Global Re-introduction Perspectives: 2016

Case-studies from around the globe

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Cover photo: Clockwise starting from top-left:
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iii. Morelos minnow, Mexico @ Topiltzin Contreras-MacBeath
iv. *Silene cambessedesii*, Spain @ Emilio Laguna
v. Tasmanian Devil, Maria Island, Tasmania @Simon DeSalis
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Re-introduction of the Persian fallow deer to the northern region of Israel

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Introduction

The Persian fallow deer (*Dama mesopotamica*), used to be abundant throughout the Middle East, ranging from today's Iran and Iraq, north-west into Syria and Turkey and down along the Mediterranean coast through Lebanon and northern Israel. Originally, the Persian and European fallow deer were considered two subspecies of *Dama dama*, but recent work has indicated them to be separate species. Hunting and loss of habitat have driven the decline of *Dama mesopotamica* and by mid 20th century it was considered extinct throughout it range. In 1956 two remnant populations (estimated at the time at two dozen) were found along the Dez and Karkeh rivers in Iran and the species changed its status to Critically Endangered. In 1976 the Israel Nature Reserves Authority (to be later named the Israel Nature and Parks Authority - INPA) established a captive-breeding core in the Hai-Bar Carmel in Israel from 2 males and 5 females, all descendants of individuals from the Irani populations.

Persian fallow deer © Eyal Bartov

The INPA started re-introducing the deer to the western Galilee region in 1996. The region, which used to be the south-

western part of the species range, is dominated by Mediterranean woodland habitat, with mild wet winters and hot dry summers.

Typical release site habitat

Goals

- Goal 1: A wild and sustainable population of at least 125 adult females.

Success Indicators

- Indicator 1: A stable or growing self-sustaining deer population.

Project Summary

Feasibility: A feasibility study was written and then scrutinized by a professional committee consisting of scientists from academic institutions and members of the INPA Science Division. The study concluded that the original causes of extinction had been removed, i.e. hunting laws now existed and were strictly enforced by the Israel Nature Reserves Authority, and the Mediterranean habitat in northern Israel had recovered. The existence of a relatively large breeding nucleus (by the mid 1990s it consisted of more than 50 adult females) and land availability made a re-introduction feasible. The release site was selected by requesting rangers from the northern region of the INPA to suggest potential sites for re-introduction. Six of these were selected and were then assessed according to 11 criteria such as water availability, distance to roads, accessibility for radio-tracking, etc. Based on these criteria the Nahal Kziv nature reserve was selected. Another smaller scaled release was later initiated in the Nahal Soreq reserve in the Judea Mountains but will not be discussed here.

The INPA adopted a long-term strategy with an adaptive management approach based on repeated releases. A computer simulation using a maximum sustained yield approach with demographic stochasticity indicated that it would be possible to remove ~28% of females aged 1 - 5 years (roughly 12 prime-aged females) annually from the breeding core without degrading it. Another demographic simulation model projecting the growth of the wild population estimated that if all releases to the wild will go as planned and reproductive success and survival will be as projected, the target population of 125 adult females can be reached within 7 - 9 years. The long-term multiple release approach necessitated the construction of a permanent habituation enclosure at the release site. The enclosure was constructed on a flat area at the bottom of the Kziv ravine, approximately 50 m from the stream, with open meadows, garigue, and Mediterranean maqui habitats.

Deer being released © Oded Berger-Tal

Implementation: During the first 5 years, releases were carried out twice a year with ~6 adult females and a similar number of males each time. All females were radio-collared and all radios had mortality sensors. Animals remained in the enclosure for up to 3 months. Prior to each release from the enclosure, jackals and feral dogs sighted in the area were culled. The process of animals exiting the enclosure to the wild took longer than expected, and often lasted days and even weeks. Efforts to herd the animals out of the enclosure were generally unsuccessful.

Mounting damage to agriculture (mostly damage to orchards) and budget cuts to the program meant that from the 6th to the 10th year after the project began, fewer animals were released (22 adult females as opposed to 57 during the first 5 years) and monitoring became irregular. Between the years 2006 and 2009 the release of animals has ceased, but was resumed in 2009. A spatially realistic model using demographic information taken from the wild population in the first years of the project indicated that the best re-introduction results, in terms of numerical growth and spatial expansion, would be obtained by repeated releases in two sites carried out sequentially. As a result, a new release site, located in the Sasa ridge, approximately 15 km from the Kziv site, was approved by the INPA, and release from that site commenced in 2013, with the goal of having the newly released population connect to the Kziv population within 10 years. By 2015, four releases have taken place in the Sasa site, and a total of approximately 40 individuals were released. Current plans are to release 20 individuals every year at this site. Additional smaller scale releases are conducted in two additional sites - Mt. Hermon and Mt. Carmel.

The current wild population of Persian fallow deer in the north of Israel is estimated to be 200 - 300 individuals.

Post-release monitoring: Post-release monitoring of the released animals was conducted by using radio-telemetry (VHF collars at first; GPS collars in recent years), direct observations (when possible), and infra-red camera traps. Home-range dynamics suggested that the re-introduced deer adapted space-use patterns similar to wild deer of other species, with males having larger home ranges during the rut than females, and mothers having larger home ranges than barren females. Re-introduced females established a home range within a year,

but exhibited shifts in the home range during the second and third years towards more moderate slopes and an overall home range consisting of roughly 50% woodland. Roads appeared to act as barriers, and did not traverse individual home ranges. Individuals from later releases established a home range quicker, supporting the notion that individuals from earlier releases serve as cues to the 'newcomers' as to where to establish a home range.

An individual-based spatially-realistic model was created to assess population performance under two scenarios: Current habitat versus future governmental development plans. The model parameters were based on data collected during the first 2.5 years of the re-introduction, and validated based on parameters generated after 5 years. Based on the results, bottlenecks in landscape connectivity that could dampen the numerical growth and spread of the population were identified on the governmental development plans, and recommendations were made to forgo development in these specific areas.

Major difficulties faced

- Damage to agriculture.
- Canid predation (feral dogs and wolves).
- Budget cuts.

Major lessons learned

- The long-term multiple releases approach which was enabled by the permanent breeding facilities enables flexibility and adaptive management.
- Long-term monitoring is a vital aspect of efficient adaptive management.
- The culling of canid predators in the vicinity of the release sites prior to major releases is necessary to ensure the survival of the deer in the weeks following the release.
- The use of models for the different stages of the project: feasibility study, release design, additional releases, enabled an efficient decisions-making process.
- Captive-breeding facilities for the purpose of re-introduction should minimize anthropogenic disturbances.

Success of project

Highly Successful	Successful	Partially Successful	Failure
√			

Reason(s) for success/failure:

- Computer simulations combined with a permanent breeding core enabled robust planning and an adaptive management approach.

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