

Grasslands notes – Paul Elias (Trustee of Naushon Island and the Beech Tree Trust)

Conservation grazing in UK

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Background: I spent four days visiting conservation land management projects in the UK during the third week of July, 2009. Two of these days were spent on both the forested and unforested parts of Dartmoor National Park, one half day was spent at Kingley Vale, and one day was spent at Knepp Castle. Dartmoor and Kingley Vale are reserves that are managed for conservation. Knepp Castle is a vast experiment in “rewilding” by allowing succession on old farmland and stocking in livestock and deer. My objective was to see the ways in which English conservation managers incorporated livestock grazing into management of early successional landscapes. In England livestock management is much more widely practiced still than in today’s New England and almost all traditional landscapes there were in part created and maintained by livestock. This means that serious conservation incorporates elements of pastoral agriculture, something rarely seen in the US, especially in New England. For all these reasons, and more laid out below, it seemed to be a very relevant model for us to examine as we plan the Naushon Grasslands work. My observations as they relate to Naushon are laid out below in the Q&A format used for the other sets of Grasslands Notes.

Why is British land management relevant to Naushon? In Europe conservation is recognized not to be about preservation of wilderness because the entire landscape is shaped by man and has been for thousands of years. As a result conservation grazing is a widespread practice to maintain open grasslands in areas which would succeed to forest. Naushon is mainly composed of quite wild forest and open lands that once were grassy sheep pasture. The grassy pasture areas contain a diverse assemblage of native plants, insects, birds, etc. and have special conservation value as “sandplain grassland” even though they were created by colonists removing the original forest in the 1600s and 1700s. Britain has a parallel history, its ecosystems dating from the same glaciation as ours. Further, the English forest is

composed of very closely related plants with oak and beech (different species than ours but very closely related) dominating many woodlands. Like Naushon, Britain has a long history of open land in a climate that readily supports forest, so only active management preserves historic landscapes.

How do UK land managers think about what they are doing if it is not wilderness preservation? Their target is biodiversity management of plants, insects, birds, etc. So they are interested in creating a mosaic of different environments to host the relevant organisms among the native flora and fauna.

How do they decide what to do to a given place? They may look at the history and see that a place was recently a rich wildflower meadow which was converted to cropland through ploughing, so they may cut and remove a few years of grassy growth to deplete nitrogen and do some seeding in of native mixes to see what takes.

How do they use animals? Animals are used to maintain open land, grazing out seedling woody plants, trampling bracken and other nonpalatable species, and fertilizing the environment.

What species are used? Sheep, cattle, and ponies are most common, goats and pigs are less common but are used.

What wild grazers exist? There are three deer (red, fallow and roe) as well as rabbits. The deer tend to browse as well as graze, and are often responsible for keeping trees out (like in the Scottish highlands). Rabbits can exist in huge numbers, but were reduced by Myxomycosis in the 19th c. and have never fully recovered. Looking back into history wild horses, cattle and sheep or goats were parts of the fauna of Europe, and occurred on England when it was connected to the mainland. So these animals are arguably part of the native fauna, albeit perhaps not since the last interglacial.

Are all three deer species native? Fallow deer appear to have been introduced from Asia by the Normans in 1066 or shortly thereafter, so they are entirely naturalized although not originally native.

What is the wild English countryside? There is no countryside in England that is not influenced by humans. Just as at Naushon, every landscape was influenced by the removal of top predators, not to mention a thousand other impacts.

Is there old growth forest in England? There is ancient woodland, which is land on which forest has been continuous for thousands of years. However, this forest has been managed in every part of England in an active way, so the original forest processes are not visible.

Is there restoration of the ancient ecosystem? The wildwood as it is called is believed to have existed between about 7 thousand and about four thousand years ago. At the time the climate was stable and similar to today (as at Naushon) but not yet impacted particularly by man.

Was there open land in the ancient English landscape? That is hotly disputed. One school associated with Frans Wals in Netherlands believes that the forest grew old in the presence of grazers, and that recruitment was impaired but browsing. The resulting open land then gradually grew until it was grassland, and then trees began to grow protected by clumps of thornscrub. The result was parkland with ancient trees and fluctuating borders, and with herbivores grazing among the trees. Loss of herbivores from time to time could then have resulted in denser forest. This pattern is probably most likely in eastern Europe where the steppe begins. There, as in Illinois and Michigan, forest is punctuated with grassland partly due to reduced rainfall, as well as animals.

Are deer numbers increasing in UK? Yes, in general there is somewhat less hunting now and populations are growing. Culling sometimes takes place to reduce pressure on land. The deer are culled at Kingley Vale reserve by a shooter who shoots during the October to May (?) hunting season with a 30 06 rifle early in the morning before visitors arrive. Shotguns are not allowed, and shots can only be made that will go into earth behind the target for safety. There is an obligatory four day course before someone can get a rifle for hunting deer.

How do grazing results differ between grazer species? Rabbits are famous for nibbling plants to the ground and then eating the roots, and destabilizing hillsides through erosion. Sheep graze very tight to the ground and eat mostly grass with some woody plant leaves. Cattle mostly eat grass but the old breeds will eat other things somewhat. Ponies are wider in their preferences and will eat some small heather and gorse as well as grass. Tree leaves of many species are eaten when accessible.

How do UK managers see the importance of trampling? At Dartmoor they believe that at least half the impact of animals is trampling, the other half is eating.

What are the UK equivalents of our catbrier? Bracken is a tall dry fern (up to 5 feet) which can grow very densely and shade out nearly everything underneath, it also regrows very fast after a burn. Gorse can be dense and is VERY prickly, but is woody and regrows slowly after a burn so it is not seen as problematic. Both bracken and gorse are native plants.

How is bracken managed? It is nonpalatable, but is easily trampled by grazers so high stocking rates will knock it down. There is also a rolling rig pulled by a tractor called a “bracken breaker” which flattens the bracken (where there are no rocks or stumps to hang up on). The land managers feel that bruising and crushing the bracken is much more effective in causing mortality than cutting it. Apparently the roots continue to pump nutrients into the broken stem while they would cut off flow to a cut stem. They suggested that catbrier might respond similarly.

Is burning done in UK? Yes, in Dartmoor “swaling” is the name for the traditional burning of the moorland. The moor is composed mainly of heather (three species on Dartmoor which grow to about a meter tall at most), gorse (a woody shrub that has very, very prickly leaves and can grow to about two meters), bracken, and grass beneath. The ratios of these plants vary from place to place but overall this is the cover. Burning is done downslope and into the wind to make a slow crawling burn. Gorse has oils that burn very hot, and the fires can escape especially if the wind changes. Once a burn has moved

down a slope and burning has been done in from the sides then the lower edge MAY be burn upwards, but this is exceptional. Ideally the burning continues downslope so that animals can escape downwards in front of the fire without being trapped by a second front. Burning is done after November and up till April 1 to avoid nesting birds. In fact late March is best and is the main window used.

Is burning as hard for them as for us? Yes. They find it hard to achieve because wind, temp, fuel, precipitation, and staffing all have to be right. They use about 15 people to burn a couple of hectares at a time and often find that they cannot start until the tops are dry at 10 am and cannot start a second patch when they get done with the first one at 3 pm because it is too late in the day (sounds familiar). They put out all smoking spots at the end.

Is fire natural on the landscape? Probably not. Fire is rare in Britain because of the rainfall, low temps and high humidity. The broadleaf forest will not burn. Fire has been used by people probably since the bronze age in some landscapes.

Is the moor stable with respect to succession? Moorland at Dartmoor is unstable in the absence of herbivores. Birches begin popping into the open land instantly if browsing is relaxed, but in some places the wild deer population is enough to maintain the moor.

Are herbivore populations stable on Dartmoor? No. Economic and social forces are resulting in the reduction of stock on the moor. The farmers' children do not want to do hill farming, and the earnings are poor. The government has incentive programs but they are not very motivating and stock levels are way down over the past few decades from levels early in the 20th c. It is very unclear how animals can be maintained longterm on the landscape.

Do ponies have economic value? Ponies have almost no market; they are sold either as live animals for riding or are butchered for dogfood. There is essentially no market for pony meat as human food, a

little in France/Belgium, but it is very taboo in the UK to eat horse. A century ago the ponies were used in mines and for cart driving, but no longer.

Do the cattle have a market? Yes. Cattle raised on the moor or on other wild land are often finished in better pastures and then sold for beef. The meat enters the main meat stream in UK in general, although some has found special markets if labelled organic and free-range. The Dartmoor farmers have not been able to brand Dartmoor Beef well at all, and it may not be “organic” depending how it is finished, or if it overwinters below the moor on other land. Sometimes wildland-raised beef has a special problem in the UK (like at Knepp Castle) in that beef over 30 months old cannot be sold on the bone due to BSE risk. Yet the growth rates are slower for old breeds and for non-grain feedstocks so the animals may get to 30 months before reaching weight and condition for butchering.

Do sheep have a market? There is a good lamb market but again they grow slowly if they are old hill breeds and are eating rough. There is essentially no wool market, and hair sheep (those that shed their coat spontaneously) are rare but not unheard of.

Is there tension between adaptation to rough country and meat production? In sheep, hill breeds often have low rates of weight gain and fat and reduced twinning. Often hill breeds are crossed with meat breeds to get a “mule” sheep that has good hybrid vigor, lots of meat vs bone and good weight. The sheep generally twin and benefit from some supervision during lambing, but not very much. Cattle breeds also have such issues, old tough breeds putting on weight much more slowly than newer lest hardy ones.

How are goats used? The only use of goats I heard of was in a reserve that David Mercer of Kingly Vale referred to in which goats were used to suppress woody growth, but they had not ringed trees as expected. The breed used is an ancient one close to ancestral British goats it is thought. They have long thick horns curved straight back from the head and can fracture each others skulls when one goats’

horn is wedged between the two horns of another. They are very wild and not handled often but may require some cover from rain.

Do animals have hoof problems in the rain? The wet climate does result in some hoof issues for sheep and goats. I am not certain whether the ponies and cattle have issues as well.

Are there thorny scrub species? Apart from gorse, there are many spiny species including blackthorn, hawthorn, bramble (blackberry) and others. These are very common because they are the constituents of most hedgerows. The spiny plants make an effective livestock fence.

Do these thorny species invade pasture? Usually deer browsing keeps the hedges in limits, although in marginal fields at the edge of the moor at both Dartmoor and on the west coast of Cornwall some fields are being invaded by gorse and bracken and turning into moor. At Knepp where fields are being allowed to succeed, the thorny species are welcomed by Charlie Burrell because he believes that natural oak regeneration will take place inside such protective clumps.

What are the tough breeds used for year-round exposure? Ponies: Dartmoor and Exmoor. Sheep: Soays, Norwegians, Blackfaced Scottish, Welsh hill breeds etc. Cattle: English Longhorns, Chillinghams, Highlanders, Galloways. Pigs: Tamworths. Goats: Bagots.

What shelter do they require if any? Rain shelter for goats, otherwise full exposure for these breeds.

What water requirement for these animals? Much more for cattle than the others.

How are the animals led? With a grain bucket if they are trained to it. Tender balance between enough habituation and too much (in which case they can mob walkers).

Do ponies mob riders? They can. If a horse approaches a pony herd, there can be aggressive interaction.

What about aggression among cattle? At Knepp the bulls are integrated into natural family assemblage herds with varied ages and sexes. Burrell maintains that pure age and sex herds are the most risky for aggression, especially with younger animals who are friskier and less well socialized. He feels that the group provides discipline and social coherence which controls juvenile behaviour, and that bulls are very calm in a stable herd setting. About forty people die annually from cattle interactions, most often with dogs, and same sex/age herds are most often involved.

When do you time birthing? The animals will cycle seasonally with young born when there is grass if they are on natural forage. This will happen with cattle as their fat levels fluctuate; low in winter, rising in spring, falling through the winter.

How can the same population find enough food in winter if they are stocked densely enough for summer? By butchering the first year animals in fall. This cuts the herd size by half and takes off the smaller animals before winter. In this way half the herbivore load is gone by fall roughly (although I don't know whether the calves and/or lambs are actually big enough to butcher until year two if they are born in May).

Are there predators in Britain? No. There are wolves and bears in Spain and Italy but not in the UK. There is discussion of reintroduction of beavers (which are extinct but have been reintroduced from Scandinavia in many countries) but no chance of wolves in .

Are guard animals used? No, because no predation. And llama or donkey guards were unheard of, only dogs were familiar.

Is intensive rotational grazing in use? Not among conservation grazers that I met. People I saw had not heard of Savory but there must be meat producers who have.

What is the key debate in conservation grazing in Europe? There is debate between those who believe like Keith Kirby that Britain was largely a close forest in the past and the Dutch biologist Frans Vera (with the 6000 hectare rewilding project at the polder at Oostvaardersplassen) who believes that there is a cycle of opening and closing. He feels that when herbivores crash (through epidemic disease like rinderpest) thorny scrub gets a foothold in grasslands and hardwoods move in and get to escape height. They grow and create a canopy which shades out grass somewhat. Then animals prevent recruitment and the trees age and collapse, creating holes. The animal populations climb, and more old trees die, and a grassland is produced. The cycle continues with the next epidemic of animal disease (of course tree disease can move this too although that was not mentioned). Keith does not believe in this version but Ted Green at Knepp is passionate, and Charlie Burrell is also interested in the idea.

Are domestic animals native in UK? Yes. Cave paintings in Spain and France show wild cattle and horses. These animals were in UK as well, Britain was connected by land in during ice ages. In the UK, therefore, putting ancient breeds on the land is part of finding proxies for a prehuman or bronze age ecosystem. In North America the same animals represent something else.

Are UK managers preserving agricultural land use or what? To some degree UK conservation is about preserving hedgerows, etc. But a new strain of thought is the “rewilding” movement which tries to reassemble ecosystems as they might have been. Thus the Knepp Estate is an attempt to allow agricultural land to revert on its own to a natural state. There is no planting, tree regeneration must be through normal processes.

How does the Naushon situation relate to this? At Naushon we are preserving cultural landscapes in which pasture was maintained by old-world animals that came with colonists. Perhaps we should look at the breeds they had. However, we now have a predator, which has been absent since very early days from the island. We wish to have active agricultural activities on the island as a cultural matter, and to

use the landscape according to its own old logic. We also want to manage for sandplain grasslands if possible. Finally we seek a self managing system at low operating cost.

How does commercial logging relate to UK forests? The managed forests I saw have very limited extraction apart from sale of timber when trees are removed to re-establish meadows for wildflower and butterfly management.

Are there invasive plant issues in UK? It is interestingly different there in that some introductions are thought to be 2000 years old. The Normans may have brought Fallow deer with them for hunting. The Romans may have brought some species too, 2000 years ago. The oak mildew is from North America a century ago, as is the sycamore, now fully integrated into the UK forest.

Do oak/beech dynamics work the same in UK as at Naushon? Pretty much, it is believed that oak expands at edges and infills openings and that beech is more shade tolerant and takes over, not allowing oak recruitment, just like at Naushon. In many UK forests there is little new recruitment and the deer are generally held responsible. Enclosures show more reproduction. Interestingly until 1900 British oak saplings used to survive in the shade of an oak canopy, but not since. The difference may be the arrival about that time of oak mildew, a fungus that coats leaves of oaks and reduces photosynthetic efficiency.

What is beech's role in the English forest? Interestingly beech was beloved of the English Victorians and so they planted it very often in rows, on top of walls and banks, along roads, or as allees. It also appears in the forest naturally, and grows to huge size in park settings. It does not grow as old as the oaks which can attain nearly 1000 years in age (although the rotted hearts make estimates of age approximate). Beech nuts and especially acorns are seen as key sources of nutrition for cattle and especially pigs. Acorn fed pork is considered very good.

How does the old Naushon landscape of the 19th C relate to the UK landscapes? Interestingly, what we think of as the overgrazed landscape of 100+ years ago is what is referred to as a “savannah” “park woodland”, or “grazed woodland”. It is considered a perfectly normal and highly desirable landscape in Britain (it is very picturesque and easy to walk and ride through, as we know).

How does a savannah form in a place as wet as the UK? The UK is certainly wet enough and low enough elevation (almost everywhere) to support trees in high density. The low density woodlands with grass underneath comes from herbivore grazing. There is almost always a well-defined browse line on the underside of the trees, and little shrubby vegetation.

What about hedges? There are hedgerows of blackthorn, hawthorn and other thorny plants which are purposely planted as living hedges, sometimes atop walls or ridges. The plants extend the height and effectiveness of the wall beneath. The earthen ridge walls often have a corresponding ditch on the stocked side to enhance the effective height of the barrier. Some of these systems surrounding individual fields date to the bronze age in Cornwall and many other places.

Do UK managers know how to convert shrub to grass? They basically cut out woody plants and then stock the land to browse the regrowth, or sometimes use herbicide on stumps. They believe that goats, which they rarely use, might be able to actually bark and kill woody plants.

Does cutting kill woody plants in the UK? No, except in the case of some conifers, cutting only causes root-sprouting or resprouting from the stump, just as at Naushon. In fact, Oliver Rackham points out in his book Woodlands, that this has been the primary form of forest management for centuries in the UK. Small wood, easy to cut without power tools, was always far more useful for fuel and many other uses than large trunks. To grow this type of wood the treetrunk was cut low enough down to resprout (for tree species that resprout when cut) where it was accessible. Large tree trunks are referred to as “timber” to be used for planks and beams, smaller stems (either sprouts from a stump, young trees, or

branches) are called “wood” in England. Wood was much more useful for building and burning than timber before there were power saws to cut trunks, so wood was cultivated by coppicing and pollarding. Coppicing is cutting the trunk at the ground and allowing resprouting, while pollarding is cutting the trunk above the browse line due to the presence of animals who would otherwise eat the sprouts.

How would British managers manage Naushon? They might keep the glades clear and protect the old pasture-grown oak trees (at trotting course, eagle hollow, etc.) by cutting invading beech and stocking animals to graze the grass that comes into the understory. They might put livestock into the open areas generally to keep woody plants out. They might keep animals out of areas where they wanted to encourage natural recruitment of young trees. They might try bracken-bashing the cat-briar and Japanese barberry to see whether that resulted in better mortality than mowing.