pc62	Pc63	Pc64	Pc65	Pc66	Pc67	Pc68	Pc69	Pc70
Pc71	Pc72	Pc73	Pc74	Pc75	Pc76	Pc77	Pc78	Pc79	Pc80
Pc81	Pc82	Pc83	Pc84	Pc85	Pc86	Pc87	Pc88	Pc89	Pc90
Pc91	Pc92	Pc93	Pc94	Pc95	Pc96	Pc97	Pc98	Pc99	Pc100
Pc101	Pc102	Pc103	Pc104	Pc105	Pc106	Pc107	Pc108	Pc109	Pc110
Pc111	Pc112	Pc113	Pc114	Pc115	Pc116	Pc117	Pc118	Pc119	Pc120
Pc121	Pc122	Pc123	Pc124	Pc125	Pc126	Pc127	Pc128	Pc129	Pc130
Pc131	Pc132	Pc133	Pc134	Pc135	Pc136	Pc137	Pc138	Pc139	Pc140
Pc141	Pc142	Pc143							
<i>Tachymenis chilensis</i> (Tc) ( <i>Galvarinus chilensis</i> )									
Tc01	Tc02	Tc03	Tc04	Tc05	Tc06	Tc07	Tc08	Tc09	Tc10
Tc11	Tc12	Tc13	Tc14	Tc15	Tc16	Tc17	Tc18	Tc19	Tc20
Tc21	Tc22	Tc23	Tc24	Tc25	Tc26	Tc27			

Source: TEBAL, 2023. Green cell: cluster with relocation; Mustard cell: cluster without relocation.

Relocation on vegetation mounds was only carried out on one mound, leaving the rest of the mounds available for eventual colonisation by individuals that previously inhabited relocation site B, in addition to the relocated specimens.



**Photograph 12. Photographic record of relocation of reptiles in habitat enrichment.**

Source: TEBAL, 2023.

## 6. DISCUSSION

The target species of the Rescue and Relocation Plan were 3 amphibians and 5 reptiles. During the execution of the rescue and relocation, 2 species of amphibians and 6 species of reptiles were recorded, captured and relocated. As for the target amphibians, the presence of *Batrachyla taeniata* was not reported at the capture site. According to Salaberry *et al*, (1981) this species is more abundant to the south of Concepción. North of Concepción it is still debated whether its distribution is continuous. It is also indicated that in the O'Higgins Region (close to the site of capture) there are records mainly associated with the coast, as observed on the INaturalist platform (2023). Given this, it cannot be ruled out that its recording by vocalisation in the characterisation of the Area of Influence of the environmental assessment of the Project has been confused with vocalisations of some stage of *Pleurodema thaul*. As for reptiles, during the execution of the plan, the presence of an extra species of reptile was noted, corresponding to *Liolaemus schroederi*, which in its different morphs and age ranges can easily be confused with *Liolaemus chiliensis*.

It is considered that an environmental characterisation survey with the design and sampling effort that is carried out results in a less accurate approximation of species richness, abundance and population density than what can be recorded in a rescue and recovery campaign.

relocation of this scale (8,000 hours of work focused on herpetofauna). Thus, the latter provides similar results to a micro-routing of the target species, being possible to have more accurate results in terms of herpetofauna richness and abundance (not population densities).

As for the estimated number of individuals to be caught and relocated, it was determined that 85 specimens of *B. taeniata*, 13 specimens of *C. gayi*, 93 specimens of *P. thaul*, 27 specimens of *G. chilensis* (ex *Tachymenis chilensis*), 635 specimens of *L. chiliensis*, 554 specimens of *L. lemniscatus*, 506 specimens of *L. tenuis* and 143 specimens of *P. chamissonis* would be caught and relocated.

The result of the campaign was a number of specimens rescued and relocated by species: 0 specimens of *B. taeniata*, 6 specimens of *C. gayi*, 594 specimens of *P. thaul*, 9 specimens of *G. chilensis*, 51 specimens of *L. chiliensis*, 1,006 specimens of *P. thaul*, 21 specimens of *L. schroederi*, 239 specimens of *L. tenuis* and 80 specimens of *P. chamissonis*.

This difference between the expected result, in addition to the different specific richness obtained in this campaign, differs in the composition of the abundances. This is presumably due to the fact that the preliminary estimate of the number of specimens to be rescued and relocated is based on the generalisation of environments for the fauna where it is assumed that the target species are homogeneously distributed. An example is the "irrigated cereal" environment, which according to the previous estimation of the abundance of the target species, it was indicated that this environment would have high abundances of reptiles, including the arboreal species *Liolaemus tenuis*. However, the reptile records that were actually recorded in this environment were mainly found in the surrounding environments such as the arboreal curtains and scrub. Assumptions such as those generally made when estimating abundance based on population densities per environment, tend to generate errors based on the delimitation of the environments and the location of the sampling stations within them, which can lead to biased selection of sectors that concentrate abundances and assume that their conditions are homogeneous for the whole environment. For this reason, the species and abundances recorded during the campaign (based on intensive surveys throughout the capture site) should be considered as a different but more accurate composition of richness and abundance than previously estimated. Notwithstanding the above, it is estimated that the total number of specimens to be rescued is close to and/or higher than expected.



## 7. CONCLUSIONS

The trapping effort employed in the campaign resulted in the rescue and relocation of 2,006 specimens, of which 600 are amphibians and 1,406 are reptiles. The species *Batrachyla taeniata* was not recorded. On the other hand, one additional reptile species, *Liolaemus schroederi*, was recorded, captured and relocated. Regarding the absence of *B. taeniata*, it cannot be ruled out that its recording through vocalisations in the environmental characterisation of the Area of Influence may have been confused with *Pleurodema thaul* in one of its life stages. *L. schroederi* is easily confused with *L. chiliensis* in some of its morphs and/or life stages. Given this, it is presumed that the high abundances of *L. chiliensis* recorded in the environmental characterisation of the Area of Influence also include possible abundances of *L. schroederi*.

The amphibian species with the highest abundance in rescue and relocation was *Pleurodema thaul*. During the campaign, 6 specimens of *Calyptocephalella gayi* were rescued and relocated, of which 2 are juveniles and 4 are larvae. For *Pleurodema thaul* 594 specimens, of which 280 are adults, 4 are juveniles and 310 are larvae.

The highest abundance of reptiles in rescue and relocation was recorded for *Liolaemus lemniscatus*, followed by *L. tenuis*, *Philodryas chamissonis*, *L. chiliensis*, *L. schroederi* and *Galvarinus chilensis*. For

*G. chilensis*, 9 specimens were rescued and relocated, of which 6 are adults, 1 sub-adult and 2 juveniles. For *Liolaemus chiliensis* 51 specimens, of which 38 are adults, 3 sub-adults and 10 juveniles. For *L. lemniscatus* 1,006 specimens, 21 specimens of *L. schroederi*, 239 specimens of *L. lemniscatus* and 239 specimens of *L. schroederi*.

*L. tenuis* and 80 specimens of *Philodryas chamissonis*.

Regarding sex, all specimens of *C. gayi* were of undefined sex. For *P. thaul*, 160 were males, 119 were females and 315 were of undefined sex. For *G. chilensis*, 1 male, 2 females and 6 of undefined sex were recorded. For *L. chiliensis*, 16 males, 34 females and 1 specimen of undefined sex were recorded. For *L. lemniscatus*, 523 males, 442 females and 41 specimens of undefined sex were recorded. For *L. schroederi*, 8 males and 13 females were recorded. For *L. tenuis*, 110 males, 101 females and 28 of undefined sex. Finally, for *P. chamissonis*, 2 males, 8 females and 70 of undefined sex.

Although this result in terms of the number of rescued and relocated specimens represents a higher number than the total number of specimens estimated as a minimum to be rescued and relocated, the values are based on a different abundance to that expected in the previous estimate. This is possibly explained by the fact that the number of specimens to be rescued and relocated is estimated based on the population densities recorded in the environmental characterisation, the results of which are usually less precise than those obtained in a rescue and relocation campaign of the effort employed in the execution of the present plan (similar to the results of micro-route abundance). Therefore, it is estimated that the implementation of the rescue and relocation plan for amphibians and reptiles is close to and/or exceeds the expected results.

## 8. BIBLIOGRAPHY

LOBOS, G., TAPIA, G., ALZAMORA, A., REBOLLEDO, N., SALINAS, H., TRUJILLO, J.C., GARÍN, C. & B, CAMOUSSEIGT (2021). Manual for the construction of refuges for reptiles present in the Antofagasta and Atacama Regions.

MINISTRY OF THE ENVIRONMENT (2011). D.S. N°41/2011. Approves and makes official the classification of species according to their conservation status, sixth process.

MINISTRY OF THE ENVIRONMENT (2012). D.S. N°19/2012. Approves and makes official the classification of species according to their conservation status, eighth process.

MINISTRY OF THE ENVIRONMENT (2016). D.S N°16/2016. Approves and makes official the classification of species according to their conservation status, twelfth process.

MINISTRY OF THE GENERAL SECRETARIAT OF THE PRESIDENCY (2008). S.D. N°50/2008. Approves and formalises the third process of classifying species according to their conservation status.

SALLABERRY, M., VALENCIA, J & DÍAZ, N (1981). Distribution and environments of *Batrachyla taeniata*.

(Girard) in Chile. Boletín del Museo Nacional de Historia Natural 38: 61-67.

VIDAL, M.A. & A., LABRA (2008). Herpetology of Chile. Science Verlag, Santiago, Chile. XXIII, 593 pp.

## **9. APPENDIX**

### **9.1 Rescue and relocation points of target species**



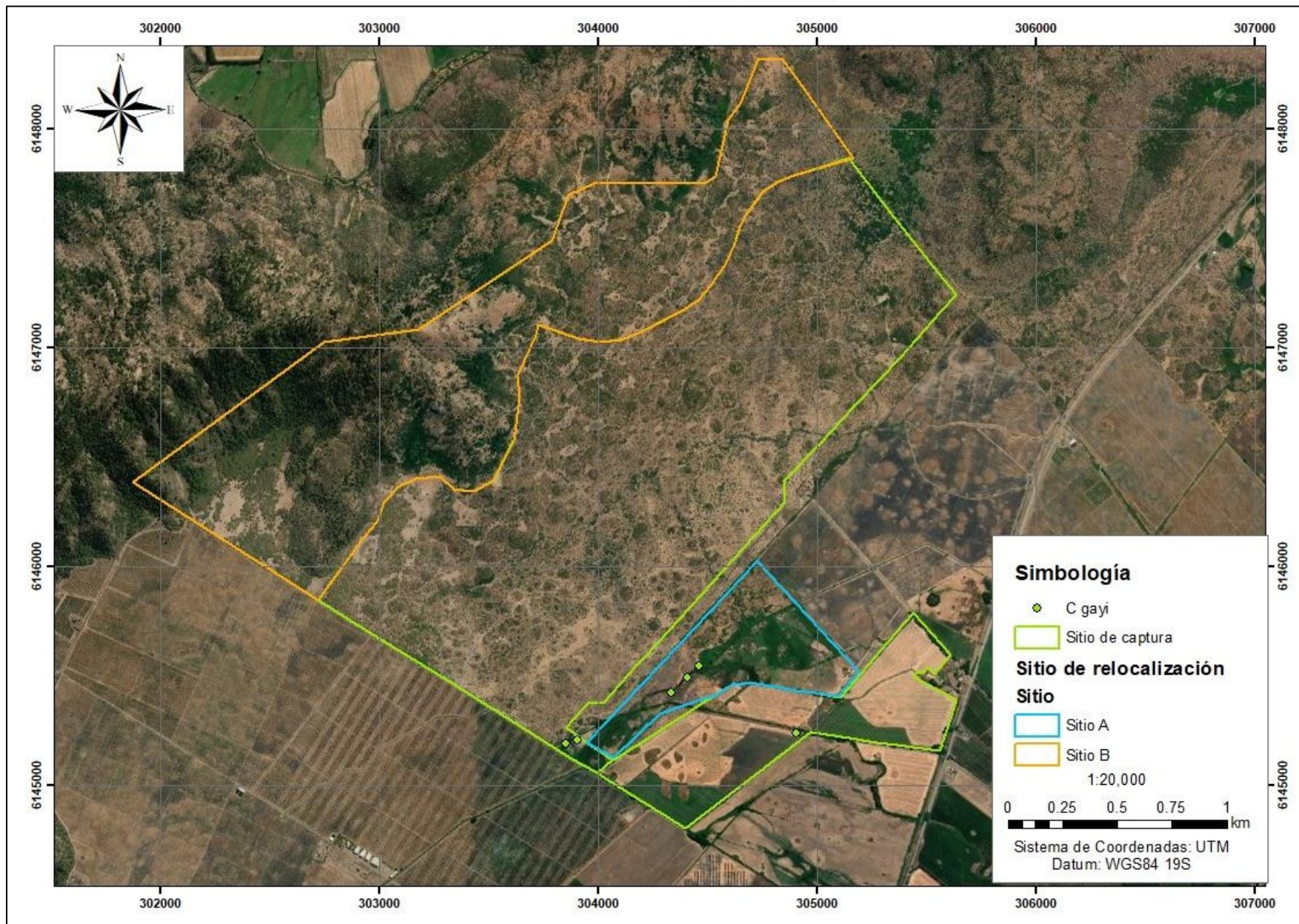


Figure 12. Rescue and relocation points of *Calyptocephalella gayi*.

Tebal, 2023.



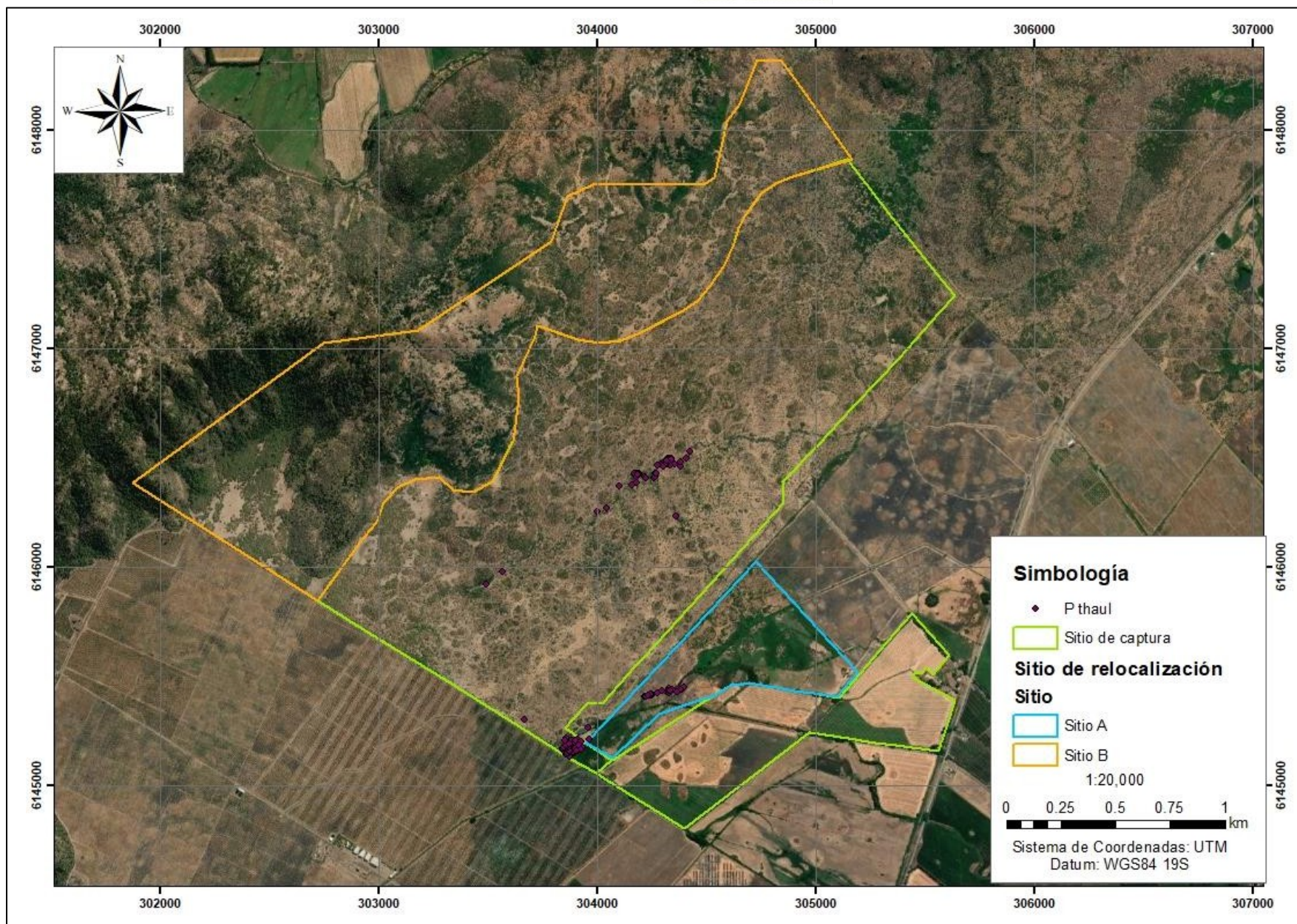


Figure 13. *Pleurodema thaul* rescue and relocation sites.

Source: TEBAL, 2023.



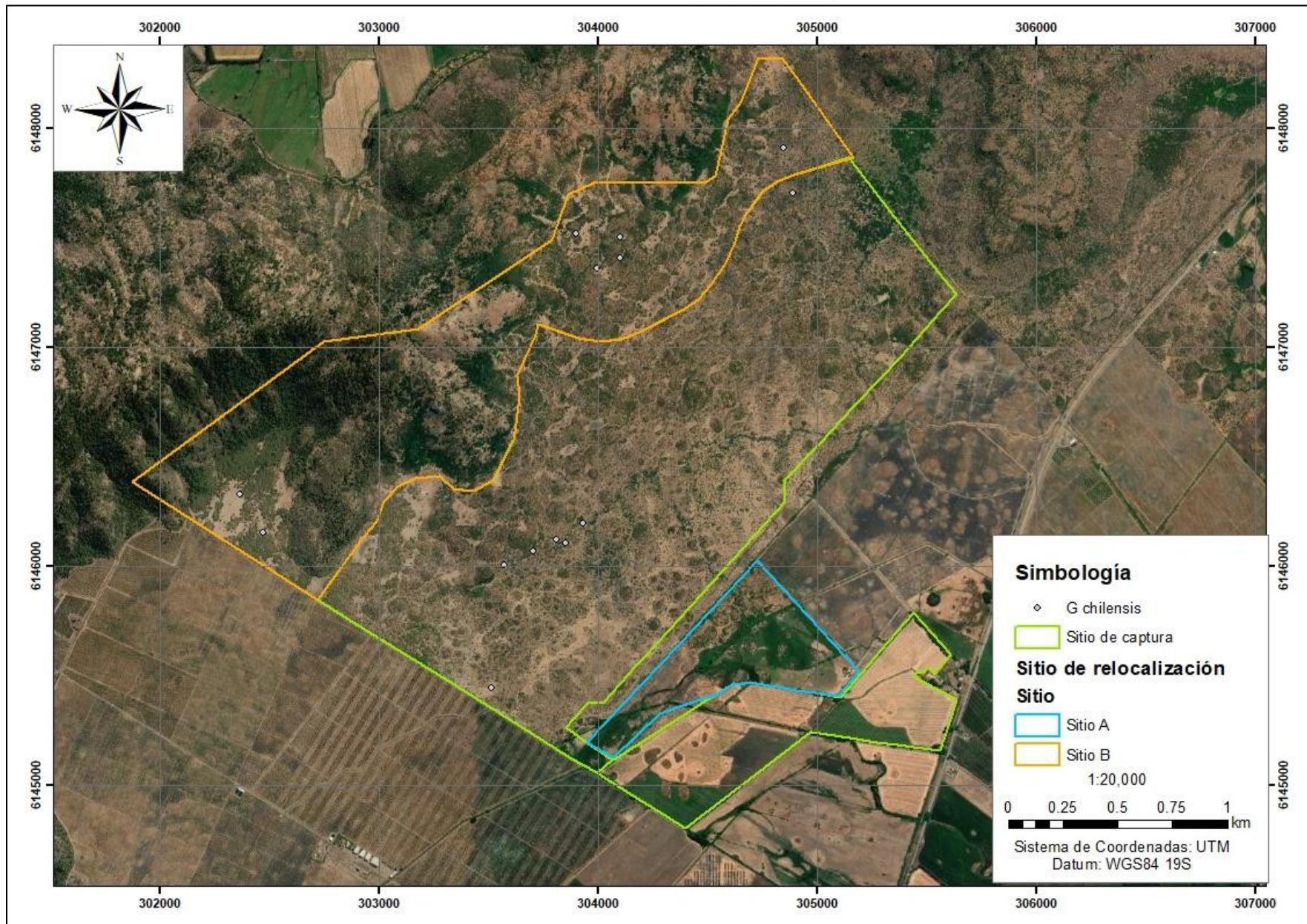


Figure 14. Rescue and relocation points of *Galvarinus chilensis*.

Source: TEBAL, 2023.



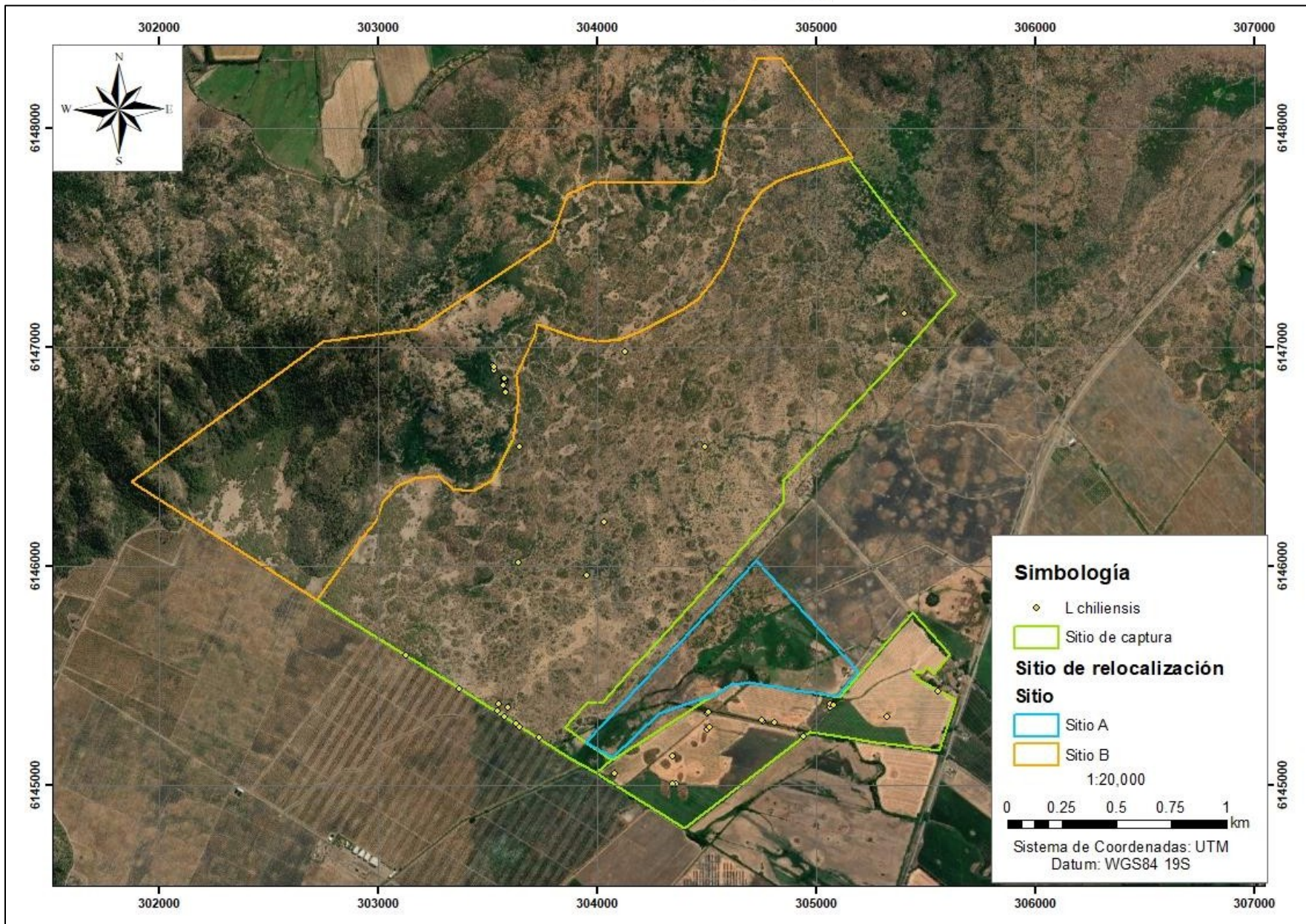


Figure 15. Rescue and relocation points of *Liolaemus chiliensis*.

Source: TEBAL, 2023.



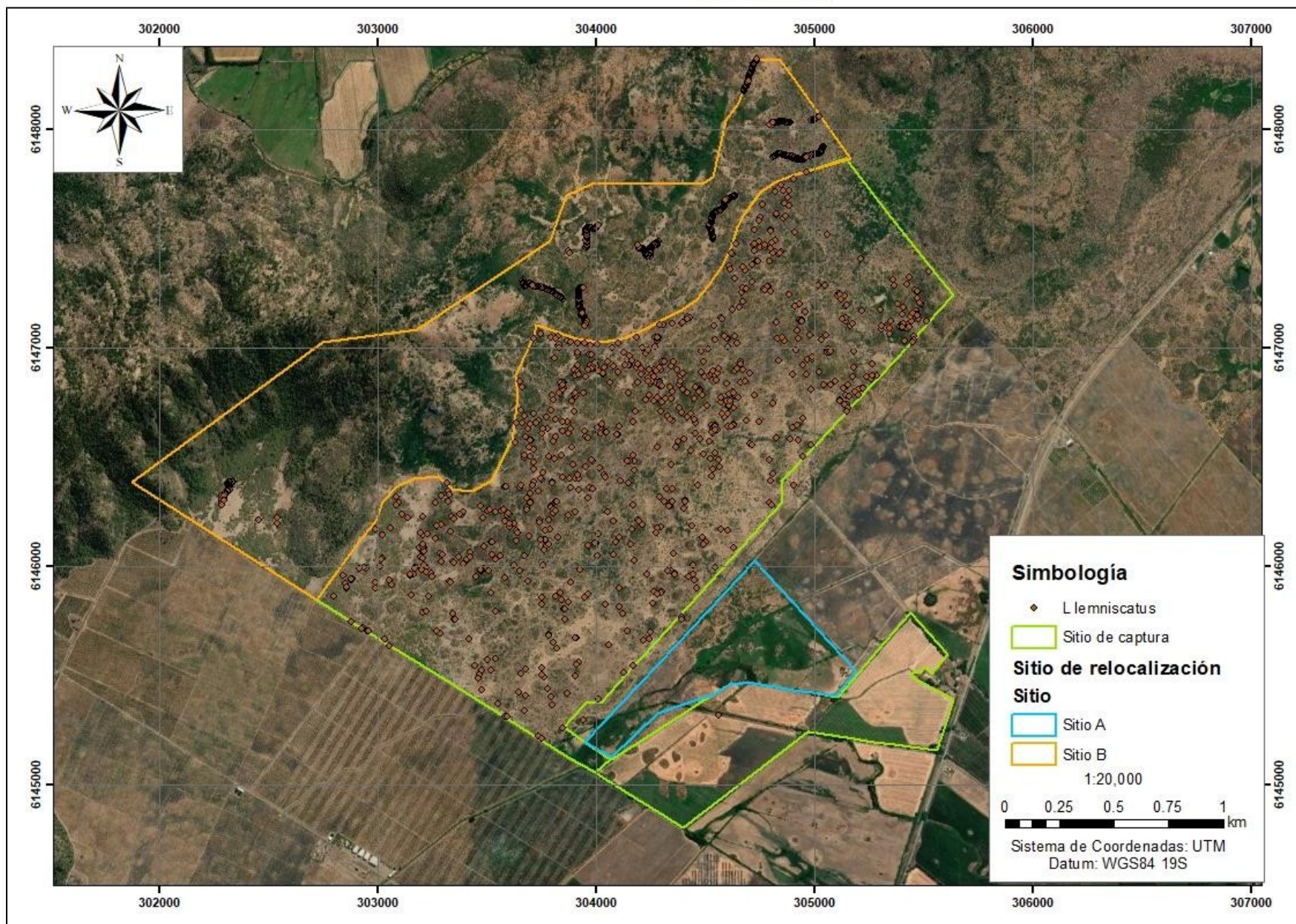


Figure 16. Rescue and relocation points of *Liolaemus lemniscatus*.

Source: TEBAL, 2023.



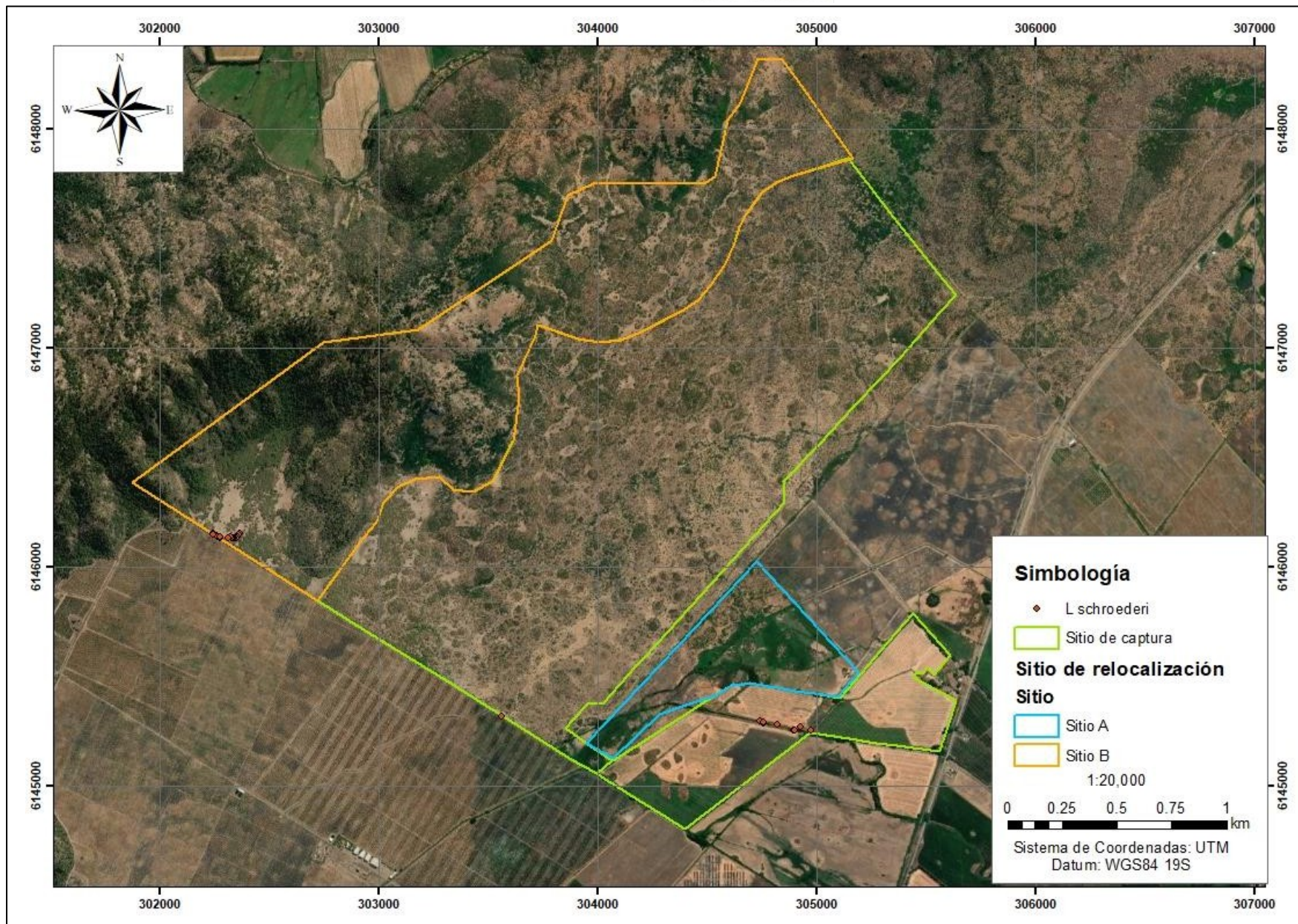


Figure 17. Rescue and relocation points of *Liolaemus schroederi*.

Source: TEBAL, 2023.



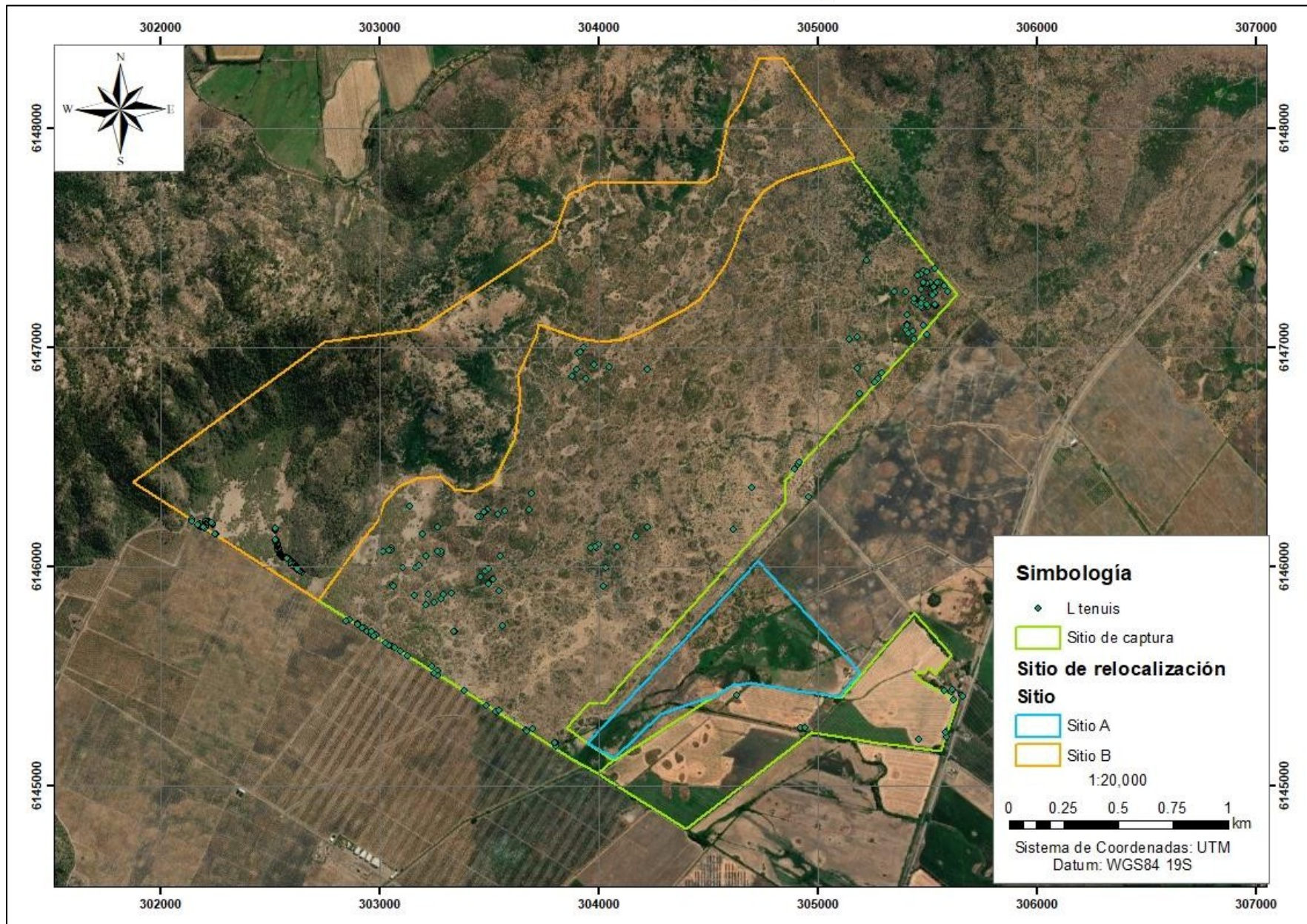


Figure 18. *Liolaemus tenuis* rescue and relocation points.

Source: TEBAL, 2023.

## 9.2 Catch permits





**EXEMPT RESOLUTION NO: 1463/2022**

**AUTHORIZE MR. PEDRO PABLO ÁLVAREZ ÁLVAREZ, RUT 17.395.138-8, THE CAPTURE OF ANIMALS OF THE PROTECTED WILD FAUNA OF THE CLASSES AMPHIBIA AND REPTILIA, WITH PURPOSES OF RESEARCH PROJECT THAT ACCOUNT CONRESOLUTION DE CALIFICACION AMBIENTAL NÚMERO 6 DEL 8 DE ENERO DE 2021 DE LA COMISIÓN DE EVALUACIÓN DE LA REGIÓN DEL MAULE, DEL PROYECTO PFV GRAN TENO 200 MW, COMMUNE OF TENO, PROVINCE OF CURICÓ, MAULE REGION**

Talca, 30/09/2022

**HAVING REGARDED:**

The application for scientific capture of Mr. Pedro Pablo Álvarez Álvarez, **Rut 17.395.138-8**, of 28 September 2022; Law N° 18.755, Organic of this Service; Law N° 4.601, on Hunting, modified by Law N° 19.473, of 1996; D.S. N° 5, of 1998, of the Ministry of Agriculture, and its Modifications; Resolution N° 2.433 of 27 April 2012 of the National Director of the Agriculture and Livestock Service, modified by Res. Exenta No. 437 of 21 January 2013, the Environmental Qualification Resolution (RCA) **No. 6** of 8 January 2021 of the Assessment Commission of the Maule Region; RES RA 240/995/2021 of 2021 of the National Director of the Agricultural and Livestock Service and Resolution No. 07 of 29 March 2019 of the Comptroller General of the Republic.

**WHEREAS:**

1. That for the execution of the project "**Photovoltaic Plant Gran Teno 200 MW**", commune of Teno, province of Curicó, Maule region, Mr. Pedro Pablo Álvarez Álvarez, Rut 17.395.138-8, with address at Andrés de Fuenzalida 17 Of. 34, Providencia, Santiago, requests permission to capture for research purposes, to comply with the indications of the Environmental Qualification Resolution No. 6 of January 8, 2021 of the Environmental Assessment Commission of the Maule region.
2. The sponsorship letter from the owner of the aforementioned project GR Algarrobo SpA, Rut Rut 76.451.217-0, through its legal representative, Mr. Antonio Ros Mesa, Rut 13.831.549-5, which entrusts the researcher **Mr. Pedro Pablo Álvarez Álvarez, Rut 17.395.138-8**, to carry out the management and actions of scientific capture as indicated in the RCA already mentioned for the project "**Gran Teno 200 MW Photovoltaic Plant**", commune of Teno, province of Curicó, region of Maule.
3. That the curriculum vitae of the applicant researcher and of the other participants are in conformity.

**RESOLVED:**

1. Authorize Mr. **Pedro Pablo Álvarez Álvarez, Rut 17.395.138-8**, domiciled at Andrés Fuenzalida 17, Of. 34, Providencia, Santiago, the capture of specimens of protected wild fauna of the Amphibia and Reptilia classes, under the conditions of this resolution, to comply with the steps and actions indicated in the Environmental Qualification Resolution No. 6 of 8 January 2021 of the Environmental Assessment Commission of the Maule region, corresponding to the project "Gran Teno 200 MW Photovoltaic Plant" commune of Teno, province of Curicó, Maule region.
2. This scientific catch permit has a duration of 1 year from the date of this resolution.
3. The classes, species, methods and characteristics of capture are as follows:

Species	Method
---------	--------

<b>Amphibia Class</b>	
<i>Pleurodema thaul</i> (Four-eyed toad)	Manual and chinguillos
<i>Calyptocephalella gayi</i> (Chilean frog)	Manual and chinguillos
<i>Batrachyla taeniata</i> (Toadfrog toad)	Manual and chinguillos
<b>Class Reptilia</b>	
<i>Liolaemus lemniscatus</i> (Lizard lemniscata)	Manual and noose with slipknot
<i>Liolaemus chilensis</i> (Weeping lizard)	Manual and noose with slipknot
<i>Liolaemus tenuis</i> (Slender lizard)	Manual and noose with slipknot
<i>Philodryas chamissonis</i> (Long-tailed snake)	Manual and noose with slipknot
<i>Tachimenis chilensis</i> (Short-tailed Snake)	Manual and noose with slipknot

4. Catches of Amphibia Class specimens shall not be taken during the winter season.
5. The capture sites are defined by the geographical area, corresponding to the vertices of the polygon indicated below, and defined in the aerial image present in the application (UTM Coordinate, WGS 84, Huso 19), commune of Teno:

Vertex	North coordinate	East Coordinate	Vertex	North coordinate	East Coordinate
A	6.145.160	305.563	M5	6.147.486	304.626
B	6.145.246	304.973	N	6.147.553	304.649
C	6.144.806	304.402	N1	6.147.615	304.681
D	6.145.850	302.721	O	6.147.711	304.750
D1	6.146.025	302.848	O1	6.147.759	304.815
D2	6.146.210	302.992	P	6.147.868	305.147
E	6.146.301	303.025	Q	6.147.248	305.637
F	6.146.367	303.085	R	6.146.393	304.851
G	6.146.407	303.164	S	6.146.297	304.856
H	6.146.313	303.279	T	6.145.383	304.027
H1	6.146.354	303.340	U	6.145.379	303.953
I	6.146.346	303.433	W	6.145.367	303.852
I1	6.146.395	303.251	X	6.145.117	304.069
J	6.146.580	303.314	Y	6.145.466	304.623
J1	6.146.775	303.645	Y1	6.145.461	304.646
K	6.146.875	303.630	Z	6.145.474	304.697
K1	6.147.061	303.714	AA	6.145.407	305.111
L	6.147.110	303.725	AB	6.145.792	305.441
L1	6.147.045	303.914	AC	6.145.601	305.612
L2	6.147.029	304.014	AD	6.145.510	305.593
L3	6.147.040	304.109	AE	6.145.539	305.505
M	6.147.075	304.198	AF	6.145.516	305.485
M1	6.147.169	304.382	AG	6.145.522	305.459
M2	6.147.218	304.456	AH	6.145.497	305.441
M3	6.147.285	304.517	AI	6.145.396	305.368
M4	6.147.391	304.586	--	--	--

6. The destination sites of the animals are defined by the geographical area, corresponding to the vertices of the polygon indicated below (2 relocation areas), and defined in the aerial image present in the application (UTM coordinate, WGS 84, Huso 19), commune of Teno:

o Relocation area A:

Vertex	North coordinate	East Coordinate
A	6.145.199	303.959
B	6.146.019	304.716
C	6.145.526	305.200
D	6.145.412	305.098
E	6.145.478	304.697
F	6.145.464	304.646
G	6.145.469	304.622
H	6.146.331	304.283
I	6.145.124	304.068

◦ Relocation area B:

Vertex	North coordinate	East Coordinate	Vertex	North coordinate	East Coordinate
A	6.146.386	301.879	P4	6.147.169	304.382
B	6.147.029	302.752	P5	6.147.075	304.198
C	6.147.085	303.183	Q	6.147.040	304.109
D	6.147.496	303.789	Q1	6.147.029	304.014
E	6.147.703	303.864	Q2	6.147.045	303.914
F	6.147.753	303.984	Q3	6.147.110	303.725
G	6.147.757	304.494	R	6.147.061	303.714
H	6.147.783	304.536	R1	6.146.875	303.630
I	6.148.043	304.597	S	6.146.775	303.645
J	6.148.123	304.656	S1	6.146.580	303.614
K	6.148.322	304.730	T	6.146.395	303.521
L	6.148.319	304.845	T1	6.146.346	303.433
M	6.147.872	305.166	T2	6.146.354	303.340
N	6.147.759	304.815	T3	6.146.413	303.279
N1	6.147.711	304.750	U	6.146.407	303.164
O	6.147.615	304.681	U1	6.146.367	303.085
O1	6.147.553	304.649	U2	6.146.301	303.025
P	6.147.486	304.626	U3	6.146.210	302.992
P1	6.147.391	304.586	V	6.146.025	302.848
P2	6.147.285	304.517	W	6.145.850	302.721
P3	6.147.218	304.456	--	--	--

7. For the captures, the investigator indicated in this resolution must always be in the field and supervise the following professionals:

- Claudio Reyes Olivares, Rut 17.099.345-4
- Álvaro Cuevas Becerra, Rut 17.731.510-9
- Rodrigo Adolfo Tiznado Granzotto, Rut 17.727.496-8
- Fabián Antonio Campos Cifuentes, Rut 17.470.811-8
- Daniel Andrés Cid Coronado, Rut 17.365.602-5
- Fabián Andrés Díaz Ríos, Rut 18.492.787-K
- Francisco Javier Cifuentes Cifuentes, Rut 18.198.425-2
- Jorge Eleazar Gagliardi Álvarez Rut 8.467.803-1
- Oscar Guillermo Hidalgo Navarrete, Rut 18.275.959-7
- Carolina Andrea Venegas Jara, Rut 18.197.298-K
- Juan Enrique Contardo Laclote, Rut 15.342.819-0
- Paola Soubllette Stagno, Rut 10.349.639-K
- Rita del Pilar Zamorano Menay, Rut 15.441.291-3
- Christopher Ide Pairoa, Rut 15.385.399-1
- Ana Belén Tenorio, Rut 27.732.616-7
- Alfredo Alejandro Ulloa Yáñez, Rut 19.196.377-6

- Camila Natalia Flores Navarro, Rut 18.123.448-2◦
- Ignacio Andrés Tapia Arcos, Rut 18.545.576-9
- Stephanie Alejandra Roloff Farías, Rut 18.148.936-7
- Valentina Genoveva Rojas Vásquez, Rut 18.516.375-ko
- Sebastián Alejandro Barra Barra Barra, Rut 16.736.678-3

8. For captures, express authorisation must be obtained from the National Forestry Corporation, in the event that they are carried out within State Protected Wildlife Areas, or from the respective owners in the event that they are carried out outside these areas.

9. Prior to the capture, at least 10 working days in advance, the holder of this resolution must inform, in writing, the SAG Regional Directorate of Maule, at the email address of the RNR manager luis.villanueva@sag.gob.cl, with a copy to the email address cristian.reyes@sag.gob.cl, the dates and specific sites of action, as well as a contact telephone number and/or email address.

If there is any publication originating from the authorisation granted, reference should be made in them to the permit issued.

In the event that the capture of individuals is not carried out, the interested party must inform the Division for the Protection of Renewable Natural Resources and the Regional Directorate of Maule, both of the Agriculture and Livestock Service.

10. Any infringement of the provisions contained in the Hunting Law and its Regulations, and of the authorisation that has been granted, shall be sanctioned by the Agriculture and Livestock Service.

BE NOTED AND COMMUNICATED



**LUIS FERNANDO PINOCHET ROMERO  
REGIONAL DIRECTOR MAULE REGION  
AGRICULTURAL AND LIVESTOCK SERVICE**

#### Annexes

Name	Type	Archive	Copies	Sheet s
Applicati on	Digital	<a href="#">See</a>		
Ballot	Digital	<a href="#">See</a>		

LVR

Distribution:

- Elias Araya Salinas - Jefa (S) División Protección de los Recursos Naturales Renovables - Oficina Central
- Rafael Asenjo Fuentealba - Jefe Departamento de Vida Silvestre - Oficina Central
- Viviana Valdes Cancino - Regional Head of the Regional Legal Unit - Maule Regional Office
- Luis Arturo Villanueva Rodríguez - Head of Regional Unit for the Protection of Renewable Natural Resources - Maule Regional Office
- Eduardo Andres Araya Morales - Head of Sectorial Office Curicó - Maule Regional Office
- Cristian Esteban Reyes Bozo - Head of Sectoral Protection RNR Sectoral Renewable Natural Resources - Maule Regional Office
- Franz Reinhard Rojas Espinoza - Secretary (S) Regional Unit for the Protection of Renewable Natural Resources - Maule Regional Office
- Elizabeth Margarita Muñoz Valdes - Jefa Oficina de Partes Regional - Oficina Regional Maule
- Pedro Pablo Álvarez Álvarez - Researcher TEBAL

Región del Maule Servicio Agrícola y Ganadero - Edificio Cervantes, 1 Oriente N° 1120, 4° Piso - Telephone:  
(71) 2226053



This document has been signed by means of an advanced electronic signature in accordance with the terms of Law  
19.799 Validate in:  
<https://ceropapel.sag.gob.cl/validar/?key=127375360&hash=613f3>



EXEMPT RESOLUTION Nº: 1464/2022

**AUTORIZA E A DOÑA CAROLINA ANDREA VENEGAS JARA, RUT II. 197.298-K, THE CAPTURE OF ANIMALS OF THE PROTECTED WILD FAUNA OF THE CLASSES AMPHIBIANS AND REPTILES, FOR THE PURPOSE OF INVESTIGATION OF THE PROJECT THAT HAS ENVIRONMENTAL QUALIFICATION RESOLUTION NUMBER 6 OF JANUARY 8, 2021 OF THE EVALUATION COMMISSION OF THE MAULE REGION, OF THE PFV GRAN TENO PROJECT.  
200 MW, COMUNA DE TENO, PROVINCE OF CURICÓ, MAULE REGION**

Talca, 30/09/2022

**VISTOS:**

**The application for scientific capture of Ms. Carolina Andrea Venegas Jara, Rut 18. 197.29á-K, of 26 September 2022; Law N° 18.755, Organic of this Service; Law N° 4.601, on Hunting, modified by Law N° 19.473, of 1996; D.S. N° 5, of 1998, of the Ministry of Agriculture, and its Modifications; Resolution N° 2.433 of 27 April 2012 of the National Director of the Agriculture and Livestock Service, modified by Res. Exenta No. 437 of 21 January 2013, the Resolution of Environmental Qualification (RCA) No. 6 of 8 January 2021 of the Assessment Commission of the Maule Region; RES RA 240/995/202 1 of 2021 of the National Director of the Agricultural and Livestock Service and Resolution No. 07 of 29 March 2019 of the Comptroller General of the Republic.**

**WHEREAS:**

1. That for the execution of the project "Photovoltaic Plant Gran Teno 200 MW", commune of Teno, province of Curicó, Maule region, Ms. Carolina Andrea Venegas Jara, Rut 18.197.298-K, domiciled at Los Robles 276 Vilcún, Araucanía region, requests permission to capture for research purposes, to comply with the indications of the Environmental Qualification Resolution No. 6 of 8 January 2021 of the Environmental Assessment Commission of the Maule region.
2. The sponsorship letter from the owner of the aforementioned project GR Algarrobo SpA, Rut Rut 76.451.217-0, through its legal representative, Mr. Antonio Ros Mesa, Rut 13.831.549-5, which entrusts the researcher Ms. Carolina **Andrea Venegas** Jara, Rut 18.197.298- K, to carry out the scientific capture activities and actions as indicated in the RCA of the project "Gran Teno 200 MW Photovoltaic Plant", commune of Teno, province of Curicó, region of Maule.
- 3. That the curriculum vitae of the applicant researcher and of the other participants are in conformity.**

**RESOLVED:**

1. Authorise Ms. **Carolina Andrea** Venegas Jara, Rut 18.197.298- K, with address at Los Robles 276, Vilcún, Araucanía Region, to capture specimens of protected wild fauna of the Amphibia and Reptilia classes, under the conditions of this resolution, in order to comply with the steps and actions indicated in the Environmental Qualification Resolution No. 6 of 8 January 2021 of the Environmental Assessment Commission of the Maule Region, corresponding to the project "Gran Teno 200 MW Photovoltaic Plant", commune of Teno, province of Curicó, Maule Region.
2. This scientific catch permit has a duration of 1 year from the date of this resolution.
3. The ~~cases~~ species, methods and characteristics of capture are as follows:

Species	Method
---------	--------

<b>Amphibia Class</b>	
<i>Pleurodema thaul</i> (Cu toad atFo EYES)	Manual and chinguillos
<i>Calyptocephalella gayi</i> (Chilean frog)	Manual and chinguillos
<i>Batrachyla taeniata</i> ('mask daddy)	Manual and chinguillos
<b>Class Reptilia</b>	
<i>Liolaemus lemniscatus</i> (Lizard lemniscata)	Manual and noose with slipknot
<i>Liolaemus chilensis</i> (Weeping lizard)	MM 0Un' and loop with slipknot
<i>Liolaemus tenuis</i> (Slender lizard)	Handle and loop with sliding knot
<i>Philodryas chamissonis</i> (Long-tailed snake)	Manual and noose with slipknot
<i>Tachimenis chilensis</i> (Short-tailed Snake)	Manual and noose with slipknot

4. Catches of Amphibia Class specimens shall not be taken during the winter season.
5. The capture sites are defined by the geographical area, corresponding to the vertices of the polygon indicated below, and defined in the aerial image present in the application (UTM coordinate, WGS 84, Huso 19), commune of Teno:

Vertex	Coordinate North	Coordinate This	Vertex	Coordinate North	Coordinate This
A	6.145.160	305.563	M5	6.147.486	304.626
B	6.145.246	304.973	N	6.147.553	304.649
C	6.144.806	304.402	N1	6.147.615	304.681
D	6.145.850	302.721	O	6.147.711	304.750
D1	6.146.025	302.848	01	6.147.759	304.815
D2	6.146.210	302.992	P	6.147.868	305.147
E	6.146.301	303.025	Q	6.147.248	305.637
F	6.146.367	303.085	R	6.146.393	304.851
G	6.146.407	303.164	S	6.146.297	304.856
H	6.146.313	303.279	T	6.145.383	304.027
H1	6.146.354	303.340	U	6.145.379	303.953
I	6.146.346	303.433	W	6.145.367	303.852
I1	6.146.395	303.251	X	6.145.117	304.069
J	6.146.580	303.314	Y	6.145.466	304.623
J1	6.146.775	303.645	Y1	6.145.461	304.646
K	6.146.875	303.630	Z	6.145.474	304.697
K1	6.147.061	303.714	AA	6.145.407	305.111
L	6.147.110	303.725	AB	6.145.792	305.441
LI	6.147.045	303.914	AC	6.145.601	305.612
L2	6.147.029	304.014	AD	6.145.510	305.593
L3	6.147.040	304.109	AE	6.145.539	305.505
M	6.147.075	304.198	AF	6.145.516	305.485
M1	6.147.169	304.382	AG	6.145.522	305.459
M2	6.147.218	304.456	AH	6.145.497	305.441
M3	6.147.285	304.517	AI	6.145.396	305.368

M4	6.147.391	304.586			
----	-----------	---------	--	--	--

6. The destination sites of the animals are defined by the geographical area, corresponding to the vertices of the polygon indicated below (2 relocation areas), and defined in the aerial image present in the application (UTM coordinate, WGS 84, Huso 19), commune of Teno:

o Relocation Area A:

Vertex	North coordinate	East Coordinate
A	6.145.199	303.959
B	6.146.019	304.716
C	6.145.526	305.200
D	6.145.412	305.098
E	6.145.478	304.697
F	6.145.464	304.646
G	6.145.469	304.622
H	6.146.331	304.283
I	6.145.124	JO4.068

o Relocation area B:

Vertex	North coordinate	East Coordinate	Vertex	North coordinate	East Coordinate
A	6.146.386	301.879	P4	6.147.169	304.382
B	6.147.029	302.752	P5	6.147.075	304.198
C	6.147.085	303.183	Q	6.147.040	304.109
D	6.147.496	303.789	Q1	6.147.029	304.014
E	6.147.703	303.864	Q2	6.147.045	303.914
F	6.147.753	303.984	Q3	6.147.110	303.725
G	6.147.757	304.494	R	6.147.061	303.714
H	6.147.783	304.536	R1	6.146.875	303.630
	6.148.043	304.597	S	6.146.775	303.645
J	6.148.123	304.656	S1	6.146.580	303.614
K	6.148.322	304.730	T	6.146.395	303.521
L	6.148.319	304.845	T1	6.146.346	303.433
M	6.147.872	305.166	T2	6.146.354	303.340
N	6.147.759	304.815	T3	6.146.413	303.279
N1	6.147.711	304.750	U	6.146.407	303.164
o	6.147.615	304.681	U1	6.146.367	303.085
O1	6.147.553	304.649	U2	6.146.301	303.025
P	6.147.486	304.626	U3	6.146.210	302.992
P1	6.147.391	304.586	V	6.146.025	302.848
P2	6.147.285	304.517	W	6.145.850	302.721
P3	6.147.218	304.456			

7. For catches, the investigator indicated in this resolution must always be in the field and supervise the following professionals:

- Claudio Reyes Olivares, Rut 17.099.345-4
- ° Álvaro Cuevas Becerra, Rut 17.731.510-9
- o Rodrigo Adolfo Tiznad o Granzotto, Rut 17.727.496-8
- o Fabián Antonio Campos Cifuentes, Rut 17.470.811-8
- o Daniel Andrés Cid Coronado, Rut 17.365.602-5
- o Fabián Andrés Díaz Ríos, Rut 18.492.787-K
- o Francisco Javier Cifuentes Cifuentes, Rut 18.198.425-2



- Jorge Eleazar Gagliardi Álvarez Rut 8.467.803-1
- o Oscar Guillermo Hidalgo Navarrete, Rut 18.275.959-7
- o Juan Enrique Contardo Laclote, Rut 15.342.819-0
- o Pedro Pablo Álvarez Álvarez, Rut 17.395.138-8
- o Paola Soubllette Stagno, Rut 10.349.639-K
- o Rita del Pilar Zamorano Menay, Rut 15.441.291-3
- o Christopher Ide Pairoa, Rut 15.385.399-1
- o Ana Belén Tenorio, Rut 27.732.616-7
- o Alfredo Alejandro Ulloa Yáñez, Rut 19.196.377-6
- Camila Natalia Flores Navarro, Rut 18.123.448-2
- o Ignacio Andrés Tapia Arcos, Rut 18.545.576-9
- o Stephanie Alejandra Roloff Farías, Rut 18.148.936-7
- o Valentina Genoveva Rojas Vásquez, Rut 18.516.375-k
- o Sebastián Alejandro Barra Barra, Rut 16.736.678-3

8. For captures, express authorisation must be obtained from the National Forestry Corporation, in the event that they are carried out within State Protected Wildlife Areas, or from the respective owners in the event that they are carried out outside these areas.
9. Prior to the capture, at least 10 working days in advance, the holder of this resolution must inform, in writing, the SAG Regional Directorate of Maule, at the email address of the RNR manager [luis.villanueva@sag.gob.cl](mailto:luis.villanueva@sag.gob.cl), with a copy to the email address [cristian.reyes@sag.gob.cl](mailto:cristian.reyes@sag.gob.cl), the dates and specific sites of action, as well as a contact telephone number and/or email address.

In case of any publication originating from the authorisation granted, reference should be made in of the permit issued.

In the event that the capture of individuals is not carried out, the interested party must inform the Division for the Protection of Renewable Natural Resources and the Regional Directorate of Maule, both of the Agriculture and Livestock Service.

10. Any infringement of the provisions contained in the Law on Hunting and its Regulations, and of the authorisation granted, shall be sanctioned by the Agriculture and Livestock Service.

BE NOTED AND COMMUNICATED



Luis FERNANDO PINOCHET ROMERO  
REGIONAL DIRECTOR REGION OF MAULE  
AGRICULTURE AND LIVESTOCK  
SERVICE

#### Annexes

Nombre	Tipo	Archivo	Copias	Hojas
Applicati on	Dig it al	<a href="#">See</a>		
Ballot	Dig ital	<a href="#">See</a>		

LVR/VVC/CUP

Distribution:

- Elias Araya Salinas - Head (S) Renewable Natural Resources Protection Division - Central Office
- Rafael Asenjo Fuentealba - Head of Wildlife Department - Central Office
- Viviana Valdes Cancino - Regional Manager Regional Legal Unit - Maule Regional Office

- Luis Arturo Villanueva Rodríguez - head of the Regional Unit for the Protection of Renewable Natural Resources  
Maule Regional Office
- Eduardo Andres Araya Morales - Head of Sector Office Curicó - Maule Regional Office
- Cristian Esteban Reyes Bozo - Sectoral Officer RNR Protection Sector Natural Resources Sector Renewables - Maule Regional Office
- Franz Reinhard Rojas Espinoza - Accounting Analyst RNR Protection Regional Unit Protection of Renewable Natural Resources - Maule Regional Office
- Franz Reinhard Rojas Espinoza - Secretary (S) Regional Unit for the Protection of Natural Resources Renewables - Maule Regional Office
- Elizabeth Margarita Muñoz Valdes - Head of the Regional Parts Office - Maule Regional Office
- Carolina Andrea Venegas para - Researcher TEBAL

Región del Maule Servicio Agrícola y Ganadero - Edificio Cervantes, 1 Oriente N° 1120, 4° Piso - Telephone: (71) 2226053



"

This document has been signed by means of an advanced electronic signature in accordance with the terms of Law L9.799 Validate on:  
hEEps://ceropapel.sag gob,cl/validar/?key=127264950&hash=86e4c