Great Southern Ark
The rewilding of southern Yorke Peninsula

Natural Resources Northern and Yorke

WWF

ZOOS SOUTH AUSTRALIA

FAUNA Research Alliance

Conservation Volunteers

Yorke Peninsula

Yorke Peninsula Council

Greening Australia

Regional Development Australia Yorke and Mid North

Legatus Group

Ag Excellence Alliance

Government of South Australia
Department of Environment, Water and Natural Resources

birdlife Australia

Trees For Life

Native vegetation communities on southern Yorke Peninsula are of notably high quality, and underpin much of the region's economic activity, via. tourism. However, 95% of the district's 29 mammal species are now locally extinct. Without the supporting ecological functions provided by these missing species, the area's native vegetation communities are undergoing a slow deterioration in condition (41% of flora species are considered to be in decline; Gillam & Urban 2008).

The ***Great Southern Ark – the rewilding of Southern Yorke Peninsula*** project aims to reinstate missing ecological processes through the reintroduction of keystone species.

Following 10 years of *Community Action Planning* on Yorke Peninsula, a consortium of organisations led by the N&Y NRM Board, WWF Australia, Zoos SA and the FAUNA Research Alliance initiated the development of the project.

Rewilding

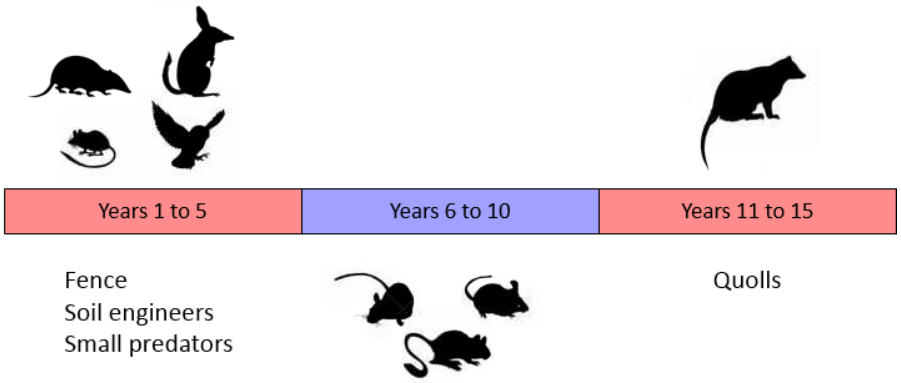
Emerging as a conservation ethos in the late 1990s (Soulé and Noss 1998), rewilding seeks to reinstate ecological processes through the re-establishment of keystone species, to drive ecosystem-wide conservation outcomes and maximize associated socio-economic benefits. Significant focus has been placed on trophic rewilding which usually refers to consumptive forces in food webs by strongly interacting species, including apex predators and large-bodied herbivores (Ripple *et al*. 2015; Svenning *et al*. 2016). The concept has been further expanded to include processes associated with ecosystem engineers; those species whose activities provide a beneficial influence on micro and macro habitat characteristics (e.g. increasing/reducing structural layers in a habitat, improvements to soil characteristics). Contemporaneous with the recognition of the profound influence that keystone species play in the long-term conservation of ecosystems, is the growing concern that many of these species' populations are dwindling and face extinction (Estes *et al*. 2011). As such, rewilding programs can deliver significant outcomes at both the species and ecosystem scale.

Rewilding seeks to build self-sustainability within a system, thereby reducing the input costs required to manage the system.

Rewilding Southern Yorke Peninsula

The rewilding of southern Yorke Peninsula is envisaged as a 20 year project, with the staged reintroduction of key native species to the landscape. The project seeks to re-establish ecological function to forestall the decline of the district's unique vegetation and to facilitate improvements in the resilience and adaptability into the system, in the face of shifting climatic conditions. The current candidates for reintroduction are:

Project phase	Species	Ecological function
Years 1 – 5	– woylie	– soil engineer
	– southern brown bandicoot	– soil engineer
	– red-tailed phascogale	– small native predator
	– augment barn owl population	– small native predator
Years 6 – 10	– native rodent species (tbd)	
Years 11 – 15	– western quoll	– medium-sized native predator



It is anticipated that the reintroduction of native *soil engineers* will increase nutrient turnover within soils, improve water infiltration and soil moisture, facilitate the dispersal of mycorrhizal fungi across the landscape, and create micro-habitat conditions for the germination and establishment of native plant seedlings. Prior to the reintroduction of medium-sized predators, the reintroduction of *native rodent species* will occur.

Returning *native predators* to the system is anticipated to reduce the abundance of vertebrate pest species, including; house mice (red-tailed phascogale, barn owl, western quoll), rabbits (western quoll) and potentially feral cats.

The innovative cross-sector development of the *Great Southern Ark* project has produced a multi-faceted program that encompasses;

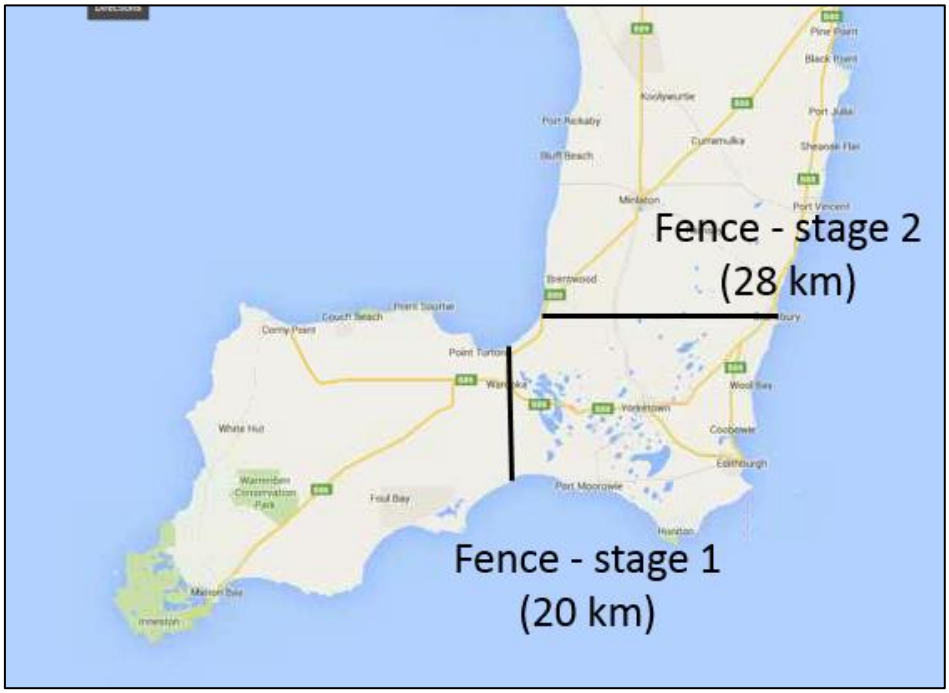
(i) habitat restoration,
(ii) a threatened species recovery program,
(iii) an integrated pest management program,
(iv) a sustainable agriculture program, and
(v) an economic renewal program.

The rewilding of southern Yorke Peninsula is a proof-of-concept project that seeks to document the many potential benefits of rewilding. As such, a significant focus has been placed on monitoring and evaluation, to enable the detection and assessment of any positive (or negative) effects that result from the project. The "experimental" nature of the project has been highlighted in all discussions held with the Yorke Peninsula community, with an emphasis placed on indicating that positive outcomes may not be realised across all sectors; for example, if the anticipated agricultural outcomes are not realised, there will still be significant positive outcomes for biodiversity conservation and the local economy.

Cost efficiencies

Native species reintroductions can prove expensive, due to the ongoing need to resource the management of threating processes. Predation by red foxes and feral cats has been identified as the likely primary cause of native species extinctions on southern Yorke Peninsula. The N&Y NRM Board has been delivering a community driven fox control program across the entirety of southern Yorke Peninsula (*Baiting for Biodiversity*; 170,000 ha) for the past five years. This program has proven highly successful, with stable populations of malleefowl and tammar wallabies recorded, the re-appearance of bush stone-curlews (following a 40 year absence), and a 30% increase in lambing percentages.

While producing significant conservation and production outcomes, the *Baiting for Biodiversity* program is costly to run and provides only a stop-gap solution to the problem, due to the constant immigration of foxes into the baited area (as witnessed by all feral predator control programs). To drive long-term cost efficiencies, the construction of a 23 kilometre predator exclusion fence across the peninsula is proposed. An intensive feral predator control program will complement the construction of the fence, resulting in the need for only low intensity predator management into the future. The first fence will enclose an area of 130,000 ha, with plans to construct a second fence in year 10 (enclosing 170,000 ha).



Captive breeding programs, to produce individuals for reintroduction, are an additional significant cost in species reintroduction programs. In collaboration with the Narungga Aboriginal Corporation Regional Authority, the *Great Southern Ark* project is discussing the potential to establish native species populations on Wardang Island Indigenous Protected Area (year 15), to act as in-situ breeding colonies for future reintroductions of animals to mainland Yorke Peninsula. This aligns with the aspirations of the Narungga Community to develop the island into an ecotourism venture.

A safe haven for threatened species

Southern Yorke Peninsula retains significant areas of native vegetation, of which 22% is contained within the conservation estate (public and private). In conjunction with the construction of the fence, and resultant low densities of feral carnivores, there is an opportunity to establish a landscape-scale safe haven for some of Australia's most threatened species. In addition to the planned reintroduction of four threatened species to reinitiate ecological processes (woylie, southern brown bandicoot, red-tailed phascogale, western quoll), the project provides the opportunity to establish secure populations of other threatened fauna species known to have once existed on the peninsula, including;

- numbat (EPBC endangered)

- western barred bandicoot (EPBC endangered)
- heath mouse (EPBC endangered)
- burrowing bettong (EPBC vulnerable)
- banded hare wallaby (EPBC vulnerable)
- plains mouse (EPBC vulnerable)
- Shark Bay mouse (EPBC vulnerable).

The reinstatement of ecological processes on southern Yorke Peninsula is anticipated to produce significant beneficial outcomes for the peninsula's threatened flora species, primarily through the enhancement of germination and recruitment rates within existing populations, and the dispersal of seed.

- silver daisy bush (EPBC endangered)
- inland green-comb spider-orchid (EPBC endangered)
- Goldsack's leek orchid (EPBC endangered)
- annual candles (EPBC vulnerable)
- large-fruit groundsel (EPBC vulnerable)
- winter spider-orchid (EPBC vulnerable)
- silver candles (EPBC vulnerable)

Integrated pest management

In addition to the production gains and cost-efficiencies derived from improved fox and rabbit control, the *Great Southern Ark* project seeks to deliver improvements in the management of house mice. While recognised as one of Australia's premium grain producing districts, Yorke Peninsula witnesses periodic plagues of house mice, which significantly impact on farm productivity and profitability, particularly for grain and oilseeds. In addition to the financial losses derived from crop damage, most farmers apply numerous applications of Zinc Phosphide baits to manage mouse numbers and ensure a return on investment. Following a wet year, yields can be impacted by up to 14%. The application of baits often occurs in a reactive fashion, has limited efficacy, and proves uneconomic. The effective management of mouse populations in agricultural systems requires an integrated approach, focussing on the constant control of populations within both crop and adjacent vegetation refuges. The *Great Southern Ark* project aims to make a significant contribution to cost-effective mouse control. Through the reintroduction of red-tailed phascogale and western quolls, the project seeks to reduce mouse abundance in native habitat, while the augmentation of barn owl populations is anticipated to reduce mouse abundance in paddocks and fields. Worldwide, increased predation by owls has been reported to reduce crop damage to <5%, and increase agricultural production by 25% (e.g. Ducket, 1991; Munoz-Pedreros *et al*. 2010; Paz *et al*. 2012; Labuschagne *et al*. 2016). The use of nest-boxes has proved successful in the rapid augmentation of barn owl populations.

Sustainable agriculture

With a sole focus on the control of fox abundance, the current *Baiting for Biodiversity* program incurs the risk of triggering meso-predator release effects, resulting in an increase in feral cat abundance. Feral cats are strongly associated with the occurrence of both toxoplasmosis and sarcosporidiosis in the environment, which can have significant impacts on livestock production through increased rates of aborted lambs and the rejection of carcasses by abattoirs, respectively. Losses of 13% in lambing percentages have been attributed to toxoplasmosis on southern Yorke Peninsula, and the initiation of cat control should drive productivity outcomes. Additionally, the current fox control program has resulted in a 30%

increase in lambing percentages, a productivity gain which could be compromised by the effects of toxoplasmosis and sarcosporidiosis, if cat numbers aren't managed.

The widespread adoption of no-till farming practices across Yorke Peninsula has resulted in significantly improved soil structure, reduced erosion rates and more sustainable yields. However, the year-round retention of stubble within paddocks provides an abundance of food and shelter for mouse populations, enabling their numbers to remain high and facilitating more frequent plague events. Without more efficient methods to manage mouse numbers many farmers will return to stubble burning practices, negating the benefits derived from no-till farming. 72% of farmers who continue to burn crop residues in the N&Y Region do so to manage pest species.

The maintenance of the condition of native vegetation also contributes to the sustainability of native insect pollinator populations, which will play a more prominent role in cropping systems when/if varroa mites establish in Australia and devastate honey bee populations.

Economic renewal

Like many regional areas, Yorke Peninsula is in slow demographic and economic decline. Notwithstanding, southern Yorke Peninsula remains a substantial tourism destination for SA visitors seeking authentic experiences in a natural environment. Rewilding has significant appeal to the local tourism industry because of the breadth of experiences that can be provided through interactions with wildlife. Eco-tourism opportunities linked to the rewilding of southern Yorke Peninsula will drive an increase in the share of the local SA market, and provide the base from which a national and international tourism industry can be developed, due to the unique selling proposition of the project.

The results of a recently released preliminary economic analysis for the project (Econsearch 2018) suggest that the project would be a more efficient allocation of resources (and therefore, use of public money) compared to current practices. The analysis suggests that at 20 years, the project will be generating an additional $1.7M of economic activity per annum on southern Yorke Peninsula, with an additional $600K across the rest of South Australia. However, this modelling has been undertaken on the conservative assumption of a limited reduction in the costs of mouse control (reduced by 22%), due to rewilding. International studies suggest that the savings on mouse control could be as high as 87%. The true value of the project is likely to lie between these two extremes.

Community engagement

Over the past 18 months, 15 presentations have been provided to the community on southern Yorke Peninsula, with 211 participants attending. These meetings included two that targeted landholders along the proposed fence lines and four meetings for which all landholders on southern Yorke Peninsula received a postal invitation to attend.

Details recorded by the facilitators of these meetings indicate that:

- 88% of attendees were supportive of the project, while
- 5% were unsure/questioning, and
- 7% were opposed.

The significant level of local support for this project reflects the cross-sector outcomes that are predicted, support that would be reduced if only biodiversity outcomes were sought.

Local farmers can envision the potential productivity benefits, financial savings, and improvements to sustainability. The broader community see opportunities for enhanced tourism, improvements to the regional economy, and supporting the continued provision of local services.

(Woylie)

Progress to date

The Northern and Yorke Natural Resources Management Board have received $2.6M from the National Landcare Program to initiate the project, 2018-2023. These funds will enable:

- The construction of stage 1 of the predator exclusion fence (2018-2019, 23km)
- Intensive feral predator control within the fence (2019-2023)
- The reintroduction of the Woylie (2020-2023)
- Initiation of monitoring to assess the progress of rewilding outcomes (2019-2023).

The partner organisations involved in the delivery of the first phase of the project include:

- Northern & Yorke NRM Board
- WWF Australia
- Zoos SA
- FAUNA Research Alliance
- Birdlife Australia
- Nature Conservation Society of SA
- Yorke Peninsula Tourism

Supporting partners include; Conservation Volunteers Australia, Yorke Peninsula Council, Regional Development Australia, Greening Australia, the Legatus Group, Ag Excellence Alliance, Trees for Life, Department for Environment and Water, Primary Industries and Regions SA.