Small Grants – Project Completion and Impact Report

Instructions to grantees: please complete all fields, and respond to all questions listed below.

Organization Legal Name	*American University of Beirut*
Project Title	Leveraging an Integrated Network: Bettering Conservation and Management of Rare Plants in and around Culturally Protected Sites (LINK)
Grant Number	CEPF-109955
Date of Report	February 28, 2021

CEPF Hotspot: Mediterranean Basin Biodiversity Hotspot

Strategic Direction: Strategic Direction 4: Strengthen the engagement of civil society to support the conservation of plants that are critically endangered or have highly restricted ranges

Grant Amount: $19,908

Project Dates: May 27, 2019 – May 14, 2020, with no-cost extension to October 31, 2020.

PART I: Overview

1. **Implementation Partners for this Project *(list each partner and explain how they were involved in the project)***

AUB NCC

The AUB Nature Conservation Center (AUB-NCC) is a transdisciplinary academic center addressing nature conservation in the MENA region. In implementing the project's tasks, the center leverages the expertise and experience of AUB faculties, research staff and volunteers. Salma N. Talhouk, professor in the department of landscape design and ecosystem management in the faculty of agricultural and food sciences was the project principal investigator. She supervised the development, planning, and implementation of the project. Moustapha Itani, researcher at the center, was appointed on a part time basis to implement the project. Sammy Kayed, researcher at the center, worked closely with Talhouk and Itani to develop the project proposal. Michele Citton worked closely with Moustapha Itani to address issues related to site integrity and map development. The team also consulted with professors from the Department of Civil and Environmental Engineering, and the Department of History and Archaeology.

Four interns at the AUB Nature Conservation Center worked closely with Moustapha Itani and Michele Citton contributing several months of their time for the project. Ibrahim Dhaini, who recently graduated from the department of landscape design and ecosystem management at the American University of Beirut and is currently a master's student in urban planning and policy, applied various GIS tools in coordination with Moustapha Itani and Michele Citton to develop citizen science survey tools. Leila Rossa Mouawad, an undergraduate student in agricultural engineering in the Lebanese University worked closely with Moustapha Itani to supervise the implementation of the vegetation management plan as well as assess needs of the nontechnical staff at the site. Nadine Abou Fakhr, a student of architecture and landscape at the University of Sheffield worked closely with Moustapha Itani and conducted a site analysis and assessed urban furniture at the site. Nivine Nasralla, a master's student in plant ecology at the Lebanese University, worked closely with Salma Talhouk and Moustapha Itani preparing reports and texts.

GOVERNMENT OF LEBANON – DIRECTORATE GENERAL OF ANTIQUITIES

The Directorate General of Antiquities is the primary stakeholder of the site and partner to the project. The following DGA members were involved in the LINK project:

- **The regional director of North Mount Lebanon**, Ms. Tania Zaven, who directs all activities on the site and manages access to it. Ms. Zaven helped guide the proposal development phase by explaining the vegetation management needs and concerns of her institution. She also facilitated all onsite activities and workshop coordination. Ms. Zaven also reviewed and approved all material produced by the project.
- **Technical/administrative staff**, usually trained archaeologists, include the regional director of Byblos and Kesrouan and the Byblos World Heritage Site managers. Such personnel are in charge of defining locations and nature of events hosted on-site. They also determine the capacity of the site for events depending on the nature and location of the event. At their management level, they own data on names and specialties of employees, detailed site maps, and have varying abilities to direct or manage work on other sites in the country. Site managers of the World Heritage Site of Byblos helped shape the project since its conception. During the implementation phase of the project, the site managers participated in consultation workshops as well as round table discussions. The aim of such activities was to ensure that the project, LINK, is aligned with their needs while taking into account their logistical and bureaucratic constraints.
- **Non-technical staff on the site are primarily recruited as site guards**. They come from different educational backgrounds and are usually locals from the District of Jbeil. Being the members who will ultimately implement any pest and vegetation management taking place on-site and are likely to endure any health risks, they were consulted before any equipment purchases were made.

  At the early phase, before CEPF funding was provided, the DGA assigned a team of two archaeologists to supervise implementation, allocated part of the fund for the renovation of the Future Archaeological Museum for implementation which included hiring a team of 10 laborers headed by an architect. Afterward, site guards were mobilized and asked to participate in all workshops organized by the project.

LOCAL INITIATIVES
Members of the local initiative *Lebanese Wildlife* offered identification of reptiles persecuted on site during the course of the project as well as guidance of rescue activities.

The COVID-19 pandemic in Lebanon has halted all sectors including the closure of educational institutions, tourism and leisure sites, and has prevented group meetings since March 15th, the beginning of the flowering season for the target species. This lockdown occurred at a time when the project team intended to implement some of its activities, particularly ones about knowledge sharing and capacity building through workshops. Accordingly, the project's monitoring activities couldn't be based on citizen science. The project team continued monitoring the rare endemic plant, Matthiola crassifolia populations. On the other hand, the lockdown did not stop site field staff from managing the vegetation according to project guidelines.

2. Summarize the overall results/impact of your project

Through LINK we successfully developed and implemented a vegetation management plan that capitalized on identified commonalities, such as problem species, and relevant contextual variability, such as the presence or absence of guards on site. Furthermore, the integration of plant conservation and site management practices is a key positive outcome for this project at the World Heritage Site of Byblos and serves as a case-study showing the best practice of integrating biodiversity conservation into archaeological sites. By emphasizing the role of the World Heritage Site as a micro-reserve for *M. crassifolia,* the intervention also allowed the site to function as a source of propagation material for *ex situ* conservation. The vegetation management plan also took into account identified enablers and barriers to implementing ecologically sound management practices. Furthermore, the project produced a safety manual, provided necessary equipment, and trained non-technical DGA staff to ecologically sound vegetation management practices. The project developed tools to publicly share collected data and trained DGA staff on the use of these tools. LINK also developed a citizen science methodology for monitoring both target species and problem species; however, due to the lockdown it was not possible to engage citizens in the monitoring process.

3. Briefly describe actual progress towards each planned long-term and short-term impact (as stated in the approved proposal)

List each long-term impact from your proposal

a. Planned Long-term Impacts - 3+ years (as stated in the approved proposal)

Impact Description	Impact Summary
Engage technical units of the public sector in charge of managing culturally protected areas with significant biodiversity value, active civil society, and citizens in improving management	The project helped parts of the public sector, specifically the Directorate General of Antiquities, realize the role of archaeological sites in providing long-term *in situ* conservation of threatened and endemic plant species. Several meetings with the DGA Director General as well as regional directors,

and conservation of endemic plants with highly restricted ranges	helped emphasize this notion and align it with the management vision of such sites. At the target site level, by making site managers and other staff aware of plants of conservation interest at different age groups, unintended persecution of the target species was decreased. In addition, training staff to recognize the rare plant at different stages of its life cycle and showing them how to collect seeds allowed them to salvage fruits from senescent plants, establish their own mini-'seed bank' of the species and introduce it to nearby gardens. Furthermore, facilitating low cost, yet effective, vegetation management methods, habitat patches at the site became more conducive for the target species and more accessible for visitors. These interventions did not require the public sector to significantly increase spending and thus are likely to be adopted without the necessitating assistance from external parties. In short, as demonstrated by LINK, activities directed at aligning vegetation management conducted by the public sector with biodiversity conservation goals can lead to more effective conservation of both cultural heritage as well as biological diversity. Vegetation management at the World Heritage Site of Byblos was modified to promote safer and more effective methods to limit or eliminate problem species. This helped reduce health hazards to staff. On the other hand, introducing more effective methods for vegetation removal, the project successfully decreased the quantity of herbicide normally applied by site managers. It trained staff on safety measures (which were non-existent before the project) and effective use of herbicides and provided tools for manual removal of problem species. As such the new protocol includes government-approved herbicides and manual removal of invasive species, ornamentals, and spreading natives that damage historical remains, threaten the habitat of species of conservation interest, or compromise visitor experience. Several documents were produced and made available to the DGA. This allowed managers access to customized references specifically written to help them better manage the vegetation at the

	site, ensure the safety of their staff and promote the presence of the target species. For example, a Pest Management Safeguard manual was produced as the project called for the use of herbicides for the removal of invasive species and plant species compromising the state of the site's archaeological remains and/or visitor experience.

b. Planned Short-term Impacts - 1 to 3 years (as stated in the approved proposal)

Impact Description	**Impact Summary**
A. Develop an overall vegetation management plan with conservation strategies that are also applicable to similar sites based on rare endemic plant species present on site, community context, and capacity of civil society engagement	A vegetation management plan was developed following local conservation and management needs. A list of all archaeological sites in Lebanon that are monitored by site guards has been acquired from the DGA. The vegetation management plan is highly relevant to sites that occur along the coast or are littoral, especially ones present in or near cities, due to common city-dwelling exotic plants as well as ruderals and expanding natives.
B. Identifying the distribution of problem species and rare endemic plants in the target site and develop ecologically responsible protocols	The distribution of problem species and rare endemic plants was achieved using geographic survey tools that also facilitate long term monitoring of such species. Technical and non-technical staff received training sessions on the use of these tools. The mapping of the target species took place during the flowering season of 2018.
C. Implement citizen science vegetation monitoring to inform improved site management, encourage civil society engagement in biodiversity protection, e.g. citizen science can be used to map and consequently manage access to areas experiencing high recruitment of target species	Data collection and monitoring of the distribution of problem and target species to inform management and needs was completed through a methodology that can be readily implemented by citizens and DGA staff.
D. Train staff of DGA on ecologically sound management practices focused on rare endemics	DGA staff received training on ecologically sound management practices focused on rare endemics. Equipment for manual weed control was purchased to reduce staff dependence on herbicide applications.
E. Identify best methods for how peripheries of protected archaeological sites with biodiversity value can be included in community and civil society driven protection activity	Of the terrestrial peripheries bordering the UNESCO World Heritage Site of Byblos, only the sea cliff has biodiversity value. A detailed geological assessment revealed that parts of the cliff, which is made of excavation rubble, were at risk of collapsing due to erosion. A document was produced detailing interventions to protect it.

4. Describe the success or challenges of the project toward achieving its short-term and long-term impacts

Project Success

- The safeguard manual developed by the project was considered as a successful model from the region.
- The integration of plant conservation and site management practices is a key positive outcome for the world heritage site.
- Technical and non-technical staff learned to recognize the plant species of conservation interest in its different life cycle stages and are now capable of preventing the destruction of this species during weeding activities.
- Following their training, staff members took a self-initiative to collect the siliques, dispersed seeds on-site, and gave some to a local nursery asking them to propagate the plant.
- The use of herbicides was significantly decreased as non-technical staff started relying on manual means to remove problem species. Equipment supplied to them by the project proved highly useful in facilitating such methods.
- The number of personnel engaged in herbicide application was decreased. Those members were introduced to safety measures. The project funds were partly used to purchase safety equipment.

Project Challenges

- The COVID-19 and lockdown prevented a follow up on citizen science training. As a result, DGA staff and other citizen scientists were more inclined to use tools they are familiar with when collecting data. Site guards continued to contribute data and observations using WhatsApp while archaeologists sometimes contributed data using AutoCAD.

5. Were there any unexpected impacts (positive or negative)?

Unexpected positive impacts

- The prospects of biodiversity conservation in the project site were expanded to include other groups of taxa, including local reptiles. At least one nest was translocated during an archaeological excavation and staff reported dead snakes to AUB NCC via WhatsApp. AUB-NCC contacted local experts for identification. Knowledge of the ecological role and how venomous each encountered species was communicated to DGA staff. None of the encountered snakes was venomous.
- The project recommendations were readily adopted by the DGA that has allocated part of its fund to implement these recommendations. As a result, new site management practices include the complete or seasonal removal of particular plant species to protect the integrity of the site and promote the establishment of target species of conservation interest. The team of 10 employed laborers who were trained to recognize several

species of conservation interest (with the target species being the primary focus) and protect them during weeding is working closely with two archaeologists who monitor and guide the implementation of all plant management interventions in consultation with AUB-NCC while preventing the removal or alteration of any physical cultural property.

PART II: Project Components and Products/Deliverables

6. Components (as stated in the approved proposal)

List each component and product/deliverable from your proposal

6. Describe the results for each deliverable:

Component		Deliverable		
#	**Description**	**Sub-#**	**Description**	**Results for Deliverable**
1	The vegetation management plan supports the engagement of civil society in protection and is easily implemented by DGA in additional suitable sites with biodiversity value	1.1	Identify commonalities between best practices for addressing problem species for the archaeology, improving habitat quality and expansion of target rare endemic, and the needs and capacity of civil society actors	Doable best practices for addressing problem species were identified and were included in vegetation management plan. The vegetation management plan grouped problem species based on similarities in eradication measures they require or threats they pose. Furthermore, the identified practices were modified to ensure that implementation does not negatively impact the population of the target species present at site. To address safety consideration of staff, Pest Management Safeguard has been formulated as a requirement for the project. Weed science expert, Dr. Mustapha A. Haidar in the Faculty of Agricultural and Food Sciences at AUB, reviewed the document. An implementation plan was established to help guide implementing the safeguard. The Pest Management Safeguard included elements that are integral to best practices guiding the vegetation management.
		1.2	Identify the contextual variability that the vegetation management plan will need to adapt around when being applied in additional sites of biodiversity value	A detailed site analysis was prepared as a benchmark to eventually identify the contextual variability that the vegetation management plan will need to adapt around when being applied in additional sites of biodiversity value, especially along the coast. Visits to the Byblos World Heritage Site, its peripheries and other archaeological sites present along the coast helped showcase variability in management and site. A list of archaeological sites that includes site guards was acquired from the DGA. Only a minority of such sites in Lebanon have active protection which enables varying levels of constant management. Furthermore, the presence of target species was shown to be independent

				of site area. Very large sites were excavated very intensively such that all remnant vegetation was entirely removed.
		1.3	Using identified commonalities and relevant contextual variability, collaboratively develop a vegetation management plan with DGA and civil society actors	Round table discussions and group field visits took place to collaboratively develop a vegetation management plan with DGA and civil society actors, specifically tourist guides that have operated on the site for more than a decade. The site managers were provided with hard copies of the Pest Management Safeguard. Several site visits led by the site managers and the site guards facilitated the identification of problem species in the target site.
2	Problem species and target rare endemic species distributions are determined and species-specific ecologically and culturally responsible protocols are developed	2.1	Identify all problem species in the target site	All problem species encountered in the UNESCO World Heritage Site of Byblos are documented and listed. Desk research and observations conducted during field visits allowed to compile information about life-form, native status and status on site.
		2.2	Determine the distribution of problem species	A Survey123 application was adapted as a complementary survey tool. The survey collects point data and subsequently, stores location, date, picture, species identity, and the problem encountered. In response to the need for the constant update of the problem species, this application serves as an update/monitoring tool. On one hand, the survey application stores data previously collected on field visits preventing them from being edited and, on another, it allows the addition of table features listing the update on the problem. In this way, it enables users to track progress.
		2.3	Determine and monitor the distribution of target rare endemic and analyze data	A Survey123 application was adapted as a complementary survey tool. The survey collects point data and subsequently stores location, date, picture, individual count. To identify zones of high recruitment, the user is requested to provide the individual counts of each demographic group (seedlings, adolescents, non-

			to identify zones of high recruitment of target species	flowering adults, and flowering adults). To avoid the redundant collection of data, the monitoring activity would take place only in the flowering season and as group activities where all available personnel would participate.
		2.4	Develop species-specific ecologically and culturally responsible protocols	Based on gardening experiments and field observation, a set of guidelines has been developed to facilitate the integration of the target species and generically some of its associates. The aesthetic preferences and cultural attitudes towards vegetation and ecology, in general, are not yet studied in Lebanon and so our generalizations are based on our hypothesized understandings of said factors.
3.	Citizens are engaged in contextualized and action-oriented citizen science and can continue monitoring variability in problem and target species	3.1	Use and adapt GIS tools for citizen science training and data entry	Several online surveys for citizen scientists have prepared using ESRI's Suvey123, some in both Arabic and English. In total, three online GIS surveys were prepared. Some of the collected data is made public in real-time through a GIS Operations Dashboard accessible via https://aub.maps.arcgis.com/apps/opsdashboard/index.html#/24a990249b034155a305d0c6f014b088.
		3.2	Develop and implement citizen science methodology for monitoring that can be continually implemented by DGA and civil society actors to better inform management	On May 8, 2019, a round table took place to discuss how to use and adapt GIS tools for citizen science based on the needs of the DGA. The round table agreed to the need for the four survey forms and monitoring tools listed below: • Survey to assess the population of species of conservation interest, *Matthiola crassifolia* (Survey 1) • Survey to identify elements of the vegetation that need to be managed (Survey 2) • A monitoring tool that updates the management status of Survey 2 outcomes • A tool to regularly monitor areas of high importance such as delicate monuments recently excavated locations and sites of high *Matthiola crassifolia* recruitment
		3.3	Conduct regular hands-on workshops for civil society and citizens in continuing to implement the	Four training sessions were initially included in the LINK's proposal. These are included in the following list: On May 8, 2019, archaeologists, guards, and laborers present on-site participated in a training session, *Training Session I: Identification of species of conservation interest on-site and potentially invasive species,* intended to help them identify Matthiola crassifolia at different demographic groups. The training session also served as

			citizen science methodology	an opportunity to introduce the participants to data collection through ESRI's Survey123 mobile phone application. *Training Session II: Introduction to pest management safeguards* aims to find out what type of work the DGA staff members are enthusiastic about performing. Based on the Pest Management Safeguard an inventory of required materials and equipment was compiled and purchased that would be used for demonstration purposes. *Training Session III: Elimination of Species threatening cultural heritage* was preceded with producing an inventory of equipment used in the vegetation management of the site. The aims of *Training Session III* were expanded to also find out what monuments on-site the archaeologists want to emphasize to the visitors and to reconcile the vision of various stakeholders concerning vegetation management interventions. *Training Session IV: Monitoring damage to and/or deaths of non-target species* will be conducted once staff is successfully trained to implement Pest Management Safeguard.
4	DGA staff is trained and able to execute ecologically sound management practices	4.1	Conduct stakeholder assessment to identify needs and potentially conflicting interests to define enablers and barriers to implementing ecologically sound management practices	DGA Personnel Skills and Work Preferences workshop targeted non-technical staff. A Google Form was created to facilitate collecting info on the skills and preferences of the site guards. A roundtable discussion took place while the aforementioned workshop was in progress. The roundtable discussion intended to define workflow processes, based on the preferences of the technical and administrative DGA staff as well as their tacit understanding of bureaucratic restrictions. The defined workflow processes need to be followed to successfully plan and conduct workshops and other activities on spaces owned by the DGA in Byblos.
		4.2	Conduct workshops with DGA staff to build capacity for the implementation of	Regular field visits were conducted on an almost weekly basis. The visits included DGA staff. Each visit was conducted with the knowledge of the regional director in charge of the site, Ms. Tania Zaven, and in the presence of site managers. Some of the visits were intended to conduct workshops, have roundtable discussions or, more frequently, conduct field assessments and monitor vegetation management activities. Practices taking place

			ecologically sound management practices and the involvement of civil society in monitoring and protection	on the site were documented and addressed either immediately or later on depending on the concerned management level. The visits helped build capacities in regards to the vegetation management of the site, personnel safety as well as sustaining the ecology of the site.
5	In a participatory approach, the interest of civil society actors, DGA, and additional key stakeholders are included in the identification of how peripheries of protected archaeological sites can be factored into community and civil society-driven monitoring and protection activities	5.1	Identify the local interests and plans in the peripheries of the protected archaeological sites	A meeting with the Municipality of Jbeil at the early stages of the project was to identify the local interests and plans in the peripheries of the protected archaeological sites. After recognizing and assessing the threats by erosion, alternative interventions were proposed.
		5.2	Contextualize site potentials and threats by analyzing land use in the peripheries and determine potentials for expanding monitoring activities and protection to these areas.	The peripheries of the UNESCO World Heritage Site of Byblos are either hardscaped urban elements or sea cliffs. Comparison of the Corona KH-4B imagery, captured on 08/06/1970, and Ikonos imagery, captured on 15/06/2005, highlights recent changes due to coastal erosion and cliff degradation (Deroin, J. P., Bou Kheir, R., and Abdallah, C., 2017). Furthermore, regional climate change models indicate an increase of concentrated precipitation potentially exacerbating erosion. Stream Power Erosion and Deposition (USPED) Model Application of erosion models within GIS Adopted from Mitasova, H. et al (2013) was used to assess sediment flow along the sea cliffs of Byblos under several Land Use Land Cover (LULC) scenarios such that both soil erosion dynamics and potential mitigation measures were evaluated. The results of the analysis were prepared for presentation at the Symposium for Sustainable Conservation of UNESCO and other Heritage Sites through Proactive Geosciences.

				Deroin, J. P., Kheir, R. B., & Abdallah, C. (2017). Geoarchaeological remote sensing survey for cultural heritage management. Case study from Byblos (Jbail, Lebanon). *Journal of Cultural Heritage*, *23*, 37-43. Mitasova, H., Barton, C. M., Ullah, I., Hofierka, J., & Harmon, R. S. (2013). GIS-based soil erosion modeling. In *Treatise on geomorphology* (pp. 228-258). Elsevier Inc..
		5.3	Develop a landscape vegetation conservation plan and a concept design for paths and outdoor seating and gathering spaces.	The current condition of urban furniture on-site was assessed. Possible proposals to comply with the DGA's concept were compiled through desktop research and through consultations over roundtable discussions with DGA technical staff. In the process, maps of trails used by visitors of the site were documented based on brochures on the site's cultural heritage which may include, established and proposed trails. The 3D map for the Byblos archaeological site was obtained through DGA. It was created by layering and combining images taken of the site by drones. The layering of images was done using Motion Capture. Unfortunately, they haven't had the chance to take photos of the whole site yet so the full site range has not been mapped. This map helped facilitate analysis of erosion patterns in the site and potential to optimize the design process of future landscape interventions. Furthermore, the World Heritage Site was assessed for potentially serving as an ancillary botanic garden (ABG). This new category of botanic gardens is being developed by AUBotanic at AUB in collaboration with the Royal Botanic Gardens, Edinburgh.

7. Please describe and submit any tools, products, or methodologies that resulted from this project or contributed to the results.

Several online surveys for citizen scientists have prepared using ESRI's Suvey123, some in both Arabic and English. In total, three online GIS surveys were prepared. Some of the collected data is made public in real-time through a GIS Operations Dashboard accessible via https://aub.maps.arcgis.com/apps/opsdashboard/index.html#/24a990249b034155a305d0c6f014b088.

Tools, Products, or Methodologies	Description	Link
Problem Species Monitoring Survey	A Survey123 application was adapted as a complementary survey tool. The survey collects point data and subsequently, stores location, date, picture,	https://arcg.is/0eDL5f

	species identity, and the problem encountered. In response to the need for the constant update of the problem species, this application serves as an update/monitoring tool. On one hand, the survey application stores data previously collected on field visits preventing them from being edited and, on another, it allows the addition of table features listing the update on the problem. In this way, it enables users to track progress.	
Matthiola crassifolia Monitoring Survey	A Survey123 application was adapted as a complementary survey tool. The survey collects point data and subsequently stores location, date, picture, individual count. To identify zones of high recruitment, the user is requested to provide the individual counts of each demographic group (seedlings, adolescents, non-flowering adults, and flowering adults). To avoid the redundant collection of data, the monitoring activity would take place only in the flowering season and as group activities where all available personnel would participate.	https://arcg.is/nHSLD
Soil and Vegetation Survey	Survey aiding in collecting data on vegetation description (land cover and L factor) and soil (dominant soil, soil type based on Unified Soil Classification System, K factor) or wall stability.	**https://arcg.is/4DPi5**
Stakeholder Suggestion Survey	A survey targeting various stakeholders to facilitate	**https://arcg.is/1S8HnX**

	developing a landscape vegetation conservation plan and a concept design for paths and outdoor seating and gathering spaces (Task 5.3).	

PART III: Lessons, Sustainability, Safeguards and Financing

Lessons Learned

8. Describe any lessons learned during the design and implementation of the project, as well as any related to organizational development and capacity building.

Consider lessons that would inform:

- Project Design Process *(aspects of the project design that contributed to its success/shortcomings)*

The main stakeholder, the DGA, was highly involved in the project design process. Numerous meetings with multiple focal points at the said governmental technical unit led to mapping various needs across the institution. Conflicting points of view were consolidated through providing tried suggestions as well as science-based explanations.

- Project Implementation *(aspects of the project execution that contributed to its success/shortcomings)*

A workflow process was not defined early on which made planning activities at the site a challenge. After recognizing this bottleneck, a roundtable discussion took place aiming to define workflow processes that are based on the preferences of the technical and administrative DGA staff as well as their tacit understanding of bureaucratic restrictions. The defined workflow process needs to be followed to successfully plan and conduct workshops and other activities on spaces owned by the DGA in Byblos.

- Describe any other lessons learned relevant to the conservation community

Engaging other departments in the organizational body of the grantee can provide access to further resources and facilitate the implementation of project-related activities. For instance, introducing the project to other departments at the American University of Beirut promoted interdepartmental cooperation and helped allocate more resources to the project especially for Task 5.3 Develop a landscape vegetation conservation plan and a concept design for paths and outdoor seating and gathering spaces was of interest to the Department of History and Archaeology. A field-trip for students registered in the Plants and People in the Past (AROL235Z) during the Fall 2019 semester, to introduce them to some of the issues surrounding the interface between archaeological site management and nature conservation was organized and funded by the Department of History and Archaeology. The students provided the project with input regarding design ideas of a botanic garden in the archaeological site.

Sustainability / Replication

9. Summarize the success or challenges in ensuring the project will be sustained or replicated, including any unplanned activities that are likely to result in increased sustainability or replicability.

The DGA is committed to applying the approaches called for by the project in other sites. Many of the staff that were engaged in the project are required to spend time in other locations where the skills and knowledge they acquired from the project are also relevant. Although the project does not support activities beyond its official completion, personnel of the AUB Nature Conservation Center will continue to visit the site. Such voluntary visits will ensure some sustainability for the project as they solidify relations between both institutions and closeness between staff members of both. As such, knowledge of challenges faced by the DGA and opportunities to more effectively implement the suggested vegetation management plan will continue to be communicated and documented.

Safeguards

10. If not listed as a separate Project Component and described above, summarize the implementation of any required action related to social or environmental safeguards that your project may have triggered.

The planning stage resulted in a brief description of the vegetation management procedures taking place at the site. As the project involves the use of herbicides for the removal of invasive species and plant species compromising the state of the site's archaeological remains and/or visitor experience, the project was required to abide by a Pest Management Safeguard. There were no new risks during the current reporting period.

To implement the Pest Management Safeguard and given that that was not accounted for in the project's budget, an intern with an agricultural engineering background was recruited specifically for that purpose. The intern was first asked to go through the Pest Management Safeguard's document then accordingly prepare an implementation plan. A list of equipment was produced based on the approved Pest Management Safeguard and most were purchased for training purposes. These items were charged on the budget line S0501 (Travel+Special Event). Provided that site guards come from different educational backgrounds, a graphic designer was initially asked by the DGA to help produce signage, booklets, and other printable material communicating the recommendations of the Pest Management Safeguard pro bono. Training Session II: Introduction to Pest Management Safeguards was incorporated in a field guide that was produced to be a reference for guiding vegetation management interventions at the site.

Additional Funding

11. Provide details of any additional funding that supported this project and any funding secured for the project, organization, or the region, as a result of CEPF investment

a. **Total additional funding** (US$)

b. Type of funding

Please provide a breakdown of additional funding (counterpart funding and in-kind) by source, categorizing each contribution into one of the following categories:

Donor	Type of Funding*	Amount	Notes

** Categorize the type of funding as:*

A Project Co-Financing (other donors or your organization contribute to the direct costs of this project)

B Grantee and Partner Leveraging (other donors contribute to your organization or a partner organization as a direct result of successes with this CEPF funded project)

*C Regional/Portfolio Leveraging (other donors make large investments in a region because of CEPF investme*nt or successes related to this project)

Additional Comments/Recommendations

12. Use this space to provide any further comments or recommendations in relation to your project or CEPF.

Instead of conducting a few lengthy full-day workshops, short periodic field activities have led to increased engagement and allowed different groups of stakeholders to develop their own separate interventions to facilitate achieving the aims of the project. These short periodic field activities need to continue after the completion of the project.

PART IV: Impact at Portfolio and Global Level

CEPF requires that each grantee report on impact at the end of the project. The purpose of this report is to collect data that will contribute to CEPF's portfolio and global indicators. CEPF will aggregate the data that you submit with data from other grantees, to determine the overall impact of CEPF investment. CEPF's aggregated results will be reported on in our annual report and other communications materials.

Ensure that the information provided pertains to the entire project, from start date to project end date.

Contribution to Portfolio Indicators

13. If CEPF assigned one or more Portfolio Indicators to your project during the full proposal preparation phase, please list these below and report on the project's contribution(s) to them.

Indicator	Narrative
1. Status of at least 12 threatened plant species improved at the site level (increased population or indicators of breeding success) in at least 4 different countries.	*Matthiola crassifolia,* a narrow Lebanese coastal endemic which is currently on extant in very few localities, including Byblos, has showed site level improvement. Several locations in the target site demonstrated increased recruitment.  This map shows the distribution and abundance of Matthiola crassifolia, a rare Lebanese steno-endemic present at the World Heritage site of Byblos. The map is being produced through an effort involving citizen scientists. The figure above shows clustering of abundance data collected in the flowering seasons of 2019 and 2020. Raw data presented via https://arcg.is/15jGam0.
2. Improved management practices in at least 8 unprotected sites important for plants (including creation of micro-reserves, etc.).	Enhanced management practices have effectively transformed the archaeological site into a functional, yet unofficially designated, micro-reserve. Essential to the newly implemented vegetation management of the site was training both technical and non-technical staff to recognize the target species at different age groups which minimized unintentional persecution. Furthermore, technical staff collected fruits from senescent plants during their regular survey work. Collected seeds were either dispersed at likely locations for recruitment or used for propagation *ex situ*. Ultimately, all this effort was intended to assist in the establishment of habitat-specific native plant species through the gradual removal and replacement of exotic and spreading native vegetation. In doing so, site guards learned to survey sites before eliminating undesired vegetation from them. Depending on method of plant removal, methods for protecting members of the target species were selected accordingly. For instance, plants were covered by empty buckets during herbicides application.
4. Improved	In order to effectively implement the vegetation management plan, knowledge of the behavior and needs of the target species needed to be promoted on site.

knowledge for at least 35 locally endemic or highly threatened plant species and improved information on plants for at least 15 KBAs.	This spanned information on the ecology of the plant to knowhow information on seed collection, storage and propagation.
5. At least 6 young professionals (at least 3 men, 3 women) gain substantial experience in plant conservation.	Interns from various backgrounds at the AUB Nature Conservation Center who helped implement the project gained hands-on experience in plant conservation. Mr. Ibrahim Dhaini, a master's student in urban planning and policy, helped utilize various GIS tools for citizen science. Ms. Leila Rossa Mouawad, a student in agricultural engineering, helped supervise the implementation of the vegetation management plan as well as assess needs of the nontechnical staff at the site. Ms. Nadine Abou Fakhr, a student of architecture and landscape at the University of Sheffield helped conduct a site analysis and assessed urban furniture at the site. Ms. Nivine Nasralla, a master's student in plant ecology at the Lebanese University, helped rewrite various technical texts to make them more accessible to the public.

Contribution to Global Indicators

Please report on all Global Indicators (sections 16 to 23 below) that pertain to your project.

14. Key Biodiversity Area Management

Number of hectares of Key Biodiversity Areas (KBA) with improved management

Please report on the number of hectares in KBAs with improved management, as a result of CEPF investment. Examples of improved management include, but are not restricted to: increased patrolling, reduced intensity of snaring, invasive species eradication, reduced incidence of fire, and introduction of sustainable agricultural/fisheries practices. Do not record the entire area covered by the project - only record the number of hectares that have improved management.

If you have recorded part or all of a KBA as newly protected for the indicator entitled "protected areas" (section 17 below), and you have also improved its management, you should record the relevant number of hectares for both this indicator and the "protected areas" indicator.

Name of KBA	# of Hectares with strengthened management *	Is the KBA Not protected, Partially protected or Fully

		protected? Please select one: NP/PP/FP
Jbeil Coast	*7*	*PP*

** Do not count the same hectares more than once. For example, if 500 hectares were improved due to implementation of a fire management regime in the first year, and 200 of these same 500 hectares were improved due to invasive species removal in the second year, the total number of hectares with improved management would be 500.*

The improvements entailed invasive species eradication, reduced persecution of species of conservation interest, and introduction of sustainable vegetation management practices.

15. Protected Areas

15a. Number of hectares of protected areas created and/or expanded

Report on the number of hectares of protected areas that have been created or expanded as a result of CEPF investment.

Name of PA*	Country(s)	# of Hectares	Year of legal declaration or expansion	Longitude**	Latitude**
N/A					

** If possible please provide a shape file of the protected area to CEPF.*

*** Indicate the latitude and longitude of the center of the site, to the extent possible, or send a map or shapefile to CEPF. Give geographic coordinates in decimal degrees; latitudes in the Southern Hemisphere and longitudes in the Western Hemisphere should be denoted with a minus sign (example: Latitude 38.123456 Longitude: -77.123456).*

15b. Protected area management

If you have been requested to submit a Management Effectiveness Tracking Tool (METT), please follow the instructions below. If you have not been requested to submit a METT, please go directly to section 16.

Should you want to know more about the monitoring of protected area management effectiveness and the tracking tool, please click here.

Download the METT template which can be found on this page and then work with the protected area authorities to fill it out. Please go to the Protected Planet website here and search for your protected area in their database to record its associated WDPA ID. Then please fill in the following table:

WDPA ID	PA Official Name	Date of METT*	METT Total Score
N/A			

** Please indicate when the METT was filled by the authorities of the park or provide a best estimate if the exact date is unknown. And please only provide METTs less than 12 months old.*

Please do not forget to submit the completed METT together with this report.

16. Production landscape

Please report on the number of hectares of production landscapes with strengthened management of biodiversity, as a result of CEPF investment. A production landscape is defined as a landscape where agriculture, forestry or natural product exploitation occurs. Production landscapes may include KBAs, and therefore hectares counted under the indicator entitled "KBA Management" may also be counted here. Examples of interventions include: best practices and guidelines implemented, incentive schemes introduced, sites/products certified and sustainable harvesting regulations introduced.

Number of hectares of production landscapes with strengthened management of biodiversity.

Name of Production Landscape*	# of Hectares**	Latitude***	Longitude***	Description of Intervention
N/A				

** If the production landscape does not have a name, provide a brief descriptive name for the landscape.*

***Do not count the same hectares more than once. For example, if 500 hectares were strengthened due to certification in the first year, and 200 of these same 500 hectares were strengthened due to new harvesting regulations in the second year, the total number of hectares strengthened to date would be 500.*

**** Indicate the latitude and longitude of the center of the site, to the extent possible, or send a map or shapefile to CEPF. Give geographic coordinates in decimal degrees; latitudes in the Southern Hemisphere and longitudes in the Western Hemisphere should be denoted with a minus sign (example: Latitude 38.123456 Longitude: -77.123456).*

17. Beneficiaries

CEPF wants to record two types of benefits that are likely to be received by individuals: structured training and increased income. Please report on the number of men and women that have benefited from structured training (such as financial management, beekeeping, horticulture) and/or increased income (such as from tourism, agriculture, medicinal plant harvest/production, fisheries, handicraft production) as a result of CEPF investment. Please provide results since the start of your project to project completion.

17a. Number of men and women receiving structured training.

# of men receiving structured training *	# of women receiving structured training *
18	8

**Please do not count the same person more than once. For example, if 5 men received structured training in beekeeping, and 3 of these also received structured training in project management, the total number of men who benefited from structured training should be 5.*

17b. Number of men and women receiving cash benefits.

# of men receiving cash benefits*	# of women receiving cash benefits*
N/A	N/A

**Please do not count the same person more than once. For example, if 5 men received cash benefits due to tourism, and 3 of these also received cash benefits from increased income due to handicrafts, the total number of men who received cash benefits should be 5.*

18. Benefits to Communities

CEPF wants to record the benefits received by communities, which can differ to those received by individuals because the benefits are available to a group. CEPF also wants to record, to the extent possible, the number of people within each community who are benefiting. Please report on the characteristics of the communities, the type of benefits that have been received during the project, and the number of men/boys and women/girls from these communities that have benefited, as a result of CEPF investment. If exact numbers are not known, please provide an estimate.

18a. Please provide information for all communities that have benefited from project start to project completion.

Name of Community	Community Characteristics (mark with x)							Type of Benefit (mark with x)									# of Beneficiaries	
	Subsistence economy	Small landowners	Indigenous/ ethnic peoples	Pastoralists / nomadic peoples	Recent migrants	Urban communities	Other*	Increased access to clean water	Increased food security	Increased access to energy	Increased access to public services (e.g. health care, education)	Increased resilience to climate change	Improved land tenure	Improved recognition of traditional knowledge	Improved representation and decision-making in governance forums/structures	Improved access to ecosystem services	# of men and boys benefitting	# of women and girls benefitting

*If you marked "Other" to describe the community characteristic, please explain:

18b. Geolocation of each community

Indicate the latitude and longitude of the center of the community, to the extent possible, or upload a map or shapefile. Give geographic coordinates in decimal degrees; latitudes in the Southern Hemisphere and longitudes in the Western Hemisphere should be denoted with a minus sign (example: Latitude 38.123456 Longitude: -77.123456).

Name of Community	Latitude	Longitude

19. Policies, Laws and Regulations

Please report on change in the number of legally binding laws, regulations, and policies with conservation provisions that have been enacted or amended, as a result of CEPF investment. “Laws and regulations” pertain to official rules or orders, prescribed by authority. Any law, regulation, decree or order is eligible to be included. “Policies” that are adopted or pursued by a government, including a sector or faction of government, are eligible.

19a. Name, scope and topic of the policy, law or regulation that has been amended or enacted as a result of your project

No.		Scope (mark with x)			Topic(s) addressed (mark with x)													
	Name of Law, Policy or Regulation	Local	National	Regional/International	Agriculture	Climate	Ecosystem Management	Education	Energy	Fisheries	Forestry	Mining and Quarrying	Planning/Zoning	Pollution	Protected Areas	Species Protection	Tourism	Transportation	Wildlife Trade
1																			
2																			

…																			

19b. For each law, policy or regulation listed above, please provide the requested information in accordance with its assigned number.

No.	Country(s)	Date enacted/ amended MM/DD/YYYY	Expected impact	Action that you performed to achieve this change
1				
2				
3				

20. Sustainable Financing Mechanism

Sustainable financing mechanisms generate financial resources for the long-term (generally five or more years). Examples of sustainable financial mechanisms include conservation trust funds, debt-for-nature swaps, payment for ecosystem services (PES) schemes, and other revenue, fee or tax schemes that generate long-term funding for conservation.

All CEPF grantees (or sub-grantees) with project activities that pertain to the creation and/or the implementation of a sustainable financing mechanism are requested to provide information on the mechanism and the funds it delivered to conservation projects during the project timeframe, unless another grantee involved with the same mechanism has already been or is expected to be tasked with this.

CEPF requires that all sustainable financing mechanism projects to provide the necessary information at their completion.

20a. Details about the mechanism

Fill in this table for as many mechanisms you worked on during your project implementation as needed.

NO.	Name of financing mechanism	Purpose of the mechanism*	Date of Establishment**	Description***	Countries
1	N/A				
2					
3					

**Please provide a succinct description of the mission of the mechanism.*

***Please indicate when the sustainable financing mechanism was officially created. If you do not know the exact date, provide a best estimate.*

****Description, such as trust fund, endowment, PES scheme, incentive scheme, etc.*

20b. Performance of the mechanism

For each Financing Mechanism listed previously, please provide the requested information in accordance with its assigned number.

NO.	Project intervention*	$ Amount disbursed to conservation projects**	Period under Review *(MM/YYYY -MM/YYYY)****
1	N/A		
2			
3			

**List whether the CEPF grant has helped to create a new mechanism (Created a mechanism) or helped to support an existing mechanism (Supported an existing mechanism) or helped to create and then support a new mechanism (Created and supported a new mechanism).*

***Please only indicate the USD amount disbursed to conservation projects during the period of implementation of your project and using, when needed, the exchange rate on the day of your report.*

****Please indicate the period of implementation of your project or the period considered for the amount you indicated.*

Please do not forget to submit any relevant document which could provide justification for the amount you stated above.

21. Biodiversity-friendly Practices

Please describe any biodiversity-friendly practices that companies have adopted as a result of CEPF investment. A company is defined as a legal entity made up of an association of people, be they natural, legal, or a mixture of both, for carrying on a commercial or industrial enterprise. While companies take various forms, for the purposes of CEPF, a company is defined as a for-profit business entity. A biodiversity-friendly practice is one that conserves or uses biodiversity sustainably.

Number of companies that adopt biodiversity-friendly practices

No.	Name of company	Description of biodiversity-friendly practice adopted during the project
1	N/A	
2		
…		

22. Networks & Partnerships

Please report on any new networks or partnerships between civil society groups and across to other sectors that you have established or strengthened as a result of CEPF investment.
Networks/partnerships should have some lasting benefit beyond immediate project implementation. Informal networks/partnerships are acceptable even if they do not have a Memorandum of Understanding or other type of validation. Examples of networks/partnerships include: an alliance of fisherfolk to promote sustainable fisheries practices, a network of environmental journalists, a partnership between one or more NGOs with one or more private sector partners to improve biodiversity management on private lands, a working group focusing on reptile conservation. Please do not use this tab to list the partners in your project, unless some or all of them are part of such a network / partnership described above.

Number of networks and/or partnerships created and/or strengthened

No.	Name of Network	Name of Partnership	Year established	Did your project establish this Network/ Partnership? Y/N	Country(s) covered	Purpose
1	N/A					
2						

…						

23. Gender

If you have been requested to submit a Gender Tracking Tool (GTT), please follow the instructions provided in the Excel GTT template. If you have not been requested to submit a GTT, please go directly to Part V.

Should you want to know more about CEPF Gender Policy, please click here.

Download the GTT template which can be found on this page and then work with your team to fill it out. Please do not forget to submit the completed GTT together with this report.

Part V. Information Sharing and CEPF Policy

CEPF is committed to transparent operations and to helping civil society groups share experiences, lessons learned, and results. Final project completion reports are made available on our Web site, www.cepf.net, and publicized in our newsletter and other communications.

Please include your full contact details below:

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