

瑰寶重生

國家公園停採礦場的再造與利用

Rebirth of Treasures

Transformation of Discontinued Mines in National Parks

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在陽明山國家公園的用心復育下，為園區各停採礦場賦予了綠色的生命力 / 陳彥伯攝
The hard work by Yangmingshan National Park Headquarters in restoring the discontinued mines
in the park has filled them with verdant vitality./ by Yan-bo Chen



由協商到公告禁採區，由廢礦到完成禁採補償，國家公園管理單位耗費25年的時間，將上萬公頃礦業用地重新賦予國有保育林的地位。已經千瘡百孔的，讓它充分休養生息；已經殘破傾圮的，讓它整裝改變新貌；久已無人聞問的，就讓它自由自在的成為野生動植物們的新樂園。

於是，土地有了新生命，人有了新的生活品質。

活化教育 重現生跡

陽明山國家公園內，位於冷水坑通往擎天崗草原的道路旁，有一處生產瓷土礦和黏土礦的雍來礦場，1988年即停採。即使近在路邊，它從不曾引起遊客留意駐足，事實上，該區周邊植被相豐富，可觀察多種不同的生態景觀，森林、草原、濕地等地景景緻串連起來，讓遊客能感受大自然孕育的奧妙與微妙變化。此外，陽管處保留部分採礦器具，期望在遊客親近自然的同時，能增添人文歷史遺跡的記憶，並設置涼亭、木棧道，將它變身為戶外解說教室，「雍來礦場跡地」才出現在親子活動造訪的名單上。

2005年，陽管處主動邀約臺灣環境資訊協會，進行雍來礦場廢棄的洗礦池植生復育與陽明山植物種源保存工作。透過辦理生態工作假期，進行植物復

Having gone through negotiations, announced no-mining areas, terminated mining, and completed compensations, Taiwan's national parks spent 25 years turning tens of thousands of hectares of mining sites into national conservation areas. The damaged was restored. The collapsed was renovated. The long-forgotten was changed into a new wonderland for wildlife.

As a result, the lands were reborn. The life quality of people was improved.

A Classroom in the Nature

Yonglai Mine, a mining site for porcelain and clay mineral extraction located beside the road from Lengshuikeng to Qingtiangang Grassland in Yangmingshan National Park (YMSNP), became abandoned since 1988. Although never being an attractive spot, there actually exists plentiful vegetation for tourists to observe and experience, such as forests, grasslands, and wetlands. Moreover, YMSNP Headquarters preserved certain mining equipment and built pavilions and wooden trails, turning Yonglai Mine into an outdoor classroom for tourists to enjoy the Nature with a historic scent.

In 2005, YMSNP and Taiwan Environmental Information Association (TEIA) co-organized Eco-Working Holiday activities. By applying phytoremediation to the mine pool and conducting a Plant Genetic Resources Preservation Project

偉利礦場開採時期紀錄照 / 陽管處提供

What Weili Mine looked like when it was still in function. / Provided by YMSNP Headquarters



育及棲地維護讓雍來礦場成為生態教育園區，以環境監測、棲地維護、環境教育、生態解說等方式，將生物多樣性與保育行動理念傳遞出去。

生態工作假期執行項目包括植被維護及棲地監測，並於活動中進行生態觀察等。內容除了移除外來種及照顧植栽之外，於每月調查水質、植被狀況及紀錄，藉由志工參與棲地復育，激發愛護環境的行動。

陽管處企劃課課長張順發將停採礦場利用區分為三類作法。第一類作法，針對週遭環境原始而且交通不便者，以自然演替為原則，符合國家公園的保育功能，例如玉紋礦場。然而因土質關係，植被生長情形有快有慢，例如偉利礦場土質比較黏，難以自然長出植被，就必須以人工植樹方式復育。

第二類作法，針對交通便利、腹地大者，設置遊憩設施供民眾親近利用，符合國家公園的遊憩功能。例如硫磺谷解說休憩設施、龍鳳谷公園，以及原雍來礦場業主搭建的冷水坑溫泉浴室，陽管處於2001年重新整建，免費提供社會大眾享受泡湯之樂。

第三類作法，針對具有人文歷史保存價值者，則現況保留。例如大油坑保存原有採硫設備，但因為有安全上考量並未對外開放，僅作為學術研究及環境教育利用。

in Yangmingshan, Yonglai Mine was made into an ecological education park.

The detailed activities included revegetation, environment monitoring, habitat preservation, and eco-interpretation. Participating volunteers helped to remove invasive species and monitor water quality and vegetation every month. Through actual works in environmental restoration, public awareness of biodiversity and conservation were thus better raised.

According to Shun-fa Chang, Chief of Planning Section of YMSNP Headquarters, there are three ways to reutilize discontinued mines. Firstly, for mines in a primitive environment and not easily accessible via transportation, like Yuwen Mine, they are left as eco-protection areas and restored by natural succession. However, for those with clayey soil where vegetation is hard to grow naturally, such as Weili Mine, artificial planting is necessary.

Secondly, mines which are accessible and with a large hinterland, are transformed into recreation areas, such as the ones in Liahuanggu, Longfonggu, and Lengshuikeng. In 2001, the park reconditioned the hot spring in Lengshuikeng built by the previous owner of Yonglai Mine and opened it for free for the public till today.

Thirdly, mines with cultural and historical values are entirely preserved, for instance, the sulfur-mining equipment at Dayoukeng. However, it is only open for academic research and environmental education but not to the public due to safety concerns.

偉利礦場跡地因土質較黏，難以自然長出植被，故以人工植樹的方式來進行復育 / 陽管處提供
For those mines with clayey soil where vegetation is hard to grow naturally, such as Weili Mine, artificial planting is necessary./
Provided by YMSNP Headquarters



偉利礦場因土質關係，植被生成較為緩慢。陽明書屋管理站主任呂理昌表示：「這也是一種經驗的學習。以後或許可再多研擬不同的方案，並根據專家的建議，找出最適宜當地環境的處理方式，如此便能針對不同性質的環境，找回各個停採礦場的土地生命力。」

「回到現場就是最好的環境教育。」這是呂理昌的信念。他收集了可觀的採硫資料照片與影像，期盼結合大油坑、守礮營地、魚路古道等採硫遺址的歷史景觀區計畫能通過評估，讓這些史料得以透過解說中心展示，並導引遊客回到現場，活化歷史的體驗。

建立在地生態規劃

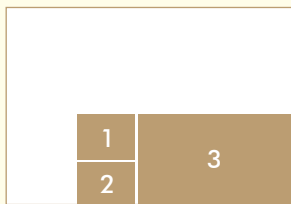
太魯閣國家公園管理處在完成補償發放作業後，隨即委託學者針對回收礦區進行監測研究及自然復原規劃。結果發現，未開採、坑內開採或停採16年以上的礦區植被良好。然而除了少數原生植物外，

“This is a way of learning. By taking into account suggestions from experts and coming up with different plans suitable for different environments with different needs, we will be able to provide the best plan for a specific land and hence give discontinued mines new lives,” said Li-chang Lu, Chief of Yangmingshuwu Service Station in YMSNP.

Lu believes that “Historic sites are the best source of environmental education.” If the project of making Dayoukeng, the sulfur guarding camp, and Fishermen’s Trail a historic attraction is approved, many sulfur-mining photos and videos collected by Lu can be displayed in the interpretation center, guiding tourists to relive the history of mining.

Specific Ecological Planning for Local Needs

Taroko National Park (TNP) Headquarters also commissioned scholars to make natural restoration plans for the mines. They found that vegetation in untapped mines or discontinued mines has well recovered. In addition to few native plants, invasive species, such as White Popinac (*Leucaena leucocephala*), Napier Grass (*Pennisetum*



1. 瓦拉米地區豐富的自然生態與地質景觀，是適合解說教育的場域 / 玉管處提供
With an abundance of ecological resources and geological landscapes, Walami area may serve as a wonderful venue for interpretation and education. / Provided by YSNP Headquarters
2. 陽管處與臺灣環境生態資訊協會在雅來礦場跡地辦理生態工作假期，藉由志工參與棲地復育，激發愛護環境的行動 / 臺灣環境生態資訊協會提供
YMSNP Headquarters and Taiwan Environmental Information Association (TEIA) co-organized Eco-Working Holiday activities at the abandoned Yonglai Mine in hopes of inspiring public actions of environmental protection through the restoration efforts by the volunteers. / Provided by TEIA3.
3. 玉管處與原住民合作，共同推動生態旅遊，體驗在地文化 / 玉管處提供
YSNP Headquarters has been working with local aborigines in developing ecotourism, offering an opportunity to experience aboriginal cultures.



自然演替大多出現銀合歡、象草、大花咸豐草、南美蟛蜞菊等外來入侵種狀況，甚至形成高達4至6公尺的銀合歡純林。

主持研究的楊懿如教授建議，利用停採礦場的生態復育現況規劃生態旅遊與解說培訓，包括改善步道設施、實施當地社區居民與保育志工人員的培訓課程，強化國家公園與地方社區、團體的夥伴關係，協助推動參與式生態旅遊。

太管處企劃課課長聶士昭表示，因太魯閣停採礦場的土地都屬於林務局，必須回歸林班地，因此以監測其自然演替狀況為優先措施，並注意水土保持，避免崩塌的危險。然而，因應蘇花改可能對中橫帶來的遊客量增加衝擊，太管處正在研議是否將部份停採礦場開放遊憩利用的可行性。

玉山國家公園的瓦拉米地區雖然生態豐富，但平均坡度大、地形陡峭，具有潛在地形危險性，屬於地質不穩定區，不適合引進過度的步道和人為設施，而干擾野生動物的棲息地。因此，瓦拉米被列為生態保護

purpureum), and Spanish Needle (*Bidens pilosa*), grew in abundance.

Prof. Yi-ju Yang suggested that discontinued mines, after ecological restoration, should be used for ecotourism. This can be realized by improving trail facilities, providing interpreter-training courses for local residents and conservation volunteers, strengthening the partnerships between national parks and local communities, and encouraging people to participate in eco-tours.

According to Shi-zhao Nie, Chief of Planning Section of TNP Headquarters, the lands of discontinued mines in Taroko belong to the Forestry Bureau. The current priority is to monitor its natural succession and pay attention to water and soil conservation to prevent possible landslides. As tourists may pour in and make impact, whether to open these discontinued mines for recreational purposes is still under discussion.

Walami area in Yushan National Park (YSNP) boasts rich eco-resources, but its steep and geologically unstable slopes have allowed limited trails and facilities. Today



區，日治越嶺道沿線與大分地區則劃入特別景觀區。2008年時又更進一步，把大分遊憩區、日治越嶺道也改列為生態保護區。

豐富的野生動植物資源、人文史蹟與地質地形景觀，不可否認的，瓦拉米是適合解說教育的場域。因此玉管處深耕瓦拉米附近部落，發展生態旅遊，結合當地原住民部落辦理多梯次「瓦拉米玉溪人文生態旅遊」活動，內容包含自然生態體驗、原住民舞蹈欣賞以及探訪布農族與日治的舊遺址，藉由當地原住民的帶領，使民眾對於瓦拉米地區能有更親近的認識與交集。

台江國家公園境內四草野生動物保護區以及七股鹽田濕地，成為闔家出遊和好友結伴旅行的熱門景點。在掃鹽的勞動中，以及歷史，傳承了先民不竭取大自然礦脈的智慧。在網路搜尋引擎鍵入「鹽田生態文化村」，立即可欣賞眾多部落客至台江國家公園體驗掃鹽、曬鹽的快樂出遊照。台管處以「創意產業」的思維包裝鹽田文化，特別於夏季舉辦鹽業體驗之旅，透過在地解說深入了解安順鹽場遺址始末，並藉由親身下鹽田，體驗昔日產鹽的辛苦過程。

幾十年來，停採礦場在歲月的流逝中，承載著不同的興衰記憶，從過往的黃金歲月，到現今的再生利用，礦場在每段時代中都寫下它不凡的歷史意義，也是後人們應永續珍惜的珍貴寶地。



Walami is an ecological protected area, while Japanese Occupation Era Batongguan Traversing Trail and Dafen area were first designated as scenic areas before listed as ecological protected areas in 2008.

Undeniably, Walami is an excellent venue for interpretation and education with its wide variety of natural resources, historic heritage, and geological landscape. So YSNP has been working with local aborigines in developing ecotourism, with a featured annual event “Walami-Yuxi Cultural and Ecological Tour,” which provides field trips, aboriginal dance shows, visits to the Bunun tribe and relics during Japanese Occupation, to help people better understand Walami area.

Sihcao Wildlife Refuge and the salt pans and wetlands in Cigu at Taijiang National Park (TJNP) are popular tourist destinations. The park advertises its salt-pan culture in a creative way and offers salt-making tours in summer. By listening to professional interpreters explaining the history of Anshun Salt Works while experiencing the salt-making process, the hard works of the ancestors and the wisdom of benign extraction of mineral resources can be thoroughly appreciated by people today.

The status of mines has waxed and waned in the past few decades. After fulfilling their historical missions, discontinued mines are now transformed and reborn, and should be sustainably cherished generation after generation.



台管處以「創意產業」的思維包裝鹽田文化，讓民眾在掃鹽的過程中能體驗先民不竭取大自然礦脈的智慧 / 台管處提供
TJNP Headquarters promotes the salt-pan culture in a creative way in which the wisdom of benign extraction of mineral resources can be thoroughly appreciated by people today. / Provided by TJNP Headquarters



野生動物新樂園

A New Home for Wildlife

太魯閣國家公園委託東華大學楊懿如教授等人，針對清水斷崖附近的正德東豐礦場、崇德正大礦場、立東三棧礦場等礦區，以焦點物種為指標、監測礦業用地回收後的生態復育狀況，記錄到眾多動物出沒的身影，其中不乏許多臺灣特有種及保育類野生動物。

TNP Headquarters has commissioned Prof. Yi-ju Yang of National Dong Hwa University and other scholars to monitor the ecological restoration status of discontinued mines in TNP, such as Zhengde-Dongfeng Mine near Qingshui Cliff, Zhengda Mine at Chongde, and Beisanzhan Mine at Lidong, by using focal species as indexes. A great variety of wild animals, including many Taiwan endemic species and protected species, have been observed and recorded.

焦點物種 Focal Species	類別數量 Numbers in Classification	臺灣特有種 Taiwan Endemic Species	保育類野生動物 Protected Species
哺乳類 Mammals	4目6科9種 4 orders, 6 families, 9 species	臺灣獼猴 <i>Formosa Macaque (Macaca cyclopsis)</i> 白面鼯鼠 <i>White-faced Flying Squirrel (Petaurista alborufus lena)</i> 刺鼠 <i>Spinous Country Rat (Rattus coxinga niviventer)</i> 臺灣長鬃山羊 <i>Formosan Serow (Naemohedus swinhoei)</i>	食蟹獾 <i>Crab-eating Mongoose (Herpestes urva)</i> 臺灣長鬃山羊 <i>Formosan Serow (Naemohedus swinhoei)</i> 臺灣獼猴 <i>Formosa Macaque (Macaca cyclopsis)</i>
鳥類 Birds	8目26科44種 8 orders, 26 families, 44 species	臺灣擬啄木(五色鳥) <i>Muller's Barbet</i> 烏頭翁 <i>Taiwan Bulbul (Pycnonotus taivanus)</i> 臺灣紫嘯鶇 <i>Formosan Whistling Thrush (Myiophonus insularis)</i> 冠羽畫眉 <i>Formosan Yuhina (Yuhina brunneiceps)</i> 白耳畫眉 <i>White-eared Sibia (Heterophasia auricularis)</i> 黃山雀 <i>Formosan Yellow Tit (Parus holsti)</i>	大冠鷲 <i>Crested Serpent Eagle (Spilornis cheela)</i> 鳳頭蒼鷹 <i>Asian Crested Goshawk (Accipiter trivirgatus)</i> 黃嘴角鴞 <i>Spotted Scops Owl (Otus spilocephalus)</i> 褐鷹鴞 <i>Brown Hawk Owl (Ninox scutulata)</i> 領角鴞 <i>Collored Owllet (Otus bakkamoena)</i> 鷓鴣 <i>Collared Owllet (Glaucidium brodiei)</i> 烏頭翁 <i>Taiwan Bulbul (Pycnonotus taivanus)</i> 黃山雀 <i>Formosan Yellow Tit (Parus holsti)</i> 朱鷲 <i>Maroon Oriole (Oriolus traillii ardens)</i> 紅尾伯勞 <i>Brown Shrike (Lanius cristatus)</i> 深山竹雞 <i>White-throated Hill Partridge (Arborophila crudigularis)</i>
爬蟲類 Reptiles	1目6科11種 1 order, 6 families, 11 species	斯文豪氏攀蜥 <i>Swinhoe's Tree Lizard (Japalura swinhonis Gunther)</i>	雨傘節 <i>Taiwan Banded Krait (Bungarus multicinctus Blyth)</i> 眼鏡蛇 <i>Chinese cobra (Naja atra)</i>
兩棲類 Amphibians	1目3科9種 1 order, 3 families, 9 species	盤古蟾蜍 <i>Taiwan Common Toad (Bufo bankorensis)</i> 斯文豪氏赤蛙 Swinhoe' frog (<i>Rana swinhoana</i>) 褐樹蛙 <i>Brown tree frog (Rhacophorus robustus)</i> 莫氏樹蛙 <i>Moltrecht' tree frog (Rhacophorus moltrechti Boulenger)</i>	 莫氏樹蛙 / 張相桐 攝 <i>Moltrecht' tree frog/ by Xiang-tung Zhang</i>



領角鴞 / 周黃得榮 攝
Collored Owllet/ by Te-jung Chou-Haung

※ 引(或改)自楊懿如等，民98，代表性生態系經營管理——礦業用地回收後生態復育計畫第一期，太魯閣國家公園管理處。
Data from Yang, Y. J. et. al.(2009) *Representative Management of Ecosystem – The Project of Ecological Restoration for Reclaimed Mining Sites, 1st Stage*, Taroko National Park Headquarters.