

Perspective

'Bedouin overgrazing' and conservation politics: Challenging ideas of pastoral destruction in South Sinai



Hilary Gilbert*

Institute of Development Policy and Management, School of Environment and Development, University of Manchester, Oxford Road, Manchester, UK

ARTICLE INFO

Article history:

Received 3 May 2012

Received in revised form 11 December 2012

Accepted 16 December 2012

Available online 9 February 2013

Keywords:

Environmental narratives

Overgrazing

Pastoral commons

Indigenous marginalization

Conservation policy

ABSTRACT

This paper examines the relationship between scientific research, political understandings and conservation policy. It presents a case, the St Katherine Protectorate, South Sinai, Egypt, where conservation policy has been driven by a dominant narrative of environmental destruction by indigenous people – in this case, 'Bedouin¹ overgrazing'. However, the science underlying this idea has proved questionable, often ignoring known evidence and failing to examine changing theory. In such situations the challenge is to explain the power of fixed ideas in the face of alternative evidence. I do so by examining the empirical and attitudinal basis of conclusions drawn by researchers from ecological data, and the uses to which they are put in conservation policy and practice. I use the terminology of the 'new conservation debate' to make sense of conservation policy in St Katherine, and a social scientist's analysis of Egyptian policy to identify a political rationale for the persistence of the 'overgrazing' concept. In conclusion I argue that by sustaining national ideas of indigenous backwardness, this unchallenged conservation narrative has helped perpetuate Bedouin inequality – a lesson relevant to conservation scientists and practitioners working with indigenous pastoral peoples elsewhere in the world.

© 2013 Elsevier Ltd. All rights reserved.

1. Introduction

1.1. The enduring idea of 'pastoral destructiveness'

Unquestioned narratives of environmental change may shape conservation policy; concepts that acquire the status of 'received wisdom', persisting whether or not the methods and motives that generate them bear scrutiny (Leach and Mearns, 1996). One such narrative is the destructiveness of pastoral peoples, of which Fratkin (1997: 242) comments: 'The accusation... has achieved the status of a fundamental truth so self-evident... that marshalling evidence in its behalf is superfluous if not absurd.' This article provides a case study of how this narrative has dominated conservation policy and practice in the St Katherine Protectorate, South Sinai, Egypt, examining it in terms of the 'new conservation debate' (Miller et al., 2011). I argue that, while serving little purpose as a conservation tool, this persistent narrative has an instrumental

impact that perpetuates the marginalization of South Sinai's indigenous people.

To avoid alienating governments, conservation is apt to present itself as a neutral source of expertise, eschewing politics (Ferguson, 1994); however, wittingly or otherwise, it may find itself co-opted. Science produces knowledge within the same rationalist paradigm that underpins the modernizing projects of emerging states: governments wish to 'develop' their citizens, to move 'along a predetermined track, out of 'backwardness' and into 'modernity' (Ferguson, 1997: 144; Agrawal and Gibson, 1999). In this evolutionist vision, indigenous peoples are seen at the wrong end of a continuum of 'progress'. With its roots in the colonial past (Olsvig-Whittaker, 2006; Wachs and Tal, 2009), what Chatty calls 'the now stale assumption that it is pastoralists who are overgrazing or overstocking' (Chatty and Colchester, 2002: 236) has until recently remained unchallenged in Egypt, where national and western environmental visions coincide to produce a landscape threatened by indigenous Bedu. Presented at best as colourful 'traditional' people, at worst as treacherous and backward, they are seen as ripe for improvement (Aziz, 2000; Altorki and Cole, 2006). Like the landscape they inhabit, they need to be controlled and 'made legible' (Scott, 1998) before they can be incorporated into the modern Egyptian state.

Conservation scientists tend not to see local power relations as their concern; however, those who prescribe solutions cannot

* Current address: School of Life Sciences, University Park, University of Nottingham, Nottingham NG7 2RD, UK.

E-mail addresses: hilary.gilbert@nottingham.ac.uk, hilarygilbert@hotmail.co.uk

¹ In general I use Bedouin as an adjective, and Bedu as a proper noun in both singular and plural denoting 'people of the desert'. In StKP it is how people describe themselves.

safely neglect the political context in which they operate (Robbins, 2004, Adams and Hutton, 2007): it may lead to gaps in perception that produce social as well as conservation outcomes, reinforcing political narratives that perpetuate social inequality. In the St Katherine Protectorate (StKP), evidence now appears to justify Bedouin resource management, confirming an established view that in arid environments, conservation may more usefully be based on enhancing than replacing traditional pastoral practices (Fratkin, 1997; Perevolotsky and Seligman, 1998; Wachs and Tal, 2009). However, Egyptian conservation discourse still seeks to blame Bedu for environmental destruction and to distance Bedouin environmental knowledge from the 'primitive' folk who produce it.

In this article my aim is not to suggest that Bedouin grazing has no negative impact on vegetation: customary restrictions testify that in certain conditions it may. I aim rather to examine why the assumption is so powerful that it survives alternative explanations and contrary evidence. I critique the scientific basis of the 'Bedouin overgrazing' concept in St Katherine not so as to discredit those who produced it,² but rather to show how science (even challengeable science) can be used to discredit those it presents as unscientific. In Egypt this has an important instrumental effect. It reinforces a national political narrative that casts Bedu as backward, justifying their exclusion as modern Egyptian citizens. As a development practitioner I am acutely aware of its impact.³

My argument proceeds as follows: having briefly described the Protectorate, the context which led to dramatic declines in pastoralism, and environmental policy in Egypt, I interrogate the 'Bedouin degradation' narrative as it pervades research done in the Protectorate. I interpret its persistence in the light of Mitchell's (2002) study of Gurna, in which treatment of another marginalized group echoes Egypt's paradoxical approach to Bedouin knowledge. I conclude by explaining conservation policy in StKP in terms of the 'new conservation debate' (Miller et al., 2011), examining its consequences for Bedu, practitioners and policy-makers.

1.2. The setting: St Katherine town and its surrounds

The Sinai Peninsula forms a triangle of land linking Africa and Asia. Its southern region has exceptional natural and cultural significance. Its rich archaeological record bears witness to its position at the crossroads of human development in agriculture, metalwork, construction, trade and writing (Finkelstein and Perevolotsky, 1990; Bar-Yosef and Belfer-Cohen, 2001). It is the landscape of the Exodus, sacred to three world faiths, with Mount Sinai and the ancient Monastery of St Catherine at its heart (Dahari, 2000; Grainger and Gilbert, 2008). South Sinai's indigenous population consists of approximately 40,000 Bedu of eight tribes and confederations. Some 2500 live in St Katherine town, central to the Protectorate that bears its name, with a further 5000 living and moving within the StKP boundaries (see Map 1).⁴

StKP sits at Latitude 29°N. Covering 4350 km² of South Sinai's central massif, it includes Egypt's highest mountains (Jebel Katari-na = 2641 m). Geologically complex, the area is characterised by impermeable Precambrian red granite mountains, interspersed with mountains and intrusions, or dykes, of permeable volcanic black basalt. Where the two intersect underground water may be

found, and Bedu site their wells to exploit this. Sinai is criss-crossed by dry wadis but has no watercourses. Water is increasingly scarce: groundwater has been seriously depleted by recent influxes of tourists and Egyptian settlers, and rainfall to replenish it is patchy and unpredictable. In 2008 no precipitation was recorded in St Katherine, at 1600 m Egypt's highest town. With so little rainfall, and evaporation rates of 20 mm per day in high summer, StKP's climate is hyper-arid. Its vegetation combines Saharo-Arabian (desert) and relict Irano-Turanian (steppe) species, and even in good years is relatively sparse. There are almost no grasses: unlike Bedouin flocks in neighbouring states with Mediterranean climates (Perevolotsky and Seligman, 1998; Olsvig-Whittaker et al., 2006), South Sinai flocks have grazed principally on annuals and perennial shrublets, as StKP's eight habitat types include no grassland, savannah or pastureland (Grainger, 2003a).

2. Development and conservation in South Sinai

2.1. Development and the decline of traditional livelihoods

The investigation described here grew out of my research into the impact of conservation and development on South Sinai Bedu, involving interviews in Arabic with 122 individuals and 85 households in St Katherine village and desert areas around the Protectorate (Gilbert, 2011a, 2011b). It began in Spring 2007, but followed visits over the previous 15 years. During these two decades, the most striking change was the near-disappearance of grazing livestock from the village. Girls leading their flocks up hillsides and wadis in the early morning, and bringing them home at dusk, had seemed a perennial element of Bedouin life. It is now rarely seen in St Katherine.

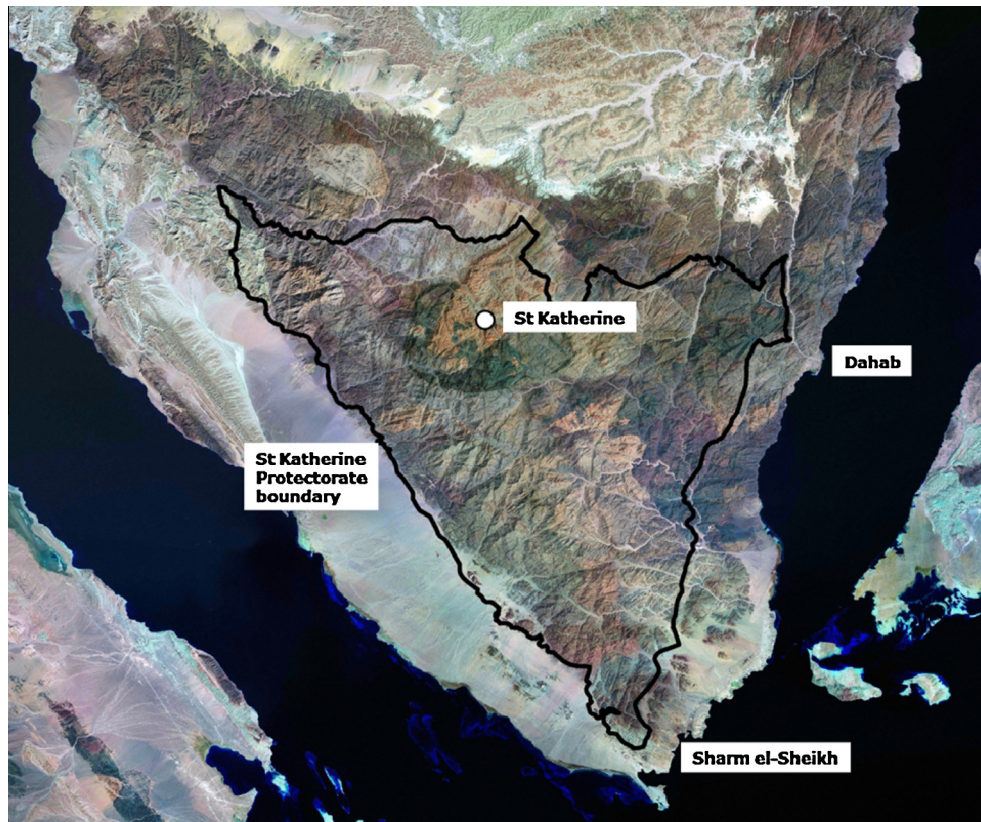
However, before the 1967 Six Day War and the resulting Israeli occupation, South Sinai Bedouin livelihoods depended largely on semi-nomadic pastoralism, and in the high mountains and oases on the cultivation of orchard fruits and dates. The occupations are complementary: the low physical endurance of the small livestock (fat-tailed sheep and black goats) restricts the distances animals can travel: daily foraging range does not exceed 5–6 km (Rashad et al., 2002; Olsvig-Whittaker et al., 2006), and Bedu rarely moved more than 50 km from summer water sources (Bailey, 2002). This enabled horticulture and limited agriculture to develop in a combination unique to the region. Agropastoral livelihoods typically provided 10 months' annual subsistence, augmented by paid occupations (Perevolotsky, 1981; Marx, 2003, 2006). Before sedentarization the Bedouin population was highly dispersed: people lived and travelled in mobile extended family groups (or *firik*). Seasonal migration between winter pastures and summer gardens cyclically removed grazing pressure on richer wadi beds or places with wells or natural springs. If patchy rainfall left some tribal territories depleted, reciprocal grazing agreements permitted people to pasture their flocks outside their own lands. Accessible areas with good vegetation at risk of overgrazing were (and still are) controlled through customary restrictions. Determined annually by the relevant sheikhs, these are known generally to Bedu as *hema* (Shoup, 1990) but in South Sinai as *helf*. Stiff penalties ensured summer pastures were not grazed in winter (Perevolotsky, 1987; Perevolotsky et al., 1989; Zalat and Gilbert, 2008).

The Israelis built a road and a centre for administrative, military and research facilities (Perevolotsky, 1981). The 'Bedouin village' of St Katherine coalesced around this centre. The integration of Sinai into the inflationary Israeli economy, and loss of Egyptian markets for Bedouin produce, quickly made agropastoral livelihoods unviable and created a dependence on cash (Perevolotsky, 1981; Perevolotsky et al., 1989). Thus after 1970 the Bedu were

² I am personally acquainted with every author I cite on StKP, making this critique a socially risky enterprise.

³ Hilary Gilbert is co-founder and Chair of the Community Foundation for South Sinai, registered in el Tur #2006-02; and of its UK-registered partner NGO the South Sinai Foundation (#1128955) (www.southsinainfoundation.org.uk). She lives in St Katherine for approximately six months a year.

⁴ Figures are best estimates based on 2009 figures from the Governorate of South Sinai; the Bedu are not censused separately, so their needs as a culturally and ethnically distinct population are not recorded.



Map 1. South Sinai showing St Katherine Protectorate boundary and town. (Source: Francis Gilbert)

increasingly settled, abandoning their mobile livelihoods – willingly or otherwise – in favour of paid employment.

Sedentarization created intolerable pressure on winter grazing, forcing people to buy expensive fodder. Bedouin response was immediate: flocks were slashed from previous norms (78 ± 42) to around 13 (Perevolotsky et al., 1989). By 1982 this had reduced to ten (El Bastawisi, 1982: 50); and by 2003–2004 to seven or eight (Zalat and Gilbert, 2008). Most livestock-owners in St Katherine today have fewer than six animals, blaming lack of rainfall for the absence of natural pasture. Half never graze their animals outside, keeping them penned and fed on scraps and imported *barseem* (alfalfa: *Medicago sativa*). Two-thirds of all livestock owners now buy in supplementary feed all year round (Gilbert, 2011a). Working from contemporary and historical data I calculate that, despite a Bedouin population increase of some 220% over the period, the total grazing herd in the St Katherine area is now reduced by a factor of 10 from its pre-1967 level: from 125 families collectively grazing around 10,000 head, to 400 families taking little more than 1000 to pasture today (El Bastawisi, 1982: 49; Perevolotsky et al., 1989: 155; Gilbert, 2011a: 142–145).

After 1982 Egyptian rule resumed. Development priorities focussed on Egyptianizing Sinai and promoting tourism. Culturally and ethnically distinct Nile Valley Egyptians now comprise more than half South Sinai's residents, and it contributes one-third of Egypt's tourist revenue, with 5 million visitor nights per year in the resort of Sharm el Sheikh (CAPMAS, 2012). However, Bedu are rarely employed in tourism except as poorly-paid guides and drivers. Aziz (2000: 28) comments: 'State officials... argue that Bedouin are incapable of working – an excuse for the alienation of Bedouin from the path of economic and social development in their own communities'. Around half of those *in work* live around US\$1 per person per day; while almost twice as many Bedu as

Egyptians (81% vs. 44%) experience food poverty (Gilbert, 2011b). Bedu live with a constant, intrusive security presence (ICG, 2007). With many lacking education, healthcare, sanitation, electricity, water and work, their human development is almost entirely neglected.

2.2. Conservation policy in Egypt

Egyptian environmental affairs are perplexing. The former Government introduced environmental legislation and signed numerous international treaties and conventions (NCS, 2006: 5); yet its practical commitment fell short of its intent. Every aspect of environmental protection lies with the Egyptian Environmental Affairs Agency (EEAA); however, its resources are no match for its responsibilities (World Bank, 2005: 153). Conserving biodiversity – a very small part of the EEAA's work – falls to an internal department, the Nature Conservation Sector (NCS), and some 15% of Egypt's landmass is now protected. However, the decision to protect an area is judged not only by the threat to its biodiversity, but by 'the site's potential for generating direct financial benefit for the nation' (NCS, 2006: 9). Consequently, vested interests in business, industry and government have drawn the teeth of the 1994 Environmental Protection Law, privileging commercial development over environmental controls (Gomaa, 1997: 39). PA managers are invested with 'police powers' to enforce legislation; yet within 6 months of StKP's declaration a Prime Ministerial decree established two 100 km² industrial zones within its boundaries (Grainger, 2003a: 10–11).

'Systematic government underinvestment' (Sowers, 2007: 376) also plays a starring role in undermining Egyptian conservation. In 2006 IUCN figures showed the global average for PA staffing as 27

per 1000 km², while the African average was 70. In Egypt, the average was 5.3 staff per 1000 km²; in StKP, 1.2 (NCS, 2006: 18). Similarly, while UNEP recommended a \$520 per km² minimum annual investment for sustainable PA management, Egypt spent \$19. In StKP, a flagship park and World Heritage Site, it spent just \$12 per km² (NCS, 2006: 25). To date, the new Government shows no sign of improving on the old.

Egyptian environmental policy, then, is marginal to state interests, and conservation issues are marginal within environmental concerns. While boding ill for conservation outcomes in StKP, this does not mean that the Protectorate is powerless to act. Rather it is restricted to acting upon groups less powerful than itself – its Bedouin residents.

2.3. Land, conservation and Bedu in St Katherine

In April 1996 Prime Ministerial decree No 904 defined StKP's boundaries, protecting most of the inhabited central massif. Unwillingness to impose IUCN development restrictions led to StKP's 'Protectorate' designation; but in practice it was modelled on a Category V 'Protected Landscape.' A 7-year EU development programme was supported by €7.5 million and an experienced European conservation manager (Grainger, 2003a). In 2002 UNESCO further inscribed 641 km² of the Protectorate, centred on the Monastery, as a cultural World Heritage Site (Grainger and Gilbert, 2008). In 2003, responsibility for funding and management reverted to the Government of Egypt.

The Protectorate area is unique in Egypt in having a significant population of indigenous pastoralists impacted by modern development. StKP was therefore established as a community-based conservation initiative and invested 17% of its budget in a Bedouin Support Programme: consulting Bedu, setting up projects to offset the 'opportunity costs' of conservation, and employing Bedu as support staff and Community Guards (Hobbs et al., 1998; Grainger, 2003a). Whilst falling short of full participatory management – rangers were (and are) almost universally Egyptian graduates – StKP's original approach was valued by Bedu, who still commend it (Gilbert, 2011a).

Its conservation objectives focussed on identifying, monitoring and conserving indicator species from its minimum of 33 endemic species of all taxa. Its 420 known higher plants include 44% of Egypt's endemic plants, with 19 of its own including Sinai primrose (*Primula boveana*) and Sinai wickweed (*Phlomis aurea*). Its 10 critically-endangered plant species include the near-endemic Sinai thyme (*Thymus decussatus*). Among 53 other endangered plants, *Rosa arabica* is perhaps the most beautiful (Grainger, 2003a: 17). Other rare, endangered or endemic species include striped hyena (*Hyaena hyaena*), ibex (*Capra nubiana*) and Dorcas gazelle (*Gazella dorcas*) (Bassuony et al., 2010), reptiles such as the Mount Sinai Gecko (*Hemidactylus mindii*) (Baha el Din, 2006), and the world's smallest butterfly, the Sinai Baton Blue (*Pseudophilotes sinaicus*) (James et al., 2003).

The Protectorate added a new layer of contestation to St Katherine's land tenure issues. Historically, the Monastery of St Catherine claimed all the land within three and one third days' camel ride. This was later overlaid by the territorial claims of incoming tribes, from 530 to around 1800 CE. Reciprocal agreements permitted Bedu to graze and seek safe passage through other tribes' lands. Within each collectively owned territory Bedu could graze any land not covered by *helf*. Individual ownership was conferred by cultivation: anyone who dug a well or cultivated a garden for 7 years could claim it. Thereafter it could be sold (Hobbs, 1995; Zalat and Gilbert, 2008).

Nationalised in the 1950s by Nasser's land reforms, under Mubarak Sinai's land was opened for private development (Gardner, 2011). Among countless Egyptian and foreign investors who

profited were a tiny handful of Bedu: those who had paperwork to prove tenure. The vast majority have no title to land their families may have lived on, grazed or cultivated for generations. This is a primary source of Bedouin resentment against state authorities (Gilbert, 2011a). Bedu – by now just 3% of Sharm's population – own a mere 1.6% of its lucrative registered land (CAPMAS, 2012).

3. Degradation thinking in StKP

3.1. Policy and rationale

StKP policy was based from the start on the assumption that Bedu were responsible for environmental damage. Whilst curtailing development is a strong feature of Protectorate policy, implementation focussed on seeking 'adjustments in patterns of Bedouin resource use' (Hobbs et al., 1998: 239): not preventing hotel owners from building swimming pools in the desert – a political lost cause – but preventing Bedu from 'selling their precious water resources to tourist hotels' (Paleczny, 2007: 25). Controlling the Bedu has remained the more achievable, and thus the more consistently pursued aim.

The dominant conservation narrative still blames pastoralism for declines in vegetation that threaten StKP's biodiversity. The ecological case for this belief rests on two linked assumptions: the first is that vegetation cover is primarily determined by grazing, making plant population dynamics critically dependent on livestock density. At the point at which so-called 'ecological carrying-capacity' is reached, herders who want denser vegetation or healthier stock must keep fewer animals (Behnke and Scoones, 1993; Brockington and Homewood, 2001). The second is that left to themselves pastoralists are unprepared to reduce their stock because of the way pastoral property resources are managed, producing a 'Tragedy of the Commons' (Hardin, 1968). The limitations of this model are now well-recognised, especially where conditions apply in which local management systems can flourish. Bedouin *helf* satisfies many of the criteria which Ostrom (1990: 186; 2009: 420–421) suggests are necessary for success.

However, despite the dramatic reduction in active grazing and livestock numbers described, Bedouin use of natural resources was restricted by policies including the banning of all livestock from St Katherine town⁵ and other settlements; an extensive array of enclosures throughout the high mountain region to prevent animals from grazing, and prohibitions on cutting vegetation for fodder. They also include the criminalisation of hunting⁶; and periodic culling of feral donkeys including those the Bedu have domesticated. These are blanket bans: there are no permits or licenced grazing as in comparable regional habitats such as the Negev (Wachs and Tal, 2009). Without land rights there is no basis for collective challenge to the authorities: people whose homes are in restricted areas simply have to comply. A plan to reduce grazing impact around settlements by paying shepherds to take flocks to more distant ranges never materialised (Hurst, 2006). Since many people had already abandoned pasturing their flocks at StKP's inception, it is hard to quantify how far recent husbandry changes are attributable to Protectorate policy; some people, however, told me unequivocally that they gave up herding as a result (Gilbert, 2011a).

⁵ Ironically, most plants in St Katherine town are ornamental municipal planting introduced by the City Council in defiance of Protectorate regulations. Many (such as *Nerium oleander*) are poisonous, and no-one seems quite sure whether the restrictions are meant to protect the plants from the animals or vice versa.

⁶ Also severe restrictions on offshore fishing in coastal Protected Areas.

3.2. Research or received wisdom?

In the past half-century, human activity on an unprecedented scale has affected Sinai's ecosystems. Over-extraction and pollution of groundwater due to sedentarization, tourism and Egyptianization policy have affected environmental conditions faster than any natural adaptive mechanism could respond. Recent international research highlights the complexities of dryland environments and their co-dependent social and ecological components, including the impacts of climate, politics and management on livelihoods, development, and the factors affecting ecological resilience to change (Walker et al., 2004; Ostrom, 2009; Huber-Sannwald et al., 2012). Latterly systems have emerged to support ecological decision-making in such complex situations (Linkov and Moeberg, 2011; Reubens et al., 2011). However, well before the development of a Drylands Development Paradigm (Reynolds et al., 2007), international literature was exploring the relationships between presence or absence of grazing, and other factors influencing sustainability, on biodiversity and plant communities (Wilson and Macleod, 1991; Milchunas et al., 1988; Peterson et al., 1998; Perevolotsky and Seligman, 1998). While most habitats discussed in this literature are temperate or semi-arid, their findings establish a range of parameters which might be used to interpret ecological change in the hyper-arid StKP.

However, environmental literature – grey and published – on the ecology of grazing in St Katherine focusses exclusively on the destructive effects of the Bedu. St KP's management plan identifies 'localized overgrazing' as one of its major challenges (Grainger, 2003a: 69). A later evaluation goes further, classifying the extent of overgrazing by domestic animals as 'High' – defined as affecting 40–75% of the whole Protectorate (Paleczny et al., 2007: 24–25). Paleczny et al. blame the Bedouin communities around the Monastery, assuming that wild plants provide a 'cheap source of fodder'. StKP policy is to introduce an 'integrated programme of sustainable grazing', particularly in critical plant habitats, and monitored plant enclosures to demonstrate the impact of grazing (Grainger, 2003a: 69; Hurst, 2006). Paleczny et al. (2007: 25) further prescribe 'public awareness', an overgrazing study and the revival of *helf*.

Most sources I cite on StKP accept it as given that Bedouin conservation has died out or been forgotten, accounting for vegetation loss and justifying Protectorate intervention (e.g. Hobbs et al., 1998: 240; NCS, 2006: 41). As Agrawal and Gibson note (1999: 631), such ideas routinely support conservation policies aimed at excluding locals. In the Protectorate's EU phase, assumptions of Bedouin degradation were tempered by respect for local communities and recognition of their rights (Hobbs et al., 1998; Grainger, 2003a,b). Subsequently however, the Protectorate's approach appears based in national rather than international discourse; one that sees Bedu as the obvious source of environmental problems (Fouda et al., 2006). Asked to identify threats to the Protectorate, one ranger cited 'the negative impact of the [local] population, and their low socio-economic status'; another noted that '[Bedouin] Community Guards don't tell about violations by their relatives'; and another said of community education: 'It is hard to fulfil this with the Bedouin' (Fouda et al., 2006 – unpublished raw data). 'Don't ask the Bedouin about plants and animals', Hobbs (1995:215) was advised by an Egyptian vet in St Katherine. 'They don't know anything'.

My findings and other research suggest no such breakdown has taken place. Bedu tell me consistently that they apply *urfi* provisions in good years, pointing out new areas of protected spring growth. Perevolotsky et al. (1989: 156) observed not only that grazing restrictions 'appear to be upheld by all' but that new agreements were swiftly put in place following

sedentarization. Knowledge of the system has been transmitted to younger generations of Bedu, even in families where flocks are no longer kept (Gilbert, 2011a: 194). Bedouin law governing resource use has not broken down, then: the problem, people explain, is that years of poor rainfall means there has been insufficient vegetation to justify efforts to conserve it (Ostrom, 2009:420–421).

This discrepancy between conservation-led research and later social findings may be because pastoral communities have only recently been part of the research process rather than the subjects of study alone (or excluded altogether) (Reid et al., 2009: 1). A number of ecological studies that have informed management in StKP claim to demonstrate the negative impacts of Bedouin practice on biodiversity; but none attempts to 'cross the boundaries' as Reid suggests, integrating rather than objectifying local people and local knowledge. One of the first botanical studies (Moustafa et al., 2001) evaluates plant diversity and endemism; a second (Moustafa, 2001) assesses the impact of grazing on its vegetation. Both are based on data collected in the Protectorate in 1996 and 1997, shortly after StKP's establishment. The first paper describes StKP as 'a great harbour of endemism' due to its climate and geology, 90% of Sinai's endemic plants being found in the central massif. Its object is to identify locations of botanical interest and recommend conservation interventions. The authors – including StKP's first Egyptian Director – note that: 'continuous overgrazing, overcutting and uprooting (for fuel and medicinal uses) resulted in disappearance of pastoral plants, paucity of trees and shrubs as well as disappearance of many rare and endemic species' (Moustafa et al., 2001: 123).

In his second study, Moustafa seeks to quantify grazing intensity, asking how grazing changes local vegetation and its structure. The author claims to establish a negative correlation between grazing intensity and species richness, and a positive correlation between grazing intensity and percentage of endangered species. Using 'visual estimates' to quantify grazing intensity over a huge area, he concludes that grazing has had a catastrophic impact on plant biodiversity: 'Some localities have a small number of endemic species. . . other wadis showed no record of endemic species due to the huge pressure of grazing and tree-cutting effects' (my emphasis).

Moustafa's conclusions cannot safely be derived from his evidence. There are too few baseline data to support the claim that overuse causes disappearance (many species were identified in StKP for the first time by his own expeditions). The second paper assumes pre-Israeli stocking levels and continual outdoor grazing, both in decline from the mid-70s. His grazing intensity index is derived not experimentally but from observation alone. Absence of data mean no assessment is possible of long-term decline in primary or secondary production – a condition of 'overgrazing' (Wilson and Macleod, 1991). It is impossible to verify claimed correlations between grazing intensity, species richness, endemism and endangered species, and these cannot in any case be interpreted as causal. Moreover Moustafa's conclusion ignores a range of other factors known to affect species richness: altitude, aspect and water. The sites he states to have suffered the greatest depletion by grazing are in dry, low-lying wadis; while sites on mountain-tops, claimed to flourish because ungrazed, have been shown by his own research (Moustafa et al., 2001: 133) to favour plant growth and species richness. With respect to loss of endemics in wadis, no evidence is provided that there were ever any endemics in those wadis. Moustafa's own research suggests otherwise, for he finds that endemism – like species richness – is positively correlated with elevation, rainfall and soil moisture content (Moustafa et al., 2001: 133; Moustafa and Kamel, 1996). The wadis he mentions as having few endemics because of human pressure are at med-

ium or low elevation (Ajramiya, W Nasb, W Isla); those with no endemics and low species diversity (Nabq, el Kid, W Yahmed, Lethi and Mandar) are south-easterly, low, and in one case at sea-level, receiving tiny amounts of annual rainfall (Perevolotsky (1981: 334) gives a mean 11.5 mm per annum on the Aqaba coast during the 1970s). Yet in spite of his own findings, Moustafa identifies only anthropogenic causes of landscape degradation.⁷ I argue below that this social interpretation has instrumental social impacts.

The influence of this explanation is clear in the work of another Egyptian scholar, Mabrouk (2008). Mabrouk used remote sensing to map changes in vegetation patterns in the Protectorate, comparing Landsat images from 1984 and 2001. Mabrouk sets out to measure the impact of grazing on vegetation cover. Far from showing declining vegetation, his findings demonstrate increased biomass in the mapped areas. Mabrouk's five study areas in and around St Katherine follow or overlap with grazing ranges identified in a study undertaken by StKP rangers (Rashad et al., 2002⁸). The central, municipal section of Mabrouk's map shows increased vegetation thanks to the City Council's flowerbeds. Lower surrounding areas show limited negative change. The areas showing major change are the High Wadis of the Jebel system west of St Katherine (59% increase); the wadis around Jebel Madsous, farther west still (73% increase), and Farsh Zubir to the south-east (77% decline).

Mabrouk's explanations for these changes (2008: 191–195) are as follows. In the high wadis, the increase is probably due to the reduction of seasonal migration to the mountains, meaning there is less grazing. Where patches of reduced vegetation cover are detected, he comments, this may indicate grazing activities that the rangers' study did not detect. In the Madsous system, increased biomass may be due to new orchards but also to 'less grazing on steep slopes that seems to deter herders'. In Zubir, 'the negative change deeper into the territory and beyond the range of the grazing regions, suggest that the grazing activities are much wider than the current known extents' (my emphasis).

Farsh Zubir does indeed lie 4 km beyond the outer edge of the grazing ranges charted by Protectorate rangers (Rashad et al., 2002). Their study makes clear that even the biggest grazing ranges at the edge of settlements never extend to such a distance, 5–6 km² being the farthest small mountain livestock can cover in a day. Vegetation change beyond that range is therefore most unlikely to be wholly explicable by grazing. Climatic and topographical causes are at least as likely (Perevolotsky et al., 1989; Rashad et al., 2002; Schwinning et al., 2004; Baez et al., 2006; Gillson and Hoffmann, 2007). However, this study offers no explanation but the presence or absence of flocks.

The divergence of these conclusions from other available data is notable, and it is worth comparing the agendas behind authors who provide different perspectives on Bedouin resource use. Perevolotsky's research describes the impact of the Israeli Occupation on Bedouin household economics and agriculture. His writing is descriptive rather than prescriptive. He records the topography and ecology of the area, including the geology and the plant communities that accompany it at different elevations, together with the changing impact of climatic effects on them from year to year.

⁷ Abd el Raouf Moustafa is an academic botanist at Suez Canal University, Isma'iliya. I accompanied his teams in 1996 and 1997. Most of the grazing literature I have cited was published in English, and I am acutely aware of the challenges of working in a second language. However, since Moustafa cites many English publications, it is reasonable to assume that additional relevant literature was accessible to him.

⁸ The study was referred to by Mabrouk as Alqamy et al., but subsequently published as Rashad et al. (2002), and is referenced as such in what follows.

He records how detailed knowledge of these factors enabled Bedouin herders with 50 or 60 livestock apiece to exploit their surroundings, typically providing 6 months' subsistence prior to 1967 (Perevolotsky et al., 1989). Perevolotsky has no explicit conservation agenda, and accepts fluctuating environmental conditions as a natural state: he attributes variations in vegetation either to 'dry years' or to elevation, noting the 'favourable conditions' of the high mountain region for animal husbandry compared with the rest of the Sinai desert (Perevolotsky et al., 1989: 160–162).

Moustafa, on the other hand, has a strong conservation agenda: he writes to sound an alarm. He takes an 'equilibrium' view of nature: that the 'man-made' impacts he records contribute to a disastrous and possibly irreversible decline from 'ecological stability' to species loss and destruction. As a scientist he repeats the discourse of conservation ('The disappearance of large numbers of plant and animal species is by now well-documented both worldwide and in Egypt... [Moustafa et al., 2001: 123]) and assumes responsibility, through policy recommendations, for halting that decline. The published work I have discussed at times describes identical places and habitats, but where Perevolotsky sees a series of plant communities, some naturally sparse according to elevation and climate, Moustafa sees evidence of Bedouin-induced overgrazing that demands corrective action. Supported by science, then, StKP weighs Bedu in the balance and finds them wanting.

The authors I cite investigate large-scale impacts of people and their herds on desert habitats, but not their small scale impacts on vegetation. Rashad et al. (2002), a team of Protectorate rangers, provide this detail. Their study of movement of domestic flocks over grazing ranges in and around St Katherine, done by attaching GPS collars to livestock and mapping their movements with GIS software, provides hard evidence of the limits of those ranges. They also investigate consumption patterns. The study is interesting both for its findings and their interpretation. Their findings are these:

- The foraging range of a flock increases the further from St Katherine town or surrounding settlements it is located, but never exceeds 5–6 km² in a day; thus grazing pressure decreases away from settlements.
- Animals spend 90% of their time between 1500 and 1800 m, less than 6% above 2100 m; so grazing pressure decreases with altitude.
- The mean time spent actually eating plants is only about 5% of the time spent foraging/sampling.
- While the most heavily grazed 6% of the study area was grazed for over 500 min per month, many transects within the grazing ranges were not grazed at all: the mean 'grazing impact'⁹ per km² by all livestock is thus just 33 min per month.
- Goats were recorded as grazing four (non-threatened) endemics, 3% of daily bite frequency.
- Sheep were recorded as grazing two endemics, 0.02% of daily bite frequency.
- The daily consumed wild biomass per goat = 21 g
- The daily consumed wild biomass per sheep = 16 g
- The total daily dry-weight requirement per animal (sheep and goats) = 500–600 g
- Wild plant consumption thus formed only 2–3% of the daily diet of an average flock, the remainder being supplied by supplementary fodder.

⁹ Also described as 'grazing presence', I take this to mean foraging, sampling and eating combined.

The rangers demonstrate that total grazing, even in well-used ranges, averages only 33 min per month by the whole herd; that 97–98% of animal nutrition now consists of supplementary fodder; and that flocks hardly stray into the high elevations associated with endemism and diversity. Nonetheless, despite their own data, the rangers conclude that grazing has a negative impact on valuable plant communities, making the area vulnerable and exposed to deterioration. They hope the study will inform ‘future grazing management practices imposed by decision-makers’ (Rashad et al., 2002: 29).

The dominant narrative, then, is unchallenged in Egypt and reinforced by its repetition in international literature. Hoyle and James (2005) modelled the potential impact of both climate change and ‘direct, human-induced habitat destruction caused by grazing’ on the endangered endemic butterfly, the Sinai Baton Blue (*P. sinai-cus*). Their model is based on assumptions that grazing intensity is directly proportional to the rising human population and that herds are ‘usually completely sustained by grazing’. However, recent population increase is due to Egyptians who keep no flocks; the Bedouin herd has shrunk dramatically; and the rangers’ study showed how little wild biomass herds consume. James’ sites are remote and at high altitude: a later publication (2006: 71) specifies that the host-plant patches (*T. decussatus*) in his study occurred between 1875 and 2220 m, reaching ranges at which Rashad’s data show grazing animals spend only ‘minute fractions’ of time. Even while the likelihood of grazing damage is limited, then, Bedouin livestock are presented as a major threat to the butterfly’s survival.

Ironically, concern over ‘overgrazing’ is producing new evidence which may refute the narrative in StKP as elsewhere. Following Moustafa’s recommendations enclosures were established and monitored by rangers. According to Francis Hurst (2010: 9) ‘[t]here is sufficient evidence from the enclosure monitoring... to indicate that these plants are adapted to grazing and/or collecting.’ Moustafa expected that vegetation would improve when animals were excluded, and in major thoroughfares it does. However, in other cases the reverse happens, and commonly-grazed plants flourish outside the enclosures while those inside die off. A new study (Katy Thomson, Amy Sheppard & Francis Gilbert, pers. comm.) provides additional evidence, showing large decreases in plant condition and survival in stands of *T. decussatus* inside the enclosures intended to protect them from grazing. Their early findings corroborate studies from nearby dryland systems indicating that grazing positively supports the production potential of the ecosystem, particularly where vegetation is adapted to a long evolutionary history of grazing (Milchunas et al., 1988; Perevolotsky and Seligman, 1998; Wachs and Tal, 2009). Research in the directly comparable, hyper-arid Negev indicates that grazing is not the cause of shrub desertification (the loss of rangeland by invasion of inedible shrubs), and that ‘systems with millennia of grazing history... are more robust when subjected to traditional patterns of pastoralism’ (Olsvig-Whittaker et al., 2006: 197). It is increasingly clear, as Hurst comments (2010: 7), that: ‘There is little empirical evidence to support excessive grazing as a contributor [to vegetation loss] in all but a few of the wadis’; but the repeated mantra of destructive pastoralism ensures that policy follows the narrative, not the evidence.

4. ‘Overgrazing’, policy and the paradox of Bedouin indigenous knowledge

Why, when herding is visibly declining and its impact demonstrably reduced, does the concept of overgrazing retain such influence? I suggest the status of the Bedu within Egypt, particularly vis-à-vis the Egyptian state, plays a key part. ‘Overgrazing’ focuses on that aspect of Bedouin life in which their Otherness is most

evident: their identity as pastoralists. It draws attention to everything that makes them most suspect to the Egyptian state: loyalty to tribe that ignores nation-state boundaries; mobility and autonomy rather than settled citizenship; *bedu* vs. *hadar*, desert vs. sown. The desert is ‘illegible’ to the authorities: its rainfall, vegetation and flash floods are unpredictable, uncontrollable by science or government. Its inhabitants, however, can be brought within the purview of the state, made subject to rational control (Scott, 1998). It is perhaps significant that Egyptian science-led conservation seeks to control above all that aspect of Bedouin life that exemplifies their non-conformity. In this it pursues, consciously or unconsciously, the nation-building agenda of the Egyptian state.

However the basis of this narrative has deeper roots than the state’s desire to control inconvenient Others. If we look closely at what is actually said about Bedouin environmental knowledge and management practices a curious paradox emerges. In Egyptian conservation literature there is a puzzling inconsistency between expressions of admiration for Bedouin environmental knowledge on the one hand, and the need to educate them and prevent their destructive behaviour on the other. Often these contradictory views appear un glossed alongside each other. Here is one example: ‘Conservation, therefore, was traditionally a matter of maintaining the fauna and flora to maintain their way of life... Harvesting plants for food, fuel or medicine is more or less regulated. The pastoral nomad knows only too well that if his flocks overgraze an area, there will be fewer plants next time there is rain.’ Two lines later, however: ‘The old ways of conserving the often-fragile ecosystems are no longer sufficient. The Government of Egypt is introducing some innovative programs through which the people will maintain an interest in their environment and culture, and in the importance of maintaining and preserving them’ (Mikhail, 2003: 36). Another explains: ‘Bedouin culture has been founded on strict tribal laws and traditions. Nature is respected, water is consumed sparingly... tribal law prohibits the cutting of green trees.’ The adjacent paragraph states: ‘Activities that are likely to damage habitats or reduce biodiversity are now regulated by EEAA staff’ (Pearson ND). In this reading Bedu are constructed simultaneously as guardians of nature, and destructive or neglectful of it.

This paradoxical position is exemplified in the Protectorate’s programme to educate Bedu in environmental protection. ‘Abd el Baset, a former St Katherine ranger, specialises in local community relations and Bedouin environmental knowledge. Whilst acknowledging the value of indigenous knowledge (which she terms ‘IK’) for conservation purposes, her key research question is: ‘How can an education for sustainability programme be formulated so that the traditional Bedouin community can be helped to improve their environment?’ (‘Abd el Baset, 2005: 6). She advocates educating Bedu by ‘sharing indigenous knowledge through practical processes to learn about plants, and acquire mercy towards wild animals by... learning and implementing Islamic norms.’ (The Bedu of course are Muslim, but apparently not devout enough to curb their destructiveness.) Her interviews, she states, indicate that young Bedu in the town ‘ignore their valuable knowledge’: they can no longer identify plants, and their predilection for the trappings of modernity mean that ‘IK’ is being lost. Young adults are ‘merely concerned to improve their financial status’. Two young men who claimed to be interested in indigenous knowledge were unmasked by observation: one wore non-Bedouin clothes, while the other’s house had ‘too many modern [aspects] such as a satellite dish, a fridge and modern furniture’ (pp. 4–22). Bedouin knowledge, ‘Abd el Baset implies, is too important to be left in the hands of the Bedu. It must be captured by proper conservationists and reprocessed before it is too late; before nature is trampled in the newfangled rush to buy fridges.

This position, and by extension the strength of the overgrazing narrative, becomes clearer in the light of the government's attitude to another marginal group – similarly celebrating their past while castigating their present. Timothy Mitchell's (2002) case study of architecture, *fellahin*, and the 'model village' of Gurna offers illuminating parallels with conservation, Bedu and 'overgrazing' in St Katherine. Mitchell describes government efforts since the 1950s to remove, sanitize and relocate a village population on the west bank of the Nile near Luxor, with the joint objects of removing their disturbing poverty from the gaze of tourists, and of building the image of a modern but 'authentically Egyptian' state by designing a replicable model village in 'heritage' idiom. In the face of long-standing resistance by residents the plan was eventually abandoned, but not before attempts to coerce the villagers' acceptance had led to their vilification as squalid and ignorant tomb-robbers. The architect, Hassan Fathy – like StKP – had started from the innovative position of consulting local people and involving them in planning, aiming 'to revive the peasant's faith in his own culture'. But, Mitchell says (2002: 187): 'There had to be some lack, something missing from the peasant, for even a sympathetic modernizer to transform his house into a national style' (my emphasis).

Mitchell's analysis of the Gurna project makes sense of this paradox so clearly that I quote it almost in full:

'In projects of this sort one sees the difficulties of making the nation. [G]roups must be included by first declaring them excluded for their lack of civilization. . .pasts [must be] declared lost so that they may be recovered. Fathy wanted to 'revive' an indigenous culture as a means of developing an Egyptian national heritage. To perform this revival, he needed the people of Gurna. . .The Gurnawis were to be treated as ignorant, uncivilized, and incapable of preserving their own architectural heritage. Only by seeing them in this way would the architect have an opportunity to intervene, *presenting himself as the rediscoverer of a local heritage that the locals themselves no longer recognized or knew how to value*. As the spokesman bringing this heritage into national politics, the architect would enable the past to speak and play its role in giving the modern nation its character' (Mitchell, 2002: 191, my emphasis).

To conform to modern western conservation practice (and make a modern nation), Egypt has to recognise and promote the value of indigenous knowledge as enshrined in the *Convention on Biological Diversity* (1992). To do this, its conservationists need its indigenous people. But to achieve progress, indigenous knowledge has to be remade as 'IK', dissociated from the destructive, unscientific people who somehow managed to produce it: it is clearly not safe in their hands, as 'severe overgrazing' proves. It has to be turned into an education programme by properly qualified people so that – suitably Egyptianized – it can be revived and proudly assimilated into the conservation practice of a modern state.

5. St Katherine Protectorate and the 'new conservation debate'

The question animating this paper has been how the narrative of Bedouin overgrazing has retained primacy regardless of huge declines in livestock numbers, and despite alternative evidence. But properly to appreciate the strangeness of its dominance, the vibrancy of ecological research in the region must be understood. These are not moribund ideas, residues of a previous era. They contribute to current research programmes. The enclosures which may ultimately exonerate grazing owe their existence to Moustafa's research. Everyone whose work I cite has contributed data that permit revised understandings of the ecology of St

Katherine. However, what differentiates their contributions is their position in what has come to be known as the 'new conservation debate.'

Contributions to a broad field of enquiry that explores the relationships between conservation, development and anthropology (e.g. Ferguson, 1997; Brosius, 1999, 2006; West et al., 2006; Adams and Hutton, 2007; Brockington et al., 2008; Miller et al., 2011) have called for a more open dialogue about the ethical rationales driving biological conservation today. Miller et al. (2011: 949) add that, to determine the 'proper ends of conservation', the field must be clearer about the values supporting the policy agendas of conservation scientists. They characterise the protagonists, in what they term the 'new conservation debate', as Nature Protectionists vs. Social Conservationists (NP vs. SC): that is, 'fortress' conservationists who believe that community-based conservation does not work because people and biodiversity cannot co-exist (Terborgh, 1999); vs. those for whom human societies are 'irreducibly integrated' within natural systems (Sarkar and Montoya, 2011: 979). Much of the debate is conducted from these polarised positions.

Adopting these terms we can say that StKP was established by Social Conservationists, intent on involving local people and offsetting losses to livelihoods entailed by conservation. On their withdrawal, however, management of the Protectorate passed to Nature Protectionists: scientifically-trained Egyptian conservationists who, inheriting the StKP Management Plan but not its value-base, ground themselves in the position that people are the problem. This approach is flawed practically and theoretically. First, it shuts off dialogue between the community, the institution of the Protectorate and academic researchers. This delays better understandings of St Katherine's complex social-ecological systems that could inform better-targeted conservation goals, while leaving contested ways of knowing unexplored, and inequities of power unchallenged (Reid et al., 2009).

Secondly, it ignores the idea of 'nature' as constructed (e.g. Adams, 2004: 233), either literally or metaphorically, assuming both that the 'nature' to be conserved exists in some pristine Platonic form, and that human impact on the environment can only be negative. South Sinai has a *recorded* history spanning three millennia, and evidence of much longer human habitation. The 'nature' being conserved has therefore been produced, historically and prehistorically, by the very people from whom the Protectorate now strives to protect it. Sarkar and Montoya (2011: 983) point out that 'fortress' conservation assumes 'without argument and evidence' that human disengagement is the best, and perhaps the only, method for biodiversity conservation. However, the authors note, exceptions to this maxim abound; and it seems StKP is one of them. The emerging data appear not only to indicate that its people and nature are not incompatible; on the contrary, their co-existence may be critical to maintaining 'nature' as currently constructed by those charged with preserving it.

Alongside more explicit discussion of the values underpinning conservation interventions (Miller et al., 2011; McShane et al., 2011), recent commentators have called for a greater degree of empiricism in policy formulation (Sarkar and Montoya, 2011). The call is qualified by an important rider requiring reflexivity on the part of conservation actors: it has been pointed out (Sarewitz, 2004) that 'unacknowledged normative and ethical dissent [may] masquerade as empirical disagreement.' In StKP, however, the reverse has applied: flawed empirical data have been used uncritically to support 'overgrazing' policy by both European management and its Egyptian successors, normative dissent over policy (the SC/NP divide) masked by common acceptance of the notion of pastoral destructiveness. Both regimes have blamed Bedu for threatening biodiversity. As Olsvig-Whittaker et al. comment (2006: 197): 'It seems that much of the overgrazing syndrome

has stemmed from prejudice, political conflicts, and lack of ecological knowledge’.

6. Conclusion

A question-mark now hangs over the ‘pastoral destruction’ narrative. New evidence, corroborating research elsewhere, should lead to acceptance in StKP that Bedouin pastoralism does not necessarily destroy biodiversity, prompting a re-evaluation of conservation policy. In fact, it seems this process may at last be underway. A lone Protectorate manager noted in 2007 that changed circumstances made overgrazing action unnecessary (Paleczny et al., 2007: 82); while a recent conversation with rangers indicated that action to combat overgrazing has been abandoned (whether as a policy decision or a response to underfunding remains unclear). Whilst a local Bedu was fined EGP 80,000 for killing ibex in 2011¹⁰ I cannot find one recent instance of a penalty for breach of grazing restrictions.

Is this because Bedu have internalized the Protectorate’s messages and become good environmental subjects as Agrawal (2005) describes? After all, the Protectorate’s policy of educating Bedu to care for the environment is still among its proudest claims (Fouda et al., 2006; ‘Abd el Baset, 2005). Far from it: today’s Protectorate lacks all legitimacy with Bedu, who see it as a spent force, charged with protecting nature but powerless to do so. Many acts of ‘everyday resistance’ (Scott, 1985) include telling stories against Protectorate managers, especially cases where Bedu alert them, as the ‘proper authority’, to environmental damage and they fail to act. Resenting rules made by those they perceive as unfit to impose them, the Bedu have responded by strengthening their view of themselves as the true guardians of Sinai’s nature (Gilbert, 2011a).

Does the overgrazing narrative still matter, then, if conservation policy is now so ineffectual that it has no practical impact on Bedu? Emphatically it does. Scientists have perpetuated the idea that Bedu are destructive, and that idea has discursive force far beyond the boundaries of StKP. It is one of many narratives that strengthen a national discourse of contempt for Bedu, reinforcing their marginalization and second-class status (Hobbs, 1995; Aziz, 2000; Gilbert, 2011a, 2011b). Other narratives include the Bedu as treacherous, leading to their continued exclusion from military and police service and local voting rights (Gilbert and al Jebaali, 2012). Another is the Bedu as terrorists: press reports standardly characterise Sinai as ‘lawless’, and the Bedu as *jihadi* or militant (Fahmy, 2012 sets the tone). Yet another portrays Bedu as backward and inept. Government officials regard them as incapable (Aziz, 2000: 28): asked at a recent public meeting to provide jobs for Bedu, the Governor of South Sinai responded: ‘Jobs for Bedouin? How can I create jobs for Bedouin? What can they do?’ (Gilbert, in press). This open contempt extends even to academic social scientists: an Egyptian sociologist recently condemned sexual attacks on women by saying: ‘This is not the culture of the Pharaohs – it is the culture of the Bedouins’ (Bell, 2012).

Achieving effective conservation in Egypt requires human and financial investment on a vast scale – a Herculean task for the post-Revolutionary civilian government. Equally important is the overturning of stereotypes that create and perpetuate second-class citizenship. The Convention on Biological Diversity is 20 years old, but for many the political message it embodies – the recognition and empowerment of indigenous peoples – remains far from real-

isation. South Sinai Bedu are keen to participate as citizens of the new Egypt (Gilbert and al Jebaali, 2012). To make a modern state for all its citizens the new Government needs to support not just Egypt’s natural habitats, but the diverse people who have shaped them for millennia. Working reflexively across the boundaries between community and authority, examining its values and weighing evidence against discourse, conservation can aid that process, recognising the contribution of indigenous peoples and challenging damaging narratives from the past. For conservationists and Bedu in St Katherine the question is – just how modern is Egypt prepared to be?

Acknowledgements

My warmest thanks to the Leverhulme Trust for support while writing; to Dawn Chatty and Smadar Lavie for their encouragement; and to James Gilbert, Lucy Gilbert, Haitham Zalat and Mohammed Khedr al Jebaali for insights and practical help. The constructive comments of four anonymous reviewers greatly strengthened the paper. I’m especially grateful for Dan Brockington’s incisive editing; and to Francis Gilbert for his statistical and bibliographical help, unfailing generosity, and willingness to think again.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.biocon.2012.12.022>. These data include Google maps of the most important areas described in this article.

References

- ‘Abd el Baset, Y., 2005. Untitled. M.Sc. Dissertation. Institute of Education, London, unpublished.
- Adams, W.M., 2004. *Against Extinction: The Story of Conservation*. Earthscan, London.
- Adams, W., Hutton, J., 2007. People, parks & poverty: political ecology and biodiversity conservation. *Conserv. Soc.* 5 (2), 147–183.
- Agrawal, A., 2005. Environmentalism: community, intimate government, and the making of environmental subjects in Kumaon, India. *Curr. Anthropol.* 46 (2), 161–181.
- Agrawal, A., Gibson, C., 1999. Enchantment and disenchantment: the role of community in natural resource conservation. *World Dev.* 27 (4), 629–649.
- Altorki, S., Cole, D., 2006. Land and identity among Awlad ‘Ali Bedouin: Egypt’s northwest coast. In: Chatty, D. (Ed.), *Nomadic Societies in the Middle East and North Africa Entering the 21st Century*. EJ Brill, Leiden.
- Aziz, H., 2000. Employment in a Bedouin Community: the case of the town of Dahab in South Sinai. *Nomadic Peoples* 4 (2), 28–47.
- Baez, S., Collins, S.L., Lightfoot, D., Koontz, T.L., 2006. Bottom-up regulation of plant community structure in an aridland ecosystem. *Ecology* 87, 2746–2754.
- Baha el Din, S., 2006. *A Guide to the Reptiles and Amphibians of Egypt*. American University in Cairo Press, Cairo.
- Bailey, C., 2002. *Bedouin Poetry from Sinai and the Negev*, second ed. Saqi Books, London.
- Bar-Yosef, O., Belfer-Cohen, A., 2001. From Africa to Eurasia – early dispersals. *Quatern. Int.* 75 (1), 19–28.
- Bassouony, M.I., Gilbert, F., Zalat, S., 2010. *Mammals of Egypt: Atlas, Red Data Listing and Conservation*. EEA, Cairo.
- Bell, B., 2012. ‘Egypt’s sexual harassment of women “epidemic”’. <www.bbc.co.uk/news/middle-east> (03.09.12).
- Behnke, R., Scoones, I., 1993. Rethinking range ecology: implications for range management in Africa. In: Behnke, R., Scoones, I., Kerven, C. (Eds.), *Range Ecology at Disequilibrium*. Overseas Development Institute, London.
- Brockington, D., Homewood, K., 2001. Degradation debates and data deficiencies: the Mkomazi Game Reserve, Tanzania. *Africa* 71 (3), 449–480.
- Brockington, D., Duffy, R., Igoe, J., 2008. *Nature Unbound: Conservation, Capitalism, and the Future of Protected Areas*. Earthscan, London & Sterling, VA.
- Brosius, J.P., 1999. Analyses and interventions: anthropological engagements with environmentalism. *Curr. Anthropol.* 40 (3), 277–310.
- Brosius, J.P., 2006. Common ground between anthropology and conservation biology. *Conserv. Biol.* 20 (3), 683–685.
- CAPMAS – Central Agency for Public Mobilization and Statistics, 2012. *Government of Egypt State Information Statistics*. <www.sis.org.eg/tourism>.
- Convention on Biological Diversity, 1992. <<http://www.cbd.int/convention>>.

¹⁰ Approximately \$13,500 at current values – an enormous sum for a Bedu. My Bedouin contacts are quick to point out, first, that the hunter was reported by Bedu themselves; and second, that the Protectorate takes no action against hard targets such as Saudi hunters capturing migrant raptors on the Sinai coast.

- Chatty, D., Colchester, M. (Eds.), 2002. Conservation and Mobile Indigenous Peoples: Displacement, Forced Settlement and Sustainable Development. Berghahn Books, New York and Oxford.
- Dahari, U., 2000. Monastic Settlements in South Sinai in the Byzantine Period: the Archaeological Remains. Israel Antiquities Authority, Jerusalem.
- El Bastawisi, I., 1982. Adaptation to a Unique Environment: el Jebeliya of Saint Catherine. M.A. Thesis, American University in Cairo, unpublished.
- Fahmy, M.F., 2012. Bedouin Leaders Threaten Armed Rebellion Against Egyptian Government. CNN 17/01/2012. <<http://edition.cnn.com/2012/01/16/world/meast/egypt-bedouin-threat/index.html?iref=allsearch>>.
- Ferguson, J., 1994. The Anti-Politics Machine. 'Development,' Depoliticization, and Bureaucratic Power in Lesotho. University of Minnesota Press, Minneapolis.
- Ferguson, J., 1997. Anthropology and its evil twin: 'development' in the constitution of a discipline. In: Cooper, F., Packard, R. (Eds.), International Development and the Social Sciences. University of California Press, Berkeley.
- Finkelstein, I., Perevolotsky, A., 1990. Processes of sedentarization and nomadization in the history of Sinai and the Negev. *Basor* 279, 67–88.
- Fouda, M., Grainger, J., Salama, W., Baha, E.I., Din, S., Paleczny, D., Zalut, S., Gilbert, F., 2006. Management Effectiveness Evaluation of Egypt's Protected Area system (RAPPAM). Nature Conservation Sector/Egyptian Environmental Affairs Agency, Cairo.
- Fratkin, E., 1997. Pastoralism: governance and development issues. *Ann. Rev. Anthropol.* 26, 235–261.
- Gardner, L.C., 2011. The Road to Tahrir Square. Saqi Books, London.
- Gilbert, H.C. 2011a. 'Everything has Its Price': Conservation, Development and Bedu in St Katherine Protectorate, South Sinai. Ph.D. Thesis, University of Manchester.
- Gilbert, H.C., 2011b. 'This is not our life, it's just a copy of other peoples': Bedu and the price of 'development' in South Sinai. *Nomadic Peoples* 15 (2), 7–32.
- Gilbert, H.C. in press. Trapped by *tatriiz*: Bedouin handicrafts and marginalization in South Sinai. *Textile*.
- Gilbert, H.C., al Jebraali, M. 2012. 'Not Philanthropists but Revolutionaries' – Promoting Bedouin Participation in the 'new Egypt.' A Case Study from South Sinai. Voices on Arab Philanthropy and Civic Engagement Working Paper. American University in Cairo Press, Cairo.
- Gillson, L., Hoffmann, M.T., 2007. Rangeland ecology in a changing world. *Science* 315, 53–54.
- Gomaa, S.S., 1997. Environmental Policy Making in Egypt. American University in Cairo Press, Cairo.
- Grainger, J., 2003. St Katherine Protected Area management plan 2003–2008. Egyptian Environmental Affairs Agency, Cairo, unpublished.
- Grainger, J., 2003b. 'People are living in the park'. Linking biodiversity to community development in the Middle East region: a case study from the Saint Katherine Protectorate, Southern Sinai. *J. Arid Environ.* 54, 29–38.
- Grainger, G., Gilbert, F., 2008. Around the Sacred Mountain. The St Katherine Protectorate in South Sinai, Egypt. In: Mallarach, J.M. (Ed.), Protected Landscapes and Cultural and Spiritual Values. Kasperek Verlag, (IUCN), Heidelberg.
- Hardin, G., 1968. The tragedy of the commons. *Science* 162, 1243–1248.
- Hobbs, J.J., 1995. Mount Sinai. University of Texas Press, Austin.
- Hobbs, J.J., Grainger, J., El-Bastawisi, I.Y., 1998. Inception of Bedouin support programme in the St Katherine Natural Protectorate, Sinai, Egypt. *Mount. Res. Develop.* 18 (3), 235–248.
- Hoyle, M., James, M., 2005. Global warming, human population pressure and viability of the world's smallest butterfly. *Conserv. Biol.* 19 (4), 1113–1124.
- Huber-Sannwald, E., Ribeiro Palacios, M., Arredondo Moreno, J., Braasch, M., Martinez-Pena, R., de Alba, Verduasco J., Monzalvo Santos, K., 2012. Navigating challenges and opportunities of land degradation and sustainable livelihood development in dryland social – ecological systems: a case study from Mexico. *Philos. Trans. R. Soc.* 367, 3158–3177.
- Hurst, F. 2006. Grazing Management in St Katherine: Terms of Reference for an Expert. St Katherine Protectorate, unpublished.
- Hurst, F., 2010. How Long is a Piece of String? Medicinal and Aromatic Plant Collection Monitoring. Report for Global Environment Facility, unpublished.
- International Crisis Group, 2007. Egypt's Sinai Question. Middle East/North Africa Report No. 61, 30 January 2007. <<http://www.crisisgroup.org>>.
- James, M., Gilbert, F., Zalut, S.M., 2003. Thyme and isolation for the Sinai Baton Blue *Pseudophilotes sinaicus*. *Oecologia* 143, 445–453.
- James, M., 2006. The natural history of the Sinai Baton Blue: the smallest butterfly in the world. *Egyptian J. Biol.* 8, 67–83.
- Leach, M., Mearns, R. (Eds.), 1996. The lie of the land: challenging received wisdom on the African environment. International African Institute, James Currey/Heinemann, London.
- Linkov, I., Moeberg, E., 2011. Multi-Criteria Decision Analysis: Environmental Applications and Case Studies. CRC Press, Boca Raton.
- Mabrouk, M., 2008. Detecting Change of Sparse Vegetation Cover Due to Socio-Economic Changes of Jebeliya Bedouins of Mt Sinai, Sinai, Egypt. M.Sc. Thesis, University of Nottingham, unpublished.
- Marx, E., 2003. Nomads and Cities: the Development of a Conception. In: Leder, S., Streck (Eds.), Shifts and Drifts in Nomadic-Sedentary Relations. Reichert, Wiesbaden.
- Marx, E., 2006. Political Economy of Middle Eastern and North African Pastoral Nomads. In: Chatty, D. (Ed.), Nomadic Societies in the Middle East and North Africa Entering the 21st Century, 2006. EJ Brill, Leiden.
- McShane, T., Hirsch, P., Tran, C.T., Songorwa, A., Kinzig, A., Monteferrri, B., Mutekanga, D., Hoang, V.T., Dammert, J., Pulgar-Vidal, M., Welch-Devine, M., Brosius, J., Copolillo, P., O'Connor, S., 2011. Hard choices: making trade-offs between biodiversity conservation and human well-being. *Biol. Conserv.* 144, 966–972.
- Mikhail, G., 2003. Egypt's Wilderness and the Quest for Conservation. Image House, Cairo.
- Milchunas, D., Sala, O., Lauenroth, W., 1988. A generalized model of the effects of grazing by large herbivores on grassland community structure. *Am. Nat.* 132 (1), 87–106.
- Miller, T., Minter, B., Malan, L.-C., 2011. The new conservation debate: the view from practical ethics. *Biol. Conserv.* 144, 948–957.
- Mitchell, T., 2002. Rule of Experts. Egypt, Technopolitics, Modernity. University of California Press, California.
- Moustafa, A., Kamel, W., 1996. Ecological notes on the floristic composition and endemic species of the Saint Catherine area, South Sinai, Egypt. *Egyptian J. Bot.* 35, 177–200.
- Moustafa, A., Zaghoul, M., 'Abd-el Wahab, R., Shaker, M., 2001. Evaluation of plant diversity and endemism in Saint Catherine Protectorate, South Sinai, Egypt. *Egyptian J. Bot.* 41 (1), 121–139.
- Moustafa, A., 2001. Impact of grazing on the vegetation of South Sinai, Egypt. In: Veste, M., Wucherer, W., Breckle, S.-W. (Eds.), Sustainable Land Use in Deserts. UNESCO. Springer-Verlag, Berlin.
- NCS [Nature Conservation Sector], 2006. Protected Areas of Egypt: towards the future. Egyptian Environmental Affairs Agency, Cairo.
- Olsvig-Whittaker, L., Frankenberg, E., Perevolotsky, A., Ungar, E., 2006. Grazing, overgrazing and conservation: changing concepts and practices in the Negev rangelands. *Secheresse* 17 (1–2), 195–199.
- Ostrom, E., 1990. Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge University Press, Cambridge.
- Ostrom, E., 2009. A general framework for analyzing sustainability of social-ecological systems. *Science* 325, 419–422.
- Paleczny, D., Allam, K., Talaat, M., 2007. The State of the St Katherine Protectorate and the St Katherine World Heritage Site: An Evaluation of Management Effectiveness. Egyptian Environmental Affairs Agency, Cairo.
- Pearson, M. National Parks of Egypt: South Sinai Sector. EAAA, Cairo.
- Perevolotsky, A., 1981. Orchard agriculture in the high mountain region of Southern Sinai. *Human Ecol.* 9 (3), 331–357.
- Perevolotsky, A., 1987. Territoriality and resource-sharing among the Bedouin of southern Sinai: a socio-ecological interpretation. *J. Arid Environ.* 13, 153–161.
- Perevolotsky, A., Perevolotsky, A., Noy-Meir, I., 1989. Environmental adaptation and ecological change in a pastoral mountain society. *Mountain Res. Develop.* 9 (2), 153–164.
- Perevolotsky, A., Seligman, N.G., 1998. Role of grazing in mediterranean rangeland ecosystems. *Bioscience* 48 (12), 1007–1017.
- Peterson, G., Allen, C.R., Holling, C.S., 1998. Ecological resilience, biodiversity, and scale. *Ecosystems* 1, 6–18.
- Reynolds, J.F., Stafford Smith, M., Lambin, F., et al., 2007. Global desertification: building a science for dryland development. *Science* 316, 847.
- Reid, R., Nkedianya, D., Saida, M.Y. et al., 2009. Evolution of models to support community and policy action with science. Balancing Pastoral Livelihoods and Wildlife Conservation in Savannas of East Africa. <<http://www.pnas.org/cgi/doi/10.1073.pnas.0900313106>>.
- Rashad, S., 'Abd el Basset, Y., Hemeed, M., Alqamy, H., Wachter, T., 2002. Grazing patterns in the high-altitude mountains around St Katherine town. EAAA/St Katherine Protectorate, Cairo.
- Reubens, B., Moeremans, C., Poesen, J., et al., 2011. Tree species selection for land rehabilitation in Ethiopia: from fragmented knowledge to an integrated multi-criteria decision approach. *Agroforestry Syst.* 82, 303–330.
- Robbins, P., 2004. Political Ecology. Blackwell, Oxford.
- Sarewitz, D., 2004. How science makes environmental controversies worse. *Environ. Sci. Policy* 7, 385–403.
- Sarkar, S., Montoya, M., 2011. Beyond parks and reserves: the ethics and politics of conservation with a case study from Peru. *Biol. Conserv.* 144, 979–988.
- Schwinning, S., Sala, O.E., Loik, M.E., Ehleringer, J.R., 2004. Thresholds, memory and seasonality: understanding pulse dynamics in arid/semi-arid ecosystems. *Oecologia* 141, 191–193.
- Scott, J., 1985. Weapons of the Weak: Everyday Forms of Peasant Resistance. Yale University Press, New Haven.
- Scott, J., 1998. Seeing Like a State. Yale University Press, New Haven.
- Shoup, J., 1990. Middle Eastern sheep pastoralism and the Hima system. In: Galaty, J.G., Johnson, D.L. (Eds.), The World of Pastoralism. Belhaven Press, London.
- Sowers, J., 2007. Nature reserves and authoritarian rule in Egypt: embedded autonomy revisited. *J. Environ. Develop.* 2007 (16), 375–397.
- Terborgh, J., 1999. Requiem for Nature. Island Press, Washington, DC.
- Wachs, E., Tal, A., 2009. Herd no more: livestock husbandry policies and the environment in Israel. *J. Agric. Environ. Ethics* 22, 401–422.
- Walker, B., Hollings, C.S., Carpenter, S.R., Kinzig, A., 2004. Resilience, adaptability and transformability in social-ecological systems. *Ecology and Society* 9 (2), 5, <http://www.ecologyandsociety.org/vol9/iss2/art5/>.

- West, P., Igoe, J., Brockington, D., 2006. Parks and peoples: the social impact of protected areas. *Ann. Rev. Anthropol.* 35 (2), 251–277.
- Wilson, A., Macleod, N., 1991. Overgrazing: present or absent? *Journal of Range Management* 44 (5), 475–482.
- World Bank, 2005. Arab Republic of Egypt: Country Environmental Analysis (1992–2002). Water and Environment Department, Middle East & North Africa Region. World Bank, Cairo.
- Zalat, S., Gilbert, F., 2008. Gardens of a Sacred Landscape: Bedouin Heritage and Natural History in the High Mountains of Sinai. American University in Cairo Press, Cairo.