

**Human-mediated landscapes of fear shape trophic  
cascades in shared desert ecosystems of the Middle  
East: elucidating the ecological roles of the  
Arabian wolf (*Canis lupus arabs*)**

by Gavin Bonsen

Thesis submitted in fulfilment of the requirements for the  
degree of Doctor of Philosophy

under the supervision of Daniel Ramp and Arian Wallach

Centre for Compassionate Conservation

Faculty of Science

University of Technology Sydney

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# Certificate of Original Authorship

I, Gavin Bonsen, declare that this thesis is submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the School of Life Sciences at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

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*I hope this thesis can play a part, in one way or another, in transitioning towards a more peaceful co-existence  
between human and non-human animals.*

## List of Papers and Statement of Author Contribution

This thesis is a compilation of an introductory chapter and the following four manuscripts currently either published or in preparation for publication. Referencing style throughout this thesis is based on the journal *Biological Conservation*.

### Chapter 2. Navigating a geopolitically complex landscape: the Arabian wolf's complicated plight.

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# Table of Contents

## Table of Contents

Certificate of Original Authorship .....	ii
Acknowledgments .....	iii
List of Papers and Statement of Author Contribution .....	vi
Table of Contents .....	viii
List of Figures .....	xii
Abstract.....	xvi
<b>Chapter 1. General Introduction.....</b>	<b>1</b>
1.1 The ecological importance of apex predators.....	2
1.2 Trophic cascades driven by fear.....	4
1.3 Humans as agents of fear.....	5
1.4 The grey wolf ( <i>Canis lupus</i> ) as apex predator.....	6
1.5 The unique desert-adapted Arabian wolf.....	8
1.6 Thesis overview .....	9
1.7 References .....	11
<b>Chapter 2. Navigating a geopolitically complex landscape: the Arabian wolf's complicated plight .....</b>	<b>18</b>
Abstract .....	18
2.1 Introduction .....	19
2.2 Lessons from global conservation efforts.....	21
2.2.1 Ecology and importance of wolves globally .....	21
2.2.2 Conflict, persecution, and mitigation.....	23
2.2.3 Human attitudes and social research .....	25
2.2.4 Practical strategies for coexistence.....	27
2.3 State of Knowledge of the Arabian wolf.....	28
2.3.1 Taxonomy of <i>Canis lupus arabs</i> .....	28
2.3.2 Ecology and importance .....	30
2.3.3 Distribution and abundance .....	32
2.4 Geopolitical Diversity .....	34
2.4.1 Conservation of the Arabian wolf.....	34
2.4.2 Scale of jurisdictional crossover .....	35
2.4.3 Governmental and non-governmental conservation effort .....	37
2.4.4 Society, culture, and human-wolf relationships .....	41
2.5 Moving Forwards .....	43
2.5.1 Building collaborative planning .....	43
2.5.2 Concluding remarks.....	45
2.6 References .....	46
Chapter 2. Supplementary material .....	63
Information sources used for overview table .....	77



<b>Chapter 3. Tolerance of wolves shapes desert canid communities in the Middle East .....</b>	<b>84</b>
Abstract .....	84
3.1 Introduction .....	85
3.2 Methods.....	87
3.2.1 Study Area.....	87
3.2.3 Data collection and analysis .....	89
3.3 Results.....	92
3.4 Discussion .....	96
3.4.1 Conclusions .....	98
3.5 References .....	99
Chapter 3. Supplementary material .....	104
<b>Chapter 4. Interactions between Arabian wolves and people drive risk-mediated trophic cascades in a Middle Eastern desert .....</b>	<b>108</b>
Abstract .....	108
4.1 Introduction .....	109
4.2 Methods.....	111
4.2.1 Study Area.....	111
4.2.2 Study Species .....	112
4.2.3 Design and Sampling .....	113
4.2.4 Data Analyses .....	115
4.3 Results.....	118
4.3.1 Evidence of human-induced trophic cascades .....	119
4.3.2 Predator-predator interactions .....	120
4.3.3 Predator-prey interactions.....	123
4.4 Discussion .....	125
4.4.1 Depiction of the landscape of fear.....	127
4.4.2 Conclusion .....	128
4.5 References .....	129
Chapter 4. Supplementary material .....	134
<b>Chapter 5. Agile responses of mesopredators and prey to ambient and imminent risk driven by Arabian wolves .....</b>	<b>142</b>
Abstract .....	142
5.1 Introduction .....	143
5.2 Methods.....	145
5.2.1 Study Species .....	145
5.2.2 Study Sites.....	146
5.2.3 Data Collection .....	147
5.2.4 Data Analyses .....	149
5.3 Results.....	150
5.3.1 Relative occupancy.....	151
5.3.2 Event duration.....	152
5.3.3 Time spent vigilant.....	153
5.4 Discussion .....	154
5.4.1 Conclusions .....	157
5.5 References .....	158
Chapter 5. Supplementary Material.....	162

# List of Tables

## *Chapter 2*

**Table 2.1.** ..... 39

Overview summary of Arabian wolf status, protection, and conservation effort in the eleven countries likely to be within its distribution. For further details, see Table S2.1 in Supplementary Material.

**Table S2.1.** ..... 62

Overview of legal frameworks, governance, and conservation efforts within the eleven countries considered to fall within the Arabian wolf's range.

## *Chapter 3*

**Table S3.1.** ..... 103

GIS layers used to categorise water point to land-use for occupancy and interspecific interactions.

**Table S3.2.** ..... 104

Summary of canid records from camera-trap data, showing the number of events overall and within each land-use category, the number of water points ( $n$ ) at which each species was recorded (% of total), and the probabilities of resource use ( $\psi$ ) and detection ( $p$ ) of each canid overall and within each category.

**Table S3.3.** ..... 105

Bootstrapped coefficient of overlap ( $\hat{\Delta}$ ) estimates and Wald's Test outputs used to determine changes in temporal activity patterns in canids. Wald's Test output corresponds to temporal activity changes of the species within the pair in **bold** text.

**Table S3.4.** ..... 106

Estimated parameters used to calculate indices of relative abundance from tracking surveys conducted in the Arava Valley

## *Chapter 4*

**Table 4.1.** ..... 118

Summary of species records from camera-trapping data, showing the number of events, the number of sampling points ( $n$ ) at which each species was recorded (% of total sampling points), and the marginal occupancy ( $\psi$ ) and detection ( $p$ ) probabilities of each species ( $\pm$  SE).

**Table 4.2.** ..... 122

Bootstrapped coefficient of overlap ( $\hat{\Delta}$ ) estimates for dominant-subordinate predator species pairs across risk levels (95 % CI). High risk and low risk columns compare  $\hat{\Delta}$  between the two species within each risk level, while dominant and subordinate columns compare  $\hat{\Delta}$  between high and low risk levels within each species. Grey cells indicate insufficient data.

**Table 4.3.** ..... 124

Bootstrapped coefficient of overlap ( $\hat{\Delta}$ ) estimates for predator-prey species pairs across risk levels (95 % CI). High risk and low risk columns compare  $\hat{\Delta}$  between the two species within each risk level, while dominant and subordinate columns compare  $\hat{\Delta}$  between high and low risk levels within each species. Grey cells indicate insufficient data.

**Table S4.1.** ..... 133

Explanatory variables used in site selection and as covariates in occupancy models.

**Table S4.2.** ..... 134

Top-performing single-species occupancy models for each species. Models were selected from a set of 31 candidate models for each species by choosing those with  $\Delta AIC < 2$ . As the entire slate of landscape variables featured in the top-performing models, we used the global model for each species.

*Chapter 5*

**Table 5.1.** ..... 149

Summary of species records from fox and rodent stations showing the total number of events recorded, total number of stations ( $n$ ), and occupancy and detection ( $p$ ) probabilities for each species (or group of species).

# List of Figures

## Chapter 2

**Figure 2.1.** ..... 29

Likely distributions of the two grey wolf subspecies that occur in the Middle East. The Indian wolf (*C. l. pallipes*) inhabits temperate climates from India to Turkey while the Arabian wolf (*C. l. arabs*) resides in the deserts of the southern Levant and Arabian Peninsula.

**Figure 2.2.** ..... 33

Population estimates of the Arabian wolf in Levantine and Arabian deserts within the Middle East (inset).

## Chapter 3

**Figure 3.1.** ..... 89

Spatial distribution of monitored water points across three human land-use categories within a ~6,000 km<sup>2</sup> study area in the southern Levant (inset), highlighting the Arava Valley (outlined in purple) which straddles the international border between Israel and Jordan.

**Figure 3.2.** ..... 92

Probabilities of resource use of canids across land-use categories as a function of human population density reveal that wolves (grey lines and shading) and foxes (red lines) are negatively influenced, while jackals (gold lines) are positively influenced, by human population density, particularly in pastoralist landscapes. Dashed lines represent 95 % confidence intervals.

**Figure 3.3.** ..... 93

Overlap in temporal activity patterns illustrating: **(a)** a relatively high temporal overlap between larger (dotted lines) and smaller (dashed lines) canids overall, where all canids are largely nocturnal with bimodal peaks in activity around dawn and dusk for wolves (grey lines and shading) and foxes (red lines and shading), and slightly later in the morning for jackals (gold lines and shading); **(b)** a significant shift in wolf (solid and dashed lines) activity in pastoralist landscapes to the middle of the night when people (dotted lines) were inactive; and **(c)** a significant shift in jackal (solid and dashed lines) activity in crop farming landscapes to times when wolves (dotted lines) were less active. Values denote bootstrapped coefficients of overlap ( $\hat{\Delta} \pm 95\% \text{ CI}$ ), while dashed lines in **(b)** and **(c)** represent overall temporal activity patterns of smaller canid [dashed boxes represent overall coefficient of overlap ( $\hat{\Delta} \pm 95\% \text{ CI}$ )].

**Figure 3.4.** ..... 94

Relative activity indices, calculated using the parameters estimated from tracking surveys, show that foxes in the Arava Valley are significantly more active in pastoralist landscapes than in crop farming landscapes where wolves are more active.

**Figure 4.1. .... 113**

Spatial distribution of human land-use and infrastructure across the study area. Inset shows the location of the study area within Israel.

**Figure 4.2. .... 119**

Conceptual diagrams illustrating Species Interaction Factors (SIFs) between a super predator–apex predator; apex predator–mesopredators; and predators–prey in non-pastoralist and pastoralist landscapes. The colour of each arrow corresponds to the strength and direction (attraction vs avoidance) of interaction between a pair of interacting species. \*Significant difference in SIF between non-pastoralist and pastoralist landscapes (refer to Fig. S4.3 in Supplementary Material).

**Figure 4.3. .... 121**

Relative risk maps depicting proposed landscapes of fear for a given subordinate predator species (bottom-right of each panel), based on spatial responses to the potential co-occurrence of a dominant predator (top-left of each panel) for a) people – wolf, b) wolf – jackal, c) wolf – foxes, and d) jackal – foxes. Colour scheme represents a gradient from low risk (green) to high risk (red).

**Figure 4.4. .... 123**

Relative risk maps depicting proposed landscapes of fear for a given prey species (bottom-right of each panel), based on spatial responses to the potential co-occurrence of a predator (top-left of each panel) for a) wolf-large ungulate, b) wolf-small-medium ungulate, c) wolf-small herbivore, and d) foxes-small herbivore. Colour scheme represents a gradient from low risk (green) to high risk (red).

**Figure S4.1. .... 135**

The six spatial variables included in site selection and occupancy model predictions, including a) human habitation (m), b) permanent water sources (m), c) paved roads (m), d) elevation (m), e) topographic complexity (2 km), and f) pastoralism (binary)

**Figure S4.2. .... 135**

Schematic diagram illustrating the process used to calculate relative risk maps using single species and two-species occupancy model predictions. The colour scheme for the relative risk gradient corresponds to the legend in the bottom-right.

**Figure S4.3. .... 136**

Species Interaction Factors (SIFs) between pairs of interacting dominant-subordinate species pairs in non-pastoralist and pastoralist landscapes. \*Significant difference in SIF between non-pastoralist and pastoralist landscapes based on the proportion of overlap of 95 % confidence intervals ( $prOv < 0.50$ ).

<b>Figure S4.4.</b> .....	<b>137</b>
Single-species occupancy model predictions across the landscape based on spatial variables included in each model for: a) people, b) wolves, c) jackals, d) foxes, e) onager, f) gazelle, g) ibex, and h) hare.	
<b>Figure S4.5.</b> .....	<b>138</b>
Single-species occupancy model predictions across the five continuous variables for each species.	
<b>Figure S4.6.</b> .....	<b>139</b>
Two-species occupancy model predictions across the landscape based on spatial variables included in each model for dominant-subordinate species pairs: a) people – wolf, d) wolf – jackal, c) wolf – foxes, d) jackal – foxes, e) wolf – onager, f) wolf – small-medium ungulates, g) wolf – hare, and h) foxes – hare).	
<b>Figure S4.7.</b> .....	<b>140</b>
Overlap in temporal activity across high and low risk areas between each dominant-subordinate predator species pair.	

## Chapter 5

<b>Figure 5.1.</b> .....	<b>146</b>
Locations of the four study sites (two “high-wolf” in the Arava Valley and two “low-wolf” in the Negev Highlands), within protected areas in the Negev Desert of Israel (inset), relative to the modelled occupancy probability of Arabian wolves and human infrastructure (paved roads and human settlements).	
<b>Figure 5.2.</b> .....	<b>150</b>
Modelled probability of occupancy of red foxes ( <i>V. vulpes</i> ) and rodents ( <i>Acomys</i> spp., <i>Gerbillus</i> spp., <i>Meriones</i> spp.) across high-wolf and low-wolf sites (point = model estimate, line range = 95 % confidence intervals).	
<b>Figure 5.3.</b> .....	<b>152</b>
Differences in mean duration of red fox and rodent events across ambient (control) and imminent cue (scent from a higher-order predator and cow) treatments at high-wolf and low-wolf sites (point = mean, line range = SE). Letters denote significant interactions ( $p < 0.025$ ).	
<b>Figure 5.4.</b> .....	<b>153</b>
Proportion of time spent vigilant in fox and rodent events on control and scent (high-order predator and cow) periods across high- and low-wolf sites (point = mean, line range = SE).	

**Figure S5.1. .... 161**

Probability of occupancy for foxes and rodents based on local presence or absence of higher-order predators (wolf or red fox). We used data from HW1 and HW2 for red fox; HW2 for Blandford's fox; and HW1 and LW1 for rodents.

## Abstract

Grey wolf (*Canis lupus*) populations are increasing globally, thanks to a general rise in human acceptance. However, the smallest subspecies, the Arabian wolf (*Canis lupus arabs*), remains endangered across its wide range in the Middle East. Human land-use varies throughout its range, as do attitudes towards wolves, which range from acceptance to complete intolerance. Likely to have played a large part in the increase in acceptance of wolves in other regions is the knowledge of the important ecological roles they play as apex predators. Presence of wolves has been linked to profound, cascading effects, which have been claimed to benefit ecosystems across multiple trophic levels. This has consistently been demonstrated in temperate regions, where ecosystems are productive, but doubt has been cast over whether Arabian wolves play similar roles in the arid to hyper-arid ecosystems they inhabit. In this thesis, I begin by exploring the mechanisms and approaches that have previously gone into global wolf conservation efforts, assisting in their recovery, and then contextualise this within the geopolitical diversity of the Middle East. Realising that relatively little is known about Arabian wolves, from their ecology to their taxonomic status and distribution, I set out to discover whether they have the capacity to influence ecosystems in similar ways to their temperate counterparts. I conducted ecological studies in the deserts of Israel and Jordan to identify the ways in which Arabian wolves shape ecosystem structure and function through their interactions with other species, and how these are mediated by human-wolf relationships. Using non-invasive survey techniques (camera-traps and passive tracking surveys), I found that wolf occupancy and density are largely related to human land-use, where wolves use areas where they are accepted but avoid areas where they are not tolerated. This then has cascading effects through the ecosystem, influencing canid communities, landscapes of fear for mesopredators and prey, and behavioural responses of predators and prey. This thesis unearths the importance of Arabian wolves in desert ecosystems by showing their role in influencing spatial distributions and behaviours of species in lower trophic levels. The last half-century has already witnessed the loss of two other large predators throughout the region, and this functional role would disappear if the Arabian wolf was to follow suit. Through improved conservation efforts and working towards a peaceful co-existence between people and Arabian wolves, this unique and iconic subspecies of wolf can persist, along with its important ecological role.