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Can a habitat selection model predict the distribution of moose *Alces alces* over multiple years?

A dissertation submitted in partial fulfilment of the requirements of the degree Master by Research (MRes).

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Abstract

The Fennoscandian population of moose *Alces alces* has been growing exponentially for decades. It is the centre of a conflict between stakeholders in the logging and hunting industries, who respectively prefer a low and high number of individuals to maximise economic gain. Population management is therefore of concern to financial stakeholders as well as wildlife management bodies. So far, management has been focussed on increasing the moose population, to benefit the hunting industry.

Predicting distributions of populations is an important tool for management. It is commonly accepted that species distribution is closely linked to habitat selection. Even so, few studies have investigated whether habitat selection models can predict distribution. This study investigates whether the winter distribution of a heavily managed ungulate species is predictable using models based on habitat factors. Focussing on three management sites in Norway of approximately 40km^2 each, a measure of time spent by moose in a patch (100m^2) was generated using the number of moose pellets in 960 patches. Using GLMs validated by AIC values, and habitat data from 2012 and 2015 – as well as data of moose distribution in 2012 to 2015, and finally 2017, – the key factors selected for by moose were identified. These factors showed a high explanatory power over moose distribution. The parameters of the model provided accurate descriptions of distribution for three years before accuracy began to fall. Despite this, the predictions of the model for all years showed a low accuracy when compared to observed distribution. The accuracy was not improved by using newer habitat data. The cause of this is likely to be that moose show spatial autocorrelation in their distribution and that selection may not be strong enough to determine distribution.

As these results show, predicting the future population of a large ungulate yields varying results. It is important that wildlife managers account for this when creating management strategies. These results also show that future studies attempting to model habitat selection must test their predictions against real world data before attempting to use them to create management strategies.

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Author’s declaration

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1 Introduction

1.1 Predicting browsers

The distributions of large herbivore populations are important factors in management strategies all over the world (Danell 2006, Foster et al. 2014). Large browsers can act as keystone species or ecological engineers; they impact on the available biomass of the ecosystems, habitat structure, litter accumulation and the speed and course of ecological succession (Davidson 1993, Knapp et al. 1999, Suominen et al. 1999, Danell 2006). Their ecological role is becoming increasingly important as predator populations everywhere are in decline, causing hyper-herbivory in many ecosystems (Wäber et al. 2013). As plants are major controllers of nutrient cycling, hydrology, light penetration, wind, temperature, and soil moisture, large herbivores will also affect the physical properties of their habitats (Danell 2006, Stark et al. 2007, Uytvanck and Hoffman 2009). This makes large browsers an important part of the ecosystem to consider when developing management strategies.

Management all over the world is therefore often concerned with solving issues surrounding large browsers. In North America, white-tailed deer *Odocoileus virginianus* impact forest regeneration and are therefore a management concern (Dobson and Blossey 2014, Faison et al. 2016). In sub-Saharan Africa, the desire to control the population size and distribution of African elephants *Loxodonta africana* have increasingly begun dominating the development of management strategies (Delsink et al. 2013, Freitag et al. 2014). On the practically apex predator free British Isles, the increasing population and distribution of deer species is impacting agriculture and forestry (Putman and Moor 1998, Wäber et al. 2013). In the boreal ecosystems of Scandinavia, Russia, and Canada, the decline of populations of grey wolf *Canis lupus lupus* and changes in management regimes has caused a dramatic increase in the population size of moose *Alces alces* (Andersen 1991, Hörnberg 2001, Lavsund et al. 2003, Edenius et al. 2014).

An important tool in management of large browsers is predictions of distribution (Dunnings et al. 1995). Habitat selection among large browsers and grazers has previouslt been successfully modelled all over the world, but few studies have used these models to create predictions about future distribution (Dettki et al. 2003, Rushton et al. 2004, Dussault et al. 2006, Herfindal et al. 2009, Månsson et al. 2012, Olsson and Bolin 2014, Dupke et al. 2016, Laforge et al. 2016a). Without reliable predictions of where the population will be, it is difficult to solve existing problems or pre-emptively avoid ecological conflict, and especially hard to create long-term management plans (Dunnings et al. 1995).

The habitat selection of many species has been modelled and described in detail and is closely linked to the distribution of the population (Pulliam and Danielson 1991, Mcnett and Rypstra 2000, Binckey and Resetaris 2005). In spite of this, most studies attempting to model species habitat selection fail to investigate whether their model can create robust predictions (Dettki et al. 2003, Rushton et al. 2004, Dussault et al. 2006, Herfindal et al. 2009, Olsson and Bolin 2014, Dupke et al. 2016, Laforge et al. 2016a).

1.2 Moose in Fennoscandia

Moose *Alces alces* are generalist herbivores which feed on many different species of plant during the winter, such as Scots pine *Pinus sylvestris*, silver birch *Betula pendula*, downy birch *Betula pubescent*, European aspen *Populous tremula* and black alder *Alnus glutinosa* (Belovsky 1978, Vivas and Saether 1987, Milligan and Koricheva 2013). As a heavily managed species with a wide geographical range, moose are often used as a representative species for investigating large browser behaviour (Vivas and Saether 1987, Skonhoft 2005, Månsson et al. 2012, Sandström et al. 2013). Moose have been the subject of intense management in Fennoscandia for decades and have become one of the most intensely studied large herbivores in the world (Lavsund et al. 2003). It is one of the herbivore species for which a solid, multi-year model of habitat selection is a desirable management resource (Månsson et al. 2012).

Prior to 1900, the number of moose hunted annually in Fennoscandia was estimated at less than 10,000 individuals, but that number had multiplied by a factor of 20 by the year 2000 (Lavsund et al. 2003). Harvesting rates peaked in Sweden and Finland in the 1980s, then again in Finland in the late 90s and early 2000s. The harvest in Norway peaked in the 1990s and is now in a slight decline (Lavsund et al. 2003). This is the result of the Fennoscandian population of moose having shown a dramatic population increase in the last century, particularly since the 1960s, which can be linked to three individual factors. One of these factors was the near-extermination of natural predators – primarily brown bear *Ursus arctos* and grey wolf *Canis lupus lupus* (Swenson et al. 1995, Hörnberg 2001, Wabakken et al. 2001). The second factor was a change in the forestry management strategy. Management shifted towards clear cutting, a method in which all trees in a given area, typically between 100m^2-300m^2, are harvested at the same time (Lavsund et al. 2003, Edenius et al. 2011). This method creates a greater number of young trees growing together in one area, which will have branches at a height accessible to moose. This increases the amount of browse available, and therefore raises the carrying capacity of the ecosystem (Lavsund et al. 2003, Potvin et al. 2005, Edenius et al. 2011). The final and perhaps most influential factor is the shifting focus of moose hunting strategies towards sex and age. Hunting efforts are now concentrated on calves, yearlings and, above all, males, which has led to an increase in the recruitment rate (Solberg et al. 1999, Nilsen et al. 2005). The result is that the Fennoscandian moose population has become one of the most productive and heavily harvested moose populations in the world (Cederlund and Bergström 1996, Lavsund et al. 2003).

The size of the moose population in Fennoscandia causes considerable damage to the forest through browsing, which has both ecological and economic impacts (Storaas et al. 2001, Mathisen 2011). Though the impact varies with habitat productivity and supplementary feeding, intense browsing by moose has been shown to cause a detrimental impact on the structure and regeneration of the coniferous forest and lowered biodiversity in the ecosystem (Mathisen 2011, Metslaid et al. 2013, Franklin and Harper 2016). The Fennoscandian moose population differs from the North American in that it utilises Scots pine *Pinus sylvestris* as its primary winter food source, a commercially harvested tree species, due to limited availability of alternative species (Rea et al. 2014). Browsing of the apical leader and bark stripping by moose causes uneven growth or even decay, rendering the trees unsuitable for harvest (Randveer and Heikkilä 1996, Bergquist et al. 2001). Intense browsing by this large population is therefore detrimental to the logging industry; the loss to the forestry industry from browsing damage is difficult to determine, but is estimated at between US $23 million and $80 million (Bergquist et al. 2001). This is likely to increase as trees reach maturity and are found to be unsuitable for harvesting (Randveer and Heikkilä 1996, Bergquist et al. 2001, Storaas et al. 2001, Nilsson et al. 2016). A further negative impact of the large moose population is the increase in animal-vehicle collisions. Police reports show an average of 4500 collisions each year in Sweden, a number which includes 10-15 human fatalities (Seiler 2005). The damage to vehicles and the measures taken to lower collision rates, such as overpasses or wildlife corridors, both have a significant economic cost – reports estimate a cost for ungulate-vehicle collisions exceeding 100 million euro per year in Sweden alone (Seiler 2004, Neumann et al. 2012). On the other hand, yearly harvesting of the large moose population constitutes a significant portion of the income for many landowners (Storaas et al. 2001). In Norway alone, the moose hunting industry is estimated to generate between US $70 million and $90 million (Storaas et al. 2001). In some cases, intense browsing can also have ecological benefits, such as increased light availability and flowering after browsing in the canopy (Mathisen 2011, Metslaid et al. 2013, Franklin and Harper 2016). As such, the large size of the moose population has far-reaching economic impacts and affects numerous stakeholders.

Modern management has, up until recently, been focused on increasing the population size in the short-term, in order to maximise economic gain derived from trophy hunting and hunting for food (Skonhoft 2005, Sandström et al. 2013). This has been done primarily through the sex- and age specific hunting strategies mentioned earlier (Lavsund et al. 2003). Other management aspects, such as attempting to prevent browsing damage, has consequently been overlooked (Skonhoft 2005, Sandström et al. 2013). It became apparent that an alternative management approach was necessary when a decline in the Norwegian moose population resulted in a decrease in harvested individuals during the early 2000s (Lavsund et al. 2003, Norwegian Environmental Agency 2017). Instead of leaving the individual landowners to determine quotas, a new scheme, known as the “unified management scheme”, was proposed. Under this scheme the population would be managed on a landscape scale (Skonhoft 2005). Regulations were then put in place which retain the right for landowners to hunt on their own land and sell the meat on the free market, but enabled government bodies to set sex and age specific hunting quota in cooperation with landowners (Storaas et al. 2001, Lavsund et al. 2003, Norwegian Environmental Agency 2017). Quotas were, however, still usually set to maximise long term population increase and therefore harvest value, with no secondary goals (Skonhoft 2005).

In more recent times, managers and researchers have begun to investigate measures which aim to allow a large moose population to exist without increasing the browsing pressure on pine (Edenius et al. 2014, Mathisen et al. 2014). These measures include creating supplementary feeding stations in high-impact areas, which is a common management tool in mitigating human-ungulate conflict (Gundersen et al. 2004, Putman and Staines 2004, Andreassen et al. 2005, Brown and Cooper 2006, van Beest et al. 2010a, Mathisen et al. 2014). Another measure is to initiate slash treatment, a logging procedure which leaves logging residues available as forage (Heikkilä and Hårkönen 2000, Månsson et al. 2010). Supplementary feeding stations have been shown to be ineffective, but the potential for slash treatment is still being investigated (Mathisen et al. 2014, Edenius et al. 2014). Another branch of wildlife management in Norway which is thought to impact the moose population is that of the grey wolf, though the assumption that wolves in Fennoscandia are an important factor in moose population size does not have any notable scientific backing (Wabakken et al. 2001, Eriksen et al. 2009, Rovdata 2016a). Regardless of these developments, the management of the moose population remains important for many stakeholders and is constantly being developed as more research is carried out (Edenius et al. 2014). A model which could predict the future distribution of the population would go a long way to help solve this conflict (Månsson et al 2012).

1.3 Predicting moose habitat selection

Many studies link habitat selection to population distribution (Pulliam and Danielson 1991, Mcnett and Rypstra 2000, Binckley and Resetarits 2005). It is therefore important to understand all aspects of habitat selection when attempting to predict the distribution of a population. In the absence of any large population of natural predators, such as is the case in Norway, the main drivers for moose habitat selection have, historically, been assumed to be forage biomass availability and cover in the landscape (Telfer 1970, Månsson et al. 2012). As such, it can be expected that the habitat selection of moose can be described and modelled by assessing tree density and the total available biomass (Månsson et al. 2012). Studies using these factors as a basis for selection have repeatedly shown that, though undoubtedly important, these two factors alone do not satisfactorily explain the observed selection patterns (Herfindal et al. 2009, Månsson et al. 2012). Many other factors are now suspected of influencing habitat selection, such as the quality of available browse and the accumulated browsing on individual trees (Månsson et al. 2012). For example, as pine shoots constitute the primary source of winter forage, it may be that aspects such as pine availability, the age of the pine trees, or accumulated browsing on pine shoots are particularly important for moose habitat selection (Månsson et al. 2007, Rea et al. 2014). Moose may also show a preference in winter for forests in which pine is a dominant or, at least, significantly present species (Cassing et al. 2016). It is necessary to investigate quite how pine in the landscape impacts moose resource selection to understand fully how moose select their habitat.

The trade-off in selection between quantity and quality is sometimes poorly understood; forage quantity is a key factor for most animals, but it is often negatively correlated with the overall quality of the patch (Demment and Soest 1985, Fryxell 1991). Though winter forage for moose in Norway is made up primarily of low-quality pine shoots, more recent studies have started to investigate the food quality of the patch as a driver for moose habitat selection (Smeets 2014). Some results indicate that, on a small scale, the selection for quality is stronger than the selection for biomass availability (Beest et al. 2010a). Smeets 2014 utilised an index known as Feeding Site Attractiveness Value (FSAV) which was developed by Manley et al. 1992 and Stokke et al. 1999 and went some way to describe patch selection based on its attractiveness to moose. Moose, though not as sensitive to the presence of humans as other animals, still show some avoidance of areas with high level of human activity (Herfindal et al. 2009). Moose in Norway also experience hunting pressure primarily from humans (Herfindal et al. 2009). The hunting season takes place in the autumn, prior to moose migration to the winter ranges and, though the impact it has on summer habitat selection has been documented, few studies have investigated its effects on winter habitat selection (Brown 2011, Brown 2016). In addition, wolves are recolonising. Although predator pressure can certainly influence herbivore habitat selection, the wolf population in Norway has not yet reached great enough numbers to influence selection in the general landscape, though it may show an effect in localised territories (Nicholson et al. 2014). The tendency of moose to avoid roads also interferes with migration routes, movement within the home range and habitat selection, can result in a build-up of browsing damage in vulnerable areas (Ball and Dahlgren 2002, Olsson et al. 2008, Herfindal 2009, Bartzke et al. 2014). The same effect can be observed around power lines and the associated clear-cut landscape (Bartzke et al. 2015). Both forage quality and the effect of human activity are now believed to be important influences on moose habitat selection.

Moose habitat selection is also impacted by various management strategies, both in intended and unexpected ways (Mathisen et al. 2014). Supplementary feeding stations have long been used to divert browsing impact on sensitive habitats, for example, though they have been shown to cause a preference for Norway spruce *Picea abies* over pine in the immediate vicinity of feeding stations (Mathisen et al. 2014). In North America, mechanical thinning and prescribed fire have, for some time, been used as management tools, showing unanticipated selection change among deer. (Long et al. 2008, Long et al. 2009). As moose prefer young pine trees, in Fennoscandia, it has long been recognised that the age of the forest can be used as a management tool as it is determined by the length of time between loggings (Wallgren et al. 2013, Bergquist et al. 2014, Edenius et al. 2015). More recently, slash treatment has been carried out to provide an alternative food resource and, while similar methods have been shown to influence selection, the impact of slash treatment on habitat selection has not yet been investigated (Edenius et al. 2014, Månsson et al. 2015). As can be seen, it is important to consider all possible impacts on the population resulting from management schemes when attempting to use habitat selection to predict distribution.

It is becoming more obvious that a multitude of factors are selected for by moose (Smeets 2014). One of these factors, which has been recognised for some time, is that of accumulated browsing on available trees: studies from Scandinavia have shown that past browsing on pine trees increases the likelihood of them being browsed upon again, along with that of its immediate neighbours (Bergquist et al. 2003, Beest et al. 2010b, Wallgren et al. 2013, Smeets 2014). Another factor which is selected for by most animals is vegetation type; individuals rely on vegetation for cover and, in the case of moose and other herbivores, food (Bjørneraas et al. 2011, Torres et al. 2011, Lone et al. 2014). Moose tend to be drawn to areas with sufficient cover and either high quality or a high abundance of food resources; young pine forest, forest with bilberry-dominated undergrowth and deciduous forest (Bjørneraas et al. 2011, Torres et al. 2011, Lone et al. 2014). They have also been shown to select for thermal shelters during high summer temperatures (Melin et al. 2014). Yet another important aspect of habitat selection in winter is that of snow depth, which is, in turn, influenced by altitude, slope, precipitation and temperature. Moose typically avoid deep snow, although there is some variation (Schwab and Pitt 1991, Christenson et al. 2014, Street et al. 2015). Moose also prefer lower elevation and steeper slopes, both of which are factors typically associated with lower snow levels (Harris et al. 2014). All of these factors may be selected for by moose and must, therefore, be included in any study aiming to predict moose distribution based on habitat selection.

1.4 Moose management challenges

A historic obstacle to generating effective management strategies has been a lack of understanding the factors which may cause moose habitat selection to vary, both in time and space (Nikula et al. 2004, Dussault et al. 2005, Beest et al. 2016). For example, density dependence has been reported to influence habitat selection by altering the functional response and limiting factors of the population (Dussault et al. 2005, Herfindal et al. 2009, Beest et al. 2010a, Beest et al. 2016), but has been ignored in other studies (Månsson et al. 2012). Another obstacle to generating effective management strategies is scale dependence, whereby studies on different scales have reported different results; a study from Norway showed that habitat type selection changed from favouring cover and forage at the landscape scale to prioritising cover and low human impact at the home range scale (Nikula et al. 2004, Araújo and Guisan 2006, Herfindal et al. 2009). An added challenge is that habitat selection varies over time and space (Beest et al. 2014, Street et al. 2015). This necessitates a thorough approach when carrying out research; accounting for variations from year to year and population to population. To go some way toward alleviating this variability, a large sample size, spread out over a geographical gradient, could be monitored across multiple years (Beest et al. 2014). Another problem arises in the variety in site fidelity displayed by different populations and even individuals; site fidelity among moose is generally much lower in winter as food resources are depleted, and it is at this point that selection begins to favour quantity of available biomass over the quality of the browse (Beest et al. 2010a). However, as with migration, this varies a great deal between populations (Beest et al. 2010a). This is also true during calving, when there is evidence that cows display a lower tolerance to anthropogenic disturbance as a risk factor, though different responses can be observed between individuals and populations (Dussault et al. 2005, Tremblay et al. 2007). This increases the complexity of predicting distribution and necessitates investigation into population specific site fidelity when devising management schemes.

Though often treated as identical for the purposes of research and management strategies, the North American and Scandinavian populations of moose are starting to display different behaviours (Sand et al. 2006, Ericsson et al. 2015, Rea et al. 2014). The most obvious difference is their anti-predator behaviour; Scandinavian moose have started to adapt to humans as their main predator, rather than wolves (Sand et al. 2006, Ericsson et al. 2015). There is also weak evidence indicating that moose in Scandinavia appear to have a stronger preference for pine as a primary winter food source than that of moose in North America, though this has only been tested in captivity and is likely to be caused by a limited variety of forage species (Rea et al. 2014). These developments may mean that scientific results from studies on the behaviour of one population may no longer be relevant to the other. This makes it difficult to extrapolate results from studies investigating moose behaviour in other parts of the world and therefore limits the amount of reliable scientific literature from which to form hypotheses and draw conclusions. However, until further differences have been documented, it must be assumed that the populations are similar enough to be studied together or, at least, that ecological patterns described in one population are likely to be present in the other (Boonstra et al. 2016).

A fundamental challenge to any investigation is to find a suitable method of observing the wildlife in question. Researchers frequently employ methods such as radio telemetry or, more recently, GPS location tracking to collect data on movements and habitat selection (Peek et al. 1976, Nikula et al. 2004, McLoughlin et al. 2005, Herfindal et al. 2009, Beest et al. 2010a, Beest et al. 2016). These methods expend considerable resources on individual animals, can be quite costly, and are less effective in monitoring population trends (Rönnegård et al. 2008, Peele et al. 2015). This resource-intensive nature of GPS tracking makes it a method few wildlife management agencies will have the capacity to replicate. This makes it more difficult to translate scientific results into practical, applied use in wildlife management. Another method which may be employed is the use of trail cameras, though this requires a lot of effort to derive useful information from the data and is very time-consuming (Lyra-Jorge et al. 2008). None of these methods are feasible when it comes to collecting data on a scale large enough to act as a basis for predicting distribution, to aiding creation of a sound management strategy. Management in Fennoscandia, therefore, typically relies on observations from hunting teams, such as harvest density, moose seen per unit effort and seen moose density (Lavsund et al. 2003, Rönnegård et al. 2008, Uemo et al. 2014). This method has been shown to be accurate in detecting population trends on subpopulations in small and medium areas (Ericsson and Wallin 1999). More recent studies indicate that it can also be accurate on a landscape scale, however, hunter surveys are carried out in the autumn and therefore do not reflect winter distribution (Rönnegård et al. 2008, Ueno et al. 2014). These observations form the basis for all moose management strategies in Norway and are used to generate hunting quotas (Hoffman and Flø 2016). During 2016 in Norway, approximately 33 000 moose were harvested, and an additional 3 000 died in traffic accidents (Miljostatus 2016).

The high mobility and wide distribution of the moose population, combined with the low density and solitary nature of moose, makes researching habitat selection and population distribution a resource-draining activity. The most cost-efficient method of investigation in scientific studies is pellet counts which do incur some margin of error by way of decay rates (Rönnegård et al. 2008, Alves et al. 2013). Pellet counting has, however, been able to provide a measure of time spent by moose in each habitat, since Rönnegård et al. 2008 reported a defecation rate of 14 pellet groups per day per animal. Temperatures during winter in Fennoscandia typically remains below 0°C, freezing pellets and halting decay until the snow melts in the spring (Månsson et al. 2011). Pellet counts are, therefore, seen as a reliable method by which to detect winter habitat selection by moose at a scale which allows for thorough scientific investigation (Månsson et al. 2011).

Any functioning management strategy is reliant on sound predictions of population distribution in order to be effective. Moose is an inherently difficult species for which to model distribution, in part due to migration and the variation in site fidelity which make the population less predictable (Sweanor and Sandgren 1989, Månsson et al. 2012). Another issue is that habitat selection changes in parallel with forest regrowth. This has often been ignored in previous studies, meaning that any predictive model will decrease in quality over time, typically becoming too inaccurate to be relied upon after a period of five years (Månsson et al. 2012). A similarly dynamic factor affecting distribution is the density dependent selection behaviour of moose in which low densities cause specialised foraging strategies and high densities show more generalised browsing behaviour (Beest et al. 2016). Finally, predicting moose habitat selection is highly dependent on the scale of the investigation; home ranges are typically selected for the overall available biomass, whilst feeding site choice appears to be more closely related to the quality of the available forage (Maier et al. 2005, Beest et al. 2010a). Whilst the above factors present a challenge in predicting moose distribution based on habitat selection, there remains an apparent relationship between the two (Pulliam and Danielson 1991, Mcnett and Rypstra 2000, Binckey and Resetaris 2005). It is, therefore, worthwhile investigating whether moose distribution can be predicted based on habitat selection, in order to successfully build a management strategy which satisfies all stakeholders.

2 Aims and Objectives

The aim of this study is to investigate whether habitat selection models on a patch scale can predict winter moose distribution. The method to achieve this is to first identify the factors for which moose select, and then test their predictive power compared to future distribution. This will be done by answering the following questions:

- Which habitat factors are most strongly selected for by moose in their winter range on the patch scale?
- Can these habitat factors accurately describe winter moose distribution?
- For how many years will the data on habitat factors be able to describe winter distribution before accuracy begins to fall?
- Do the predictions of distribution based on selected habitat factors accurately describe future distributions?

The expected result is that a clear subset of variables which determine moose distribution will be identified. It is expected that the ability of these variables to predict distribution will initially be high, before slowly decreasing as the habitat changes over time.

3 Method

3.1 Study area

The study was carried out in the Hedmark district in Eastern Norway. The winter ranges of moose in the region are in the lowlands, which favour milder winter temperatures, and was identified using the detailed description found in Odden et al. 2010. Three study sites in the winter ranges were selected: Gravberget (60.8829° N, 12.2377° E) in Våler county and Plassen (61.1314° N, 12.5078° E) and Ljørdalen (61.3840° N, 12.6844° E) in Trysil county, all within forests which are commercially logged. The three sites were each approximately 40km^2. All three sites were split into two areas of equal size to reflect current management schemes (see section 3.2, "Site description"), giving 6 areas in total (Figure 1).

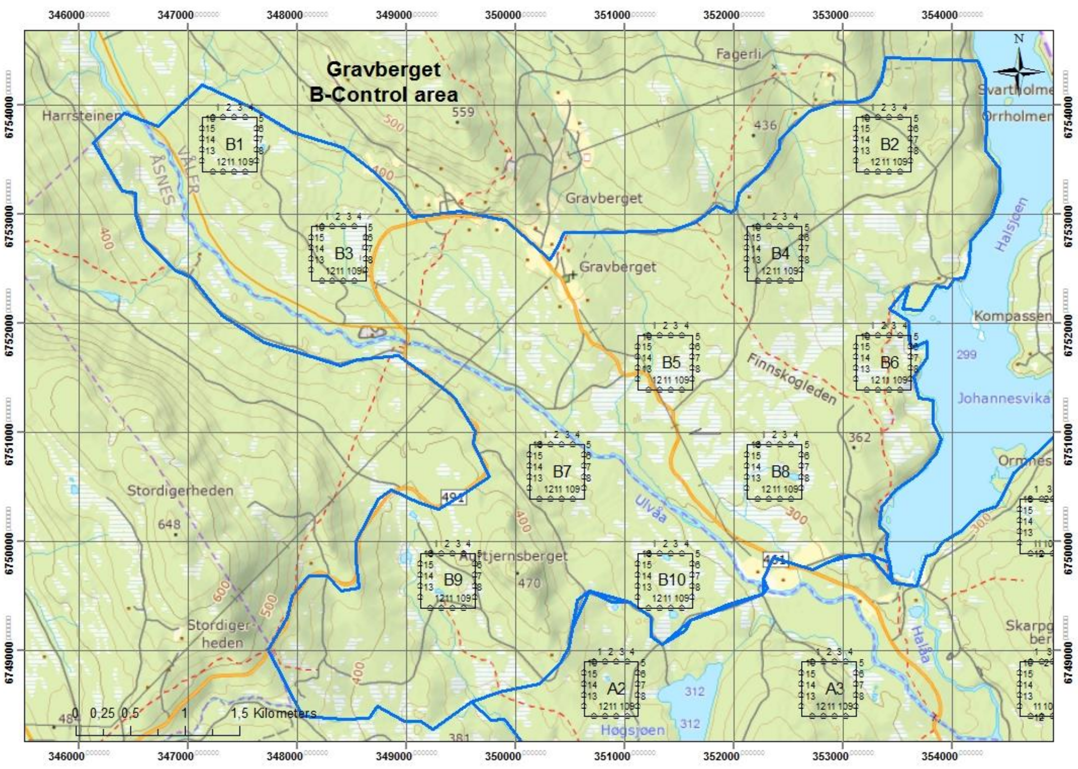

Figure 1: A map of one of the two areas in the Gravberget study sites. All study sites were split into two to reflect current management schemes. All of area B can be seen, whereas the top of area A can be seen at the bottom of the map. The map is the property of Norway Inland University, printed with premission.

3.2 Site description

The study sites were located within the subarctic region of the Taiga in Scandinavia, ecoregion PA0608 (WWF 2017). The sites are sparsely populated, with an average within the municipalities of 2-5 people per km^2. Lakes and rivers make up approximately 5% of the surface area of the region, while the forest cover is at 45%. Typical of the region, the sites contain boreal forest in which Scots pine *Pinus sylvestris* was the dominant tree species. Norway spruce *Picea abies* and deciduous species silver birch *Betula pendula* and downy birch *Betula pubescent* were also frequent. Additionally, willow *Salix spp.,* juniper *Juniperus communis,* aspen *Populus tremula,* alder *Alnus incana* and rowan *Sorbus aucuparia* were present in small numbers. Bilberry *Vaccinium myrtillus,* lingonberry *Vaccinium vitis-idaea,* heather *Calluna vulgaris* and lichen dominated the undergrowth (Figure 2).

Figure 2: A picture taken of part of the Gravberget study site in June 2017. Pine is the dominant tree species, while the undergrowth is dominated by bilberry and heather (Sletten 2017).

The average temperature for the winter months (January – April) in the district where the study sites are located ranges from -12.1°C to 3.1°C. This can be found described in Table 1.

Table 1: Average temperatures given in Celcius in the winter months over the duration of the study. Data is derived from the Norwegian Meteorological Institute (Meteorologisk Institutt 2017).

	2012	2013	2014	2015	2016	2017	Average
January	-8.7	-10.9	-7.3	-6.1	-12.1	-10.3	-9.2
February	-7.7	-7.2	-1.1	-4.5	-6.1	-5.8	-5.4
March	0.7	-8.0	0.6	-0.5	0.3	-1.6	-1.4
April	1.2	1.3	3.1	3.0	2.2	1.1	2.0
All year	-3.6	-6.3	-1.2	-2.1	-4.1	-4.3	-3.6

Each study site contained two management areas, one of which had been subject to slash treatment (Edenius et al. 2014) (Areas labelled ‘A’). Slash treatment maximises the forage left available to moose after logging by leaving logging residues such as tree tops and branches in large piles and thereby leaving browse available above the snow (Edenius et al. 2014, figure 3). The other area has been used as a control area for previous studies aiming to investigate the impact of slash treatment. It was therefore logged in the standard mechanical method used throughout Fennoscandia, which leaves little forage available (Areas labelled ‘B’). This experimental management scheme was initiated in 2012 and has been carried out in A-areas every year since.

Figure 3: Piles of logging residues created through experimental slash treatment carried out in January 2015. The tops and branches of logged trees are left available above snow level and offer a new source of browse in the winter (Sletten 2015).

The annual moose hunt is organised in areas called *vald*. Two of the three study sites were in such areas. The permitted quantity of harvested individuals per year, (which is derived from the estimated different population sizes, and indicates hunting intensity), varies between the hunting areas and consequently between study sites. However, moose are far ranging animals and as such may travel between both *vald* and study sites. The Gravberget site was located in a *vald* which had a moderate amount of hunting, with 150 individuals in 2012 increasing to 275 in 2016. The *vald* in which the Ljørdalen site was located had been allocated 200 individuals in 2012, which changed to 130 in 2016 (Norwegian Environment Agency 2017). A complete overview of hunting quotas in the study period can be found in Table 2. Though these were the allocated numbers, *vald*s are large and hunting efforts may have been centred far from the actual study sites. In addition, the yearly hunting takes place in September and October, and will therefore only have an indirect effect on winter distribution. A map of the *vald* in the areas surrounding the study sites can be found in figure 4.

Table 2: Hunting quotas of total allocated individuals in the management zones for the study sites.

	2012	2013	2014	2015	2016
Gravberget	150	160	250	250	275
Ljørdalen	200	120	120	130	130

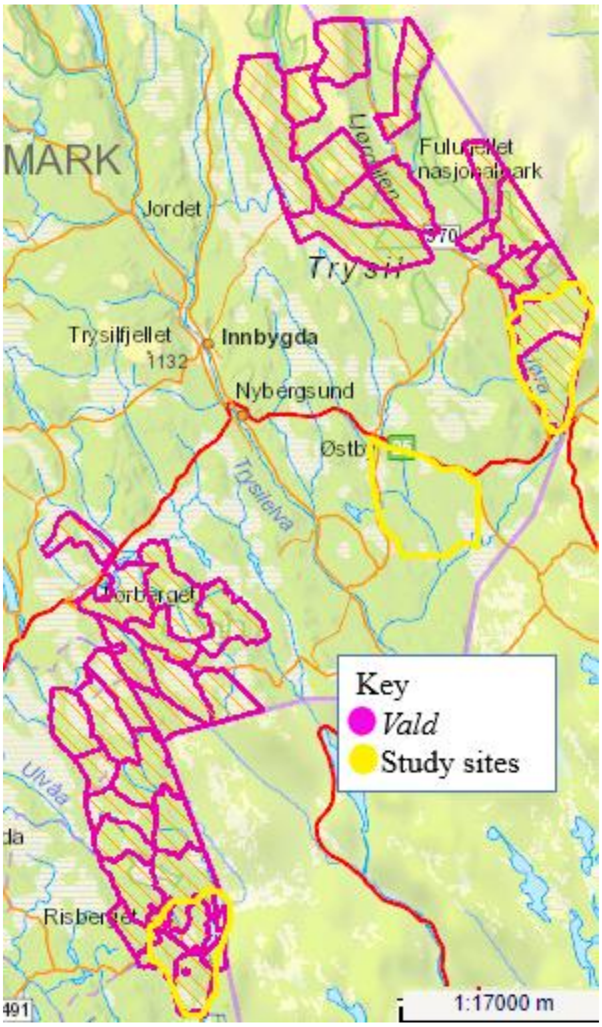

Figure 4: A map of the *vald* in the area of Norway where the tree study sites are located. *Vald* from 2017 are given in pink, while the three study sites are given in yellow (Kartverket 2017).

The Gravberget study site was located partially within the terriotry of the Slettås grey wolf *Canis lupus* family group in the north, and the Juvberget wolf family group on the south (Rovdata 2016b, Rovdata 2017a). The Plassen study site was not within a wolf territory, but within 10km of the border of the Varåa family group territory. The Ljørdalen study site was within the territory claimed by a new wolf couple, the Fulufjellet pair. A complete map of known wolf territories in Eastern Norway can be found in Rovdata 2017a.

Located mostly to the north of the Ljørdalen study site, though with some individuals scattered further south, approximately 10-15 individual brown bears *Ursus arctos* travel through the region each summer (Rovdata 2017b). The distribution of brown bears, though a major factor in neonatal survival among moose in the spring and summer, is unlikely to influence winter distribution due to their winter hibernation (Oates et al. 2016).

3.3 Study design

Twenty quadrats were established at each study site, 10 in each management area. They were located so as to maximise the distance between them whilst being fully within the study sites and not in a body of water (figure 5). The quadrats were 500m x 500m and consisted of 16 plots along the perimeter, located with 100m between each plot and avoiding the corners of the quadrats (figure 6). The plots were circular with a radius of 5.64m for pellet counts (100m^2) and 4m for vegetation surveys (50m^{2,} figure 7). These plots were the areas where data collection took place, since this study is focussed on habitat selection on the patch scale. This method was selected so as to be similar to Månsson et al. 2012, an influential study on moose habitat selection, so that the results could be somewhat compared. The plots were revisited every year from 2012 – 2015 and in 2017. GPS positions of the centre of each plot can be found in appendix B. The maps of all six areas can be found in appendix C, giving the location of the plots as well as country roads and lakes within the study site.

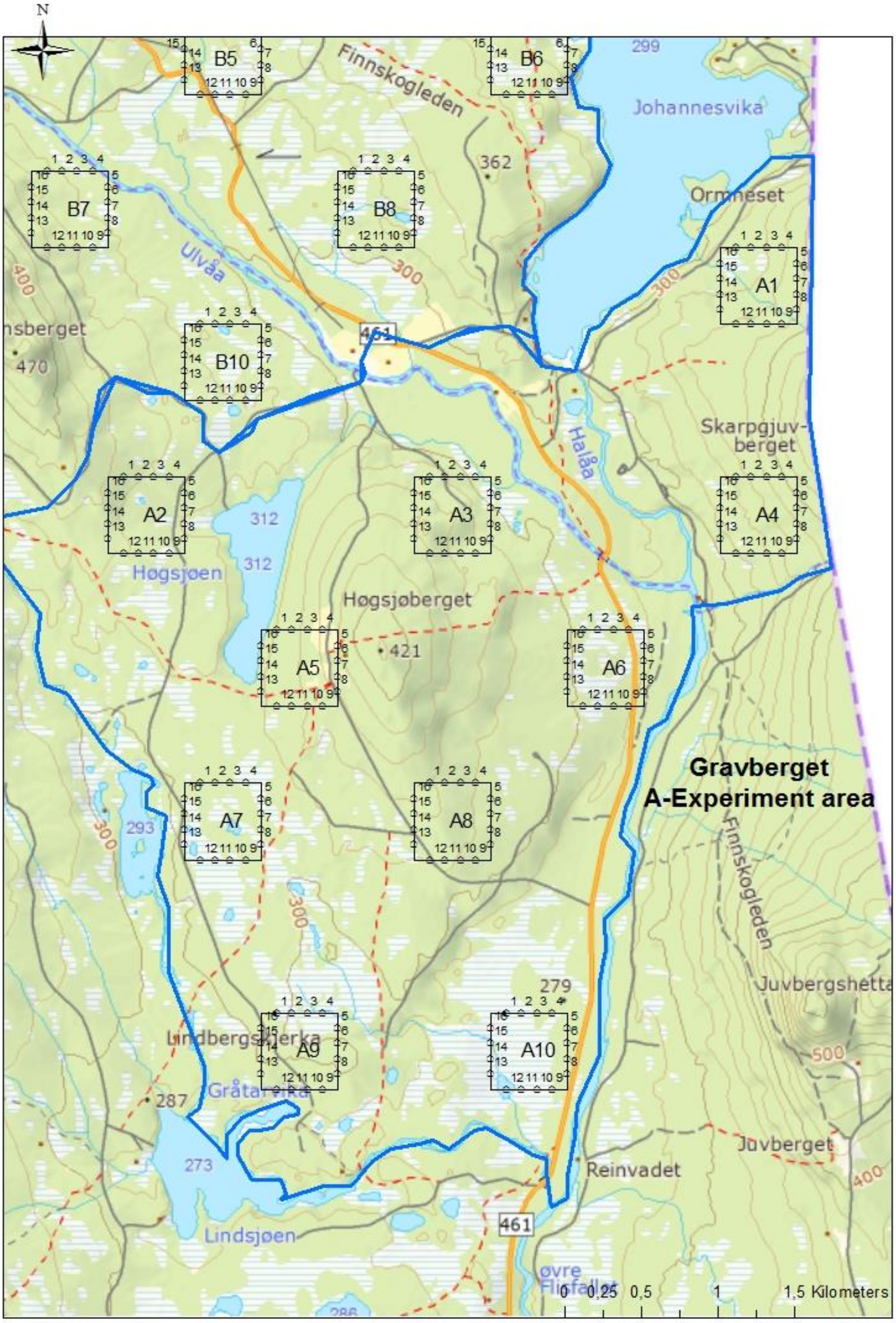

Figure 5: A map of the A area in the Gravberget study site. The plots are numbered and organised in quadratical groups of 16. The maps of all areas and study sites can be found in appendix C.

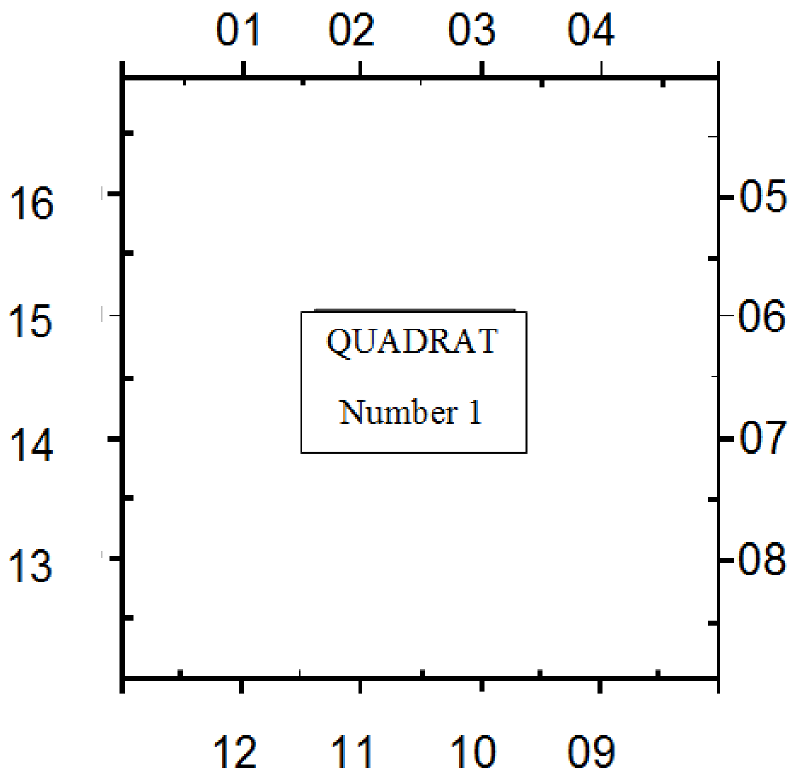

Figure 6: The organisation of 16 plots within a quadrat. The quadrats were 500m by 500m, with 100m between the centres of the plots.

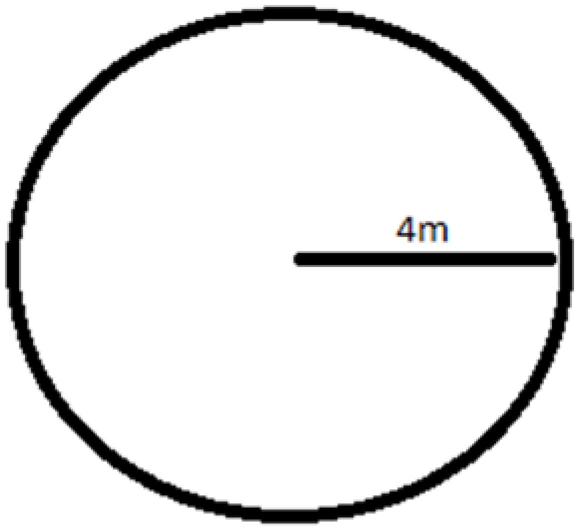

Figure 7: The shape of the plots used. Plots were circular, with a radius of 4m for vegetation surveys which was extended out to a 5.68m radius for pellet counts.

3.4 Moose distribution

The dependent variable of this study was the time spent in each plot by moose during a winter. The number of moose pellet groups in each plot, defined as a group of more than 20 pellets where more than 50% lay within the plot, were counted annually in May or June. The method and timing of data collection was similar to that of Månsson et al 2012, an infuential investigation into the effect of small-scale latitude and longitudinal differences on moose habitat selection, so that the results could be compared to an extent. Counting had to take place at this time, in the late spring, in order to include all pellets which had accumulated throughout the winter. It also took place at this time to ensuring that the snow would have melted to reveal all pellets, but before ground vegetation would grow high enough obscure the pellet groups. A pellet group was only counted if it the pellets were not covered in dead leaves, as this would indicate the group being from before last autumn. As the known defecation rate of moose is 14 pellets per day per moose, this measure gives an indication of the time spent by moose in each plot by using the equation in figure 8 (Rönnegard et al. 2008). This method also gives data on which plots were not visited. Data on moose pellet groups was collected in 2012, 2013, 2014, 2015 and 2017, though one site (Plassen) was omitted in 2013 due to insufficient manpower to carry out data collection in all three sites.

$$\text{Time (hours) spent by moose in plot} = \frac{\text{Number of pellets}}{14 * 24}$$

Figure 8: The equation used to derive a measure of time spent by moose in each plot throughout the winter season.

3.5 Environmental variables

The environmental variables investigated in this study were recorded in May 2012 and again in May 2015. They were selected based on the current scientific knowledge and theories around moose habitat selection, as detailed in section 1.3 Moose management challenges. A complete overview of all the explanatory variables used in this study can be found in table 3.

Table 3: An overview over the habitat factors used in this study.

Variable	Impact	Classification	Measurement
Moose pellet group	Dependent variable	Continuous	Number
Red deer pellet groups	Competition	Continuous	Number
Roe deer pellet groups	Competition	Continuous	Number
Accumulated browsing	Competition	Ordinal	Scale, 0-3
Pine accumulated browsing	Competition	Ordinal	Scale, 0-3
Ground vegetation type	Food source	Categorical	Seven categories
Management area	Food source	Categorical	Two categories
Total available biomass	Food source	Continuous	g
Pine biomass	Food source	Continuous	g
Feeding Site Attractiveness Value	Food source	Ordinal	Scale
Cutting class	Food source	Ordinal	Scale, 1-5
Bilberry cover	Food source	Continuous	%
Dominant tree species	Food source	Categorical	Six categories
Number of tree species	Food source	Continuous	Number
Number of trees	Predator avoidance	Continuous	Number
Distance to road	Predator avoidance	Continuous	0.1 km
Distance to houses	Predator avoidance	Continuous	0.1 km
Latitude and longitude	Spatial autocorrelation	Continuous	degrees
Altitude	Temperature	Continuous	m.a.s.l.
Slope	Temperature	Continuous	degrees
Aspect	Temperature	Continuous	degrees

Here follows a detailed description of each variable, the method of data collection and calculation, and their expected impact on moose distribution.

Several variables are linked to avoidance of humans or predators, and are often connected to the available cover in the landscape. Distance to roads and houses, as well as the altitude, slope and aspect of each plot was determined using Digital Terrain Models and N50 vector maps (available from Kartverket 2017). The total number of trees was also noted.

There was some evidence of interspecific competition. The number of red deer pellets and roe deer pellets within each plot was recorded. They were distinguished from moose pellet groups according to the following rules: moose pellets are 2-3cm long, round or long in shape and light brown in colour, red deer pellets are 2-2.5cm long, pointed at one end and dark brown or black in colour and roe deer pellets are 1-1.5cm long, round or long. After recording the number of pellet groups, all dung was removed from the plot to increase the accuracy of the following years' count.

Intraspecific competition was also investigated in the form of accumulated browsing on trees within the height 0.5 to 3m. As pine is one of the most important winter food sources of moose, the accumulated browsing on pine was noted separately to other species. A note was taken of the number of trees above 0.3m within the plot. Of the 10 trees above 0.3m closest to the centre of the plot, species, stem diameter, number of broken stems and number of instances of top shoot browsing was recorded. For this subsample of trees, accumulated browsing was also recorded on a scale from 0 to 3 (0 = no old browsing, 1= old browsing visible but growth not changed, 2 = old browsing visible and growth form changed to a crooked stem, 3 = old browsing visible and growth form severely changed). The presence of bark browsing, and the number of browsed and non-browsed shoots were also recorded for these ten trees.

Moose favour milder temperatures in the winter to conserve energy, relating to both cost of movement in the deep snow and simply keeping warm. As it was not plausible to measure exact temperature and snow level all winter in every plot altitude, slope, and aspect was included in the analysis, measured from the centre of each plot.

Where an animal will be next is mostly depending on where it is at the moment. This is a common phenomenon in most distribution modelling. This is known as spatial autocorrelation. This was accounted for by including data on latitude and longitude in the analysis, as well as the label given to the quadrats and plots.

Nine of the variables included are expected to influence food availability. The ground vegetation type of the plot, thought to be an important food source, was identified as lichen, dwarf shrub, small ferns, tall ferns, bog, moss, fern, grass or rocks. The bilberry cover, also a food source, was estimated as the percentage of the entire plot which was covered in bilberry. The dominant species of tree in the canopy was also recorded, which impacts food quality. The forest type was identified as belonging to one of five cutting classes; 1: clear cut and no regeneration, 2: visible regeneration and tree height less than 10m, 3: tree height above 10m, but before reaching full maturity 4: forest mature for logging and tree age between 55 and 75 years, and 5: trees approaching or older than 80 years and have stopped growing. The forest type could also be classified as *no trees* if the plot fell in a patch with a break in tree cover. This is a standard scale frequently used by the logging industry, which makes the results easier to put into management context. The age of the forest is an important factor in food availability, as branches are primarily at 0.5-3m altitude, and therefore available to moose, when trees are in category 2. It is also a central factor in the cover available in the landscape as a mean of predator avoidance.

The average available biomass in each shoot of species known to be browsed on by moose was determined using an existing data set belonging to the Inland Norway University of Applied Sciences. This data set was made up of randomly selected shoots where shoot diameter and dry weight had been recorded. Using regression, an exponential equation describing the relationship between shoot diameter and dry weight was produced for each species in this pre-existing dataset. These equations can be found in table 4. This equation was then used to find the biomass of the randomly selected shoots in each plot in the study, which was then used to calculate the average biomass of shoots of individual species. The average biomass of those shoots can also be found in table 4. When multiplied by the number of browsed and unbrowsed shoots in each plot, this generated a measure of the total available biomass and the browsed biomass of each tree species in each plot. The measure of combined biomass for all species, as well as the biomass for pine alone, was included in analysis.

Table 4: The regression equations used to calculate the dry weight (g) of a shoot for forage species based on the diameter of the shoot (x). The r^2 value of the equation and the calculated average weight of a shoot are also given.

Species	Equation	r^2 value	Average weight across all sites (g)
Betula pendula	$y=0.1452x^2-0.2985x$	$r^2=0.8698$	0,373842
Betula pubescent	$y=0.1818x^2-0.3526x$	$r^2=0.836$	0,113866
Pinus sylvestris	$y=0.1239x^2 + 0.1116x$	$r^2=0.8932$	1,086541
Populus tremula	$y=0.3256x^2-0.6193x$	$r^2=0.8698$	2,411241
Salix spp.	$y=0.14x^2-0.2297x$	$r^2=0.8918$	0,525966
Sorbus aucuparia	$y=0.1031x^2-0.2243x$	$r^2=0.8402$	0,692555
Juniper communis	$y=0.4529x^2-0.3515x$	$r^2=0.8704$	0,094734

Feeding Site Attractiveness Value (FSAV) is a measure of the attractiveness of a plot to moose, based on the available species in the plot. It was estimated using methods from Manley et al. 1992 and Stokke et al. 1999. Forage selection may vary between study sites and therefore a forage preference index (FPI) was generated in each site separately (Smeets 2014).

$$FPI\ species\ X = \frac{Biomass\ browsed\ species\ X\ /\ Total\ biomass\ browsed}{Biomass\ available\ species\ X\ /\ Total\ biomass\ available}$$

The FSAV value could then be calculated using the sum of FPI and the abundance of trees within each plot (Smeets 2014). The final FSAV value was included in analysis.

$$FSAV\ plot\ X=(FPI\ species\ 1 * N\ trees\ species\ 1\ in\ plot\ X) + (...species\ 2 * ...species\ 2) + ...$$

The FSAV value encompasses a number of other variables included in the study, such as tree diversity, tree density, and biomass availability. As it did not show a strong correlation to any of the other variables, it was decided that it would be included in analysis without removing any other variable.

Some variables were not included in analysis. This includes data on predator density and human hunting intensity. They were omitted because data in official figures available to the public was collected at a regional level, which is much larger scale than the plot level used in this study (Rovdata 2017a). A note was taken when faeces from other species than cervids was found in a plot, but the density was much too low to derive any useful results (less than 5 per year across all three sites). Data on weather conditions such as precipitation and temperature was also based on a regional level, and was therefore omitted from analysis.

3.6 Model creations and statistical analysis

The distribution of data was investigated using calculations of skewness and kurtosis as well as Kolmogorov-Smirnov and Shapiro-Wilk tests of normality. Correlations between continuous or ordinal explanatory variables were investigated using Spearman's rho.

Due to the nested nature of the data in this study, that is, small plots organised into larger quadrats, the best method of model creation would have been to use a GLMM. This was attempted, using the MuMln package in R 3.4.0 and following methods from Zuur et al. 2009, using a Poisson distribution. However, due to the data set being strongly zero inflated, this model did not converge. Further attempts were made using a binominal distribution based on presence/absence data, but this did not improve the model. Further improvements were made, including rescaling and centring the continuous parameters, recalculating the gradients using functions in the numDeriv package, and changing the default nloptwrap optimiser to the bobyqa optimiser, however, the GLMM still did not converge. Increasing the number of instances to 200 000 merely produced a false positive, as indicated by a near-singular fit.

It was therefore decided to use a GLM. To identify the set of variables which best describe distribution, GLMs with Poisson distributions were created using

R 3.4.0. Two GLM were created for each site, one for 2012 and one for 2015. In addition, two GLMs were created for all three study sites combined, again one for 2012 and one for 2015, giving a total of eight models created in this study.

For each of the eight models, the following steps were taken. Using a stepwise reduction to screen the variables, the variable with the lowest impact (as indicated by their AIC) were removed one at a time (Crawley 2007). This was done in the knowledge that AIC is asymptotically equivalent to leave-one-observation-out cross-validation, and as such deemed a suitable validation method (Fang 2011). After removing a variable, the new version of the model was compared to the older version. This was continued until the explanatory power of the model saw a significant drop ($p<0.05$), indicating that a variable with an important impact had been removed from the model. The last variable to be taken out of the model would then be added in again, and the model would be complete. The explanatory power of each remaining variable, as well as the residual deviance, was identified by using an ANOVA test.

The modesl created to describe moose distribution in 2012 were then used to describe moose distribution in 2012 – 2015, and 2017. This was done to investigate for how many years the habitat data collected was able to accurately describe moose distribution.

To test if the model in 2012 could produce accurate results, the predict function in R was used. Taking in the parameters of the 2012 model, predictions for the 2012, 2013, 2014, 2015, and 2017 moose distributions were created. These predictions were compared to the observed moose distribution for those years using a chi square test. The same model was then updated with the environmental variable values from 2015 and used to make predictions for the 2015 moose distribution. These predictions were also compared to the observed moose distribution in the same manner.

4 Results

4.1 Descriptive statistics

An average of 285.2 pellet groups were found across all three study sites each year. When using the equation from section 4.3, this results in an average of 20.4 hours spent by moose in each plot throughout the winter season. The Gravberget study site showed approximately twice as many moose as each of the other study sites, in all years. The distribution of time spent by moose in plots across sites and years, as indicated by the number of pellet groups, can be seen in table 5.

Table 5: The average number of hours spent by moose in a plot, per year and study site.

	2012	2013	2014	2015	2017
All sites	14,4	16,6	22,9	20,1	27,9
Gravberget	6,5	11,0	13,1	10,7	14,2
Ljørdalen	3,9	5,6	5,1	4,4	8,7
Plassen	4,0	0,0	4,7	5,0	4,9

There was very little evidence of other deer species being present in the study sites; there was an average of 0.04 groups of red deer pellets in each plot, and an average 0f 0.01 roe deer pellet groups.

The number of moose pellet groups found in plots showed significant, but weak, correlations to some numerical habitat variables both in 2012 and 2015. As all relationship were too weak to be useful to represent in scatterplots (spearman's rank < 0.2), the relationships are given in table 6.

Table 6: The habitat variables which showed significant relationships to the number of moose pellet groups. Habitat variables omitted from the table did not show significant relationships to the number of moose pellet groups. Those habitat variables for which no value is given in 2012, did also not show significant relationships to the number of moose pellet groups in this year.

	2012		**2015**	
	Correlation coefficient	P-value	Correlation coefficient	P-value
Accumulated browsing, all trees	0,112	0,001	0,172	<0,001
Accumulated browsing, pine			0,13	<0,001
Total available biomass	0,1	0,002	0,127	<0,001
Available pine biomass	0,103	0,001	0,07	0,031
Feeding Site Attractiveness Value	0,093	0,004	0,173	<0,001
Bilberry cover			0,091	0,005
Total number of trees	0,13	<0,001	0,185	<0,001
Distance from nearest road			0,077	0,017
Latitude			0,105	0,001
Longitude	0,067	0,038	0,174	<0,001
Altitude			0,147	0<0,001

The ground vegetation type which had the highest number of average moose pellet groups was “grass” in 2012 and “fen” in 2015, while the lowest was “small fern” both years. An overview of average number of moose pellet groups found in different vegetation types can be found in table 7.

Table 7: An overview of average number of moose pellet groups found in different vegetation types.

	Average number of moose pellet groups per plot	
Vegetation class	2012	2015
Bog	0,14	0,19
Dwarf shrub	0,33	0,49
Fen	0,20	0,60
Grass	0,51	0,38
Lichen	0,27	0,37
Rocks	0,38	0,19
Small Fern	0,08	0,08

The number of average pellet groups found in different cutting classes can be found in table 8. Unsurprisingly, moose generally avoided cutting class 0 “no forest” and preferred cutting class 2 “visible regeneration and tree height less than 10m”.

Table 8: The number of average pellet groups found in different cutting classes. The cutting classes indicate levels of regrowth after logging, with cutting class 0 = clear cut, no trees, and cutting class 5 = mature forest.

	Average number of moose pellet groups per plot	
Cutting Class	2012	2015
0	0,08	0,06
1	0,18	0,45
2	0,45	0,74
3	0,29	0,26
4	0,16	0,23
5	0,18	0,20

The preference of moose for a dominant species of tree seemed less apparent. Even so, most pellets tended to be found among the coniferous tree species pine and spruce (table 9).

Table 9: The average number of pellet groups given by the dominant tree species in the plot. Alder and silver birch has been omitted from the table due to a low sample size (only 1 plot of each).

	Average number of moose pellet groups per plot	
Dominant tree species	2012	2015
Downly birch	0,52	0,48
No trees	0,25	0,00
Norway spruce	0,28	0,36
Scots pine	0,28	0,42

In addition, some independent variables showed significant relationships to one another. A common method in statistics is to omit highly correlated variables from analysis, to avoid replication. This was not done in this study because most of the relationships only showed a moderate or weak correlation ($r<0.7$, Mukaka 2012). A complete overview of the correlation between all continuous variables in this study can be found in appendix D.

Some significant relationships with a high degree of correlation was still found among the independent variables. A high degree of correlation was found in the relationship between total available biomass and available pine biomass ($r_s=0.873$, $p<0.001$). It was decided not to omit either variable from analysis, as one of the aims of the study was to determine exactly which factors moose select for. It is therefore interesting to see if a model could distinguish between selection for total available biomass rather than for pine biomass, despite the correlation. Significant relationships were also found between longitude and latitude ($r_s=0.865$, $p<0.001$), and between altitude and latitude ($r_s=0.881$, $p<0.001$) and altitude and longitude ($r_s=0.856$, $p<0.001$). This is expected, as these are all spatial variables and will usually show some correlation. Spatial elements were expected to be of importance to the models because the data was collected in a nested design (see section 3.3 for details and diagrams). These factors were therefore all included, as they were expected to be able to account for some spatial autocorrelation in the models (see section 3.5 for more information about spatial autocorrelation).

4.2 Can habitat factors accurately describe moose distribution?

8 models were created, following the method stated in section 3.6. Of these models, three were independent models of the three study sites in 2012 and three were from 2015, as well as two models (also from 2012 and then from 215) of all three study sites combined. The r^2 values of the models range from 0.28 to 0.42, with the majority (7 out of 8 models) having an r^2 between 0.3 and 0.4 (Table 10). According to Mukaka 2012, r^2 values of 0.25 to 0.49 indicates a moderate correlation. The models therefore describe moose distribution to a moderate degree. The percentage of variation in moose distribution which could be explained by each of these models can be found in table 10.

Table 10: The r^2 values of the eight models created in this study. The r^2 value is equivalent to the percentage of variation in moose distribution which the model can explain.

Site and year	R^2
2012: All sites	0,34
2012: Gravberget	0,42
2012: Ljørdalen	0,39
2012: Plassen	0,35
2015: All sites	0,31
2015: Gravberget	0,36
2015: Ljørdalen	0,28
2015: Plassen	0,35

4.3 Which habitat factors are most strongly selected for by moose?

The percentages of variation which could be explained by the variables included in these eight models were identified. The results can be found in table 11, along with the residual deviance, that is, the percentage of unexplained variation in the models. The factors which, on average, accounted for the largest amount of explanation were, in descending order: quadrat label, vegetation type, and available pine biomass. The values and parameters including the AIC value of all eight models can be found in appendix E.

Table 11: The percentage of variation explained by each independent variable for the eight models created. Due to space constraints, the three study sites (Gravberget, Ljørdalen, and Plassen) are indicated by their first letter. When a model does not have a value for an independent variable in this table, it indicates that the variable was removed from the model (using stepwise regression as described in section 3.6) to achieve a better fit. Those independent variables included in the study (see table 3 in section 3.5) and not listed in this table, such as interspecific competition, has been removed by stepwise regression in all models.

Independent variable	**Percentage of variation explained**								
	All, 2012	G, 2012	L, 2012	P, 2012	All, 2015	G, 2015	L, 2015	P, 2015	Ave-rage
Quadrat name	19,8	21,2	24,9	25,3	13,5	16,7	16,5	21,3	19,9
Vegetation type	5,5	7,4			4,1	7,4		8,4	6,56
Pine biomass	5,1	1,5	4,8	8,9	2,4				4,54
Feeding site attractiveness value			0,2		4,4	7,4		2,9	3,725
Site	2,4				4,9				3,65
Dominant tree species		1,1	4,9						3
Total biomass		3,1				4,7	2,2	0,9	2,725
Accumulated browsing	1,3	2,4							1,85
Number of trees	0,7	2,2	0,01		1,3		3,9	2,2	1,71833333
Bilberry cover		0,6	1,7			1,3			1,2
Number of species						1,2			1,2

Slope		1							1
Logging Class	0,1	0,8	0,6				1		0,625
Altitude		0,4							0,4
Distance to road	0,1			0,7					0,4
R^2	0,34	0,42	0,39	0,35	0,31	0,36	0,28	0,35	0,35
Accumulated pine browsing		0,3							0,3
Residual deviance	65	58	62,8	65,1	69,4	61,3	76,4	64,3	65,2

4.4 For how many years will the data on habitat factors be able to describe distribution before accuracy starts to fall?

Using the habitat values collected in 2012 to describe moose distribution in following years, it was discovered that data begins to lose their ability to accurately describe distribution after three years (Figure 9). This was indicated by a drop in r^2 value, and therefore the percentage of variation which the model could explain.

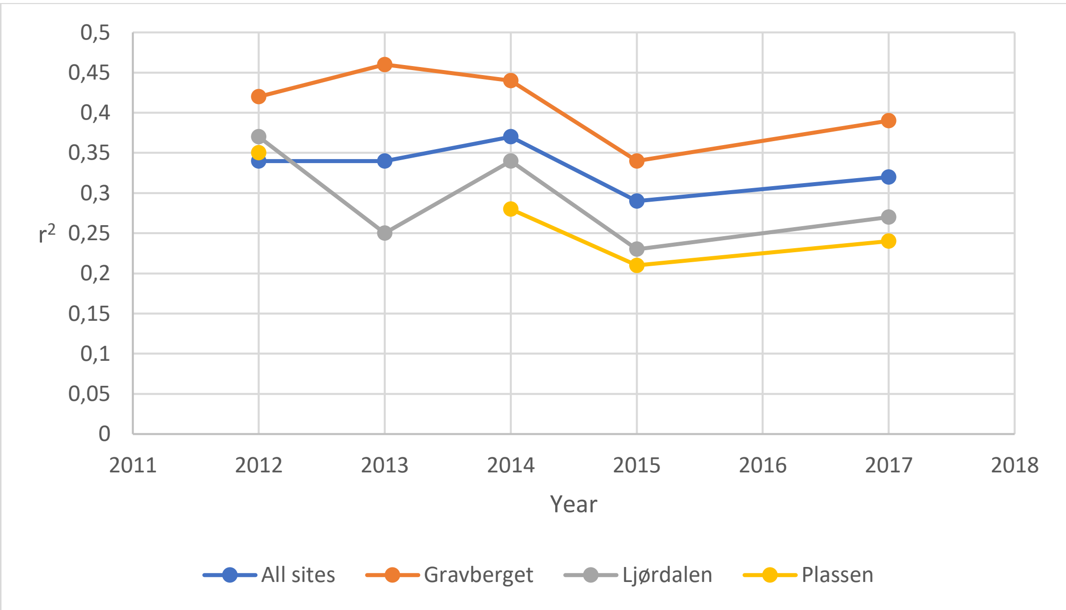

Figure 9: The decrease in r^2 value when the age of the data increases. The data used in this model was collected in 2012. The model experiences a drop in explanatory power when the data was three years old.

4.5 Can the descriptions of moose distributions based on habitat selection create accurate predictions for distribution?

Using linear regression to compare the predictions from the 2012 model and the actual moose distribution, it was discovered that the model was not able to produce accurate predictions (Figure 10). Parameters which originally produced an appropriate fit for the model from 2012 (see section 4.1) were not able to accurately predict moose distribution in 2015. The accuracy did not improve, even when using the habitat data collected from that very year; predictions for 2015 moose distributions based on the habitat data from 2012 had an r^2 value of 0.01965, while the predictions based on the habitat data collected in 2015 had an r^2 value of 0.01466.

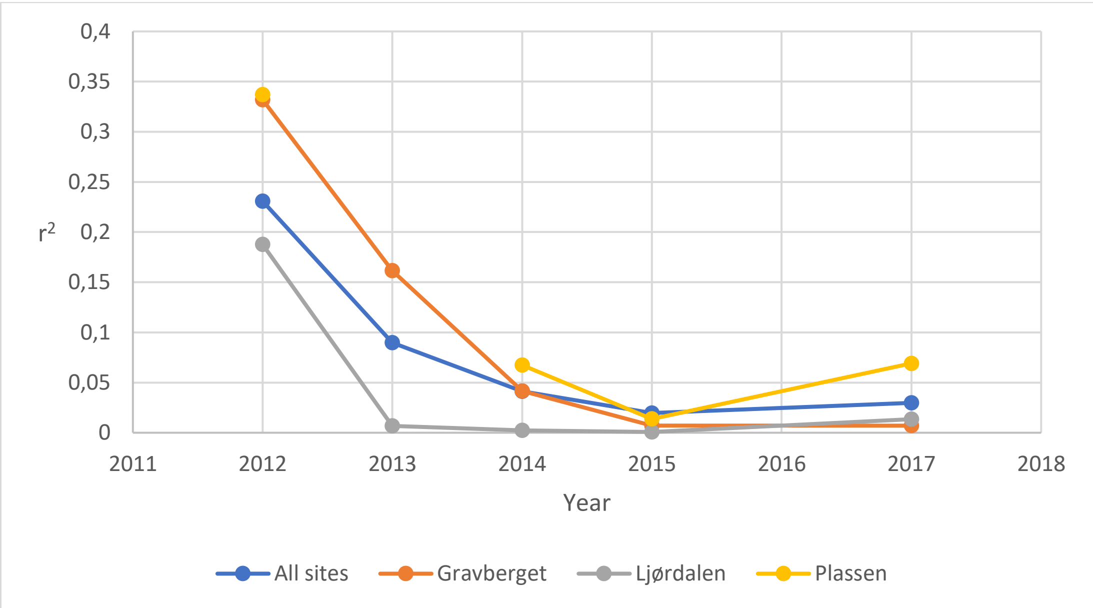

Figure 10: The accuracy of predictions made with the parameters of the model from the 2012 habitat data when compared to the observed distribution in future years.

5 Discussion

The results from this study have shown that moose select for a specific subset of variables and that those variables can accurately describe moose distribution. Furthermore, the results indicate that the data describes distribution well for three years before the explanatory power begins to fall. Finally, the predictions derived from these models were not accurate when compared to the observed distribution, even when habitat data from the same year was used.

5.1 The habitat factors selected for by moose

In the scientific literature, moose have been shown to select for many habitat factors. Key among these are tree density, which provides cover from predators, as well as the availability of high quality or high quantity browse (Telfer 1970, Månsson et al. 2012). These factors were included in this study, and the data showed a large variance. They were also found to be a significant factor in habitat selection in most sites and years. Another factor for which moose have been known to select, and which was well represented in this study, was the accumulated browsing on trees; moose are known to prefer trees where another individual has already been browsing (Bergquist et al. 2003, Beest et al. 2010b, Wallgren et al. 2013, Rea et al. 2014, Smeets 2014). Unexpectedly, the level of accumulated browsing was an important factor in the models. Moose are also known to favour pine in the winter, which is why the available pine biomass was included as a separate factor in analysis, and indeed was found to have a significant effect on selection (Cassing et al. 2016). Humans are generally avoided, such as can be seen from the increase in moose number further away from the roads and houses present in the study sites (Herfindal et al. 2009, Bartzke et al. 2015). Another important part of winter habitat selection is the depth of the snow, which is why aspect, slope, and altitude was included in analysis (Schwab and Pitt 1991, Christenson et al. 2014, Harris et al. 2014, Street et al. 2015). These were also to varying degrees important. The factors thought to be crucial to moose habitat selection were included in this study in some form.

The factors identified as most important for moose habitat selection in this study were which quadrat the plot was located in, vegetation type of the plot, the available pine biomass, feeding site attractiveness value (FSAV) and the site the plot was located in. The quadrat label, as well as study site, is a product of spatial autocorrelation, implying that there is a strong relationship between moose and space (Lichstein et al. 2002). It may also imply that moose, having arrived in an area, are more likely to remain in that area, though this is more speculative (Lichstein et al. 2002). Similarly, the site factor is likely to have been included as important for moose habitat selection because the population varied between study sites, which also gives the data another measure of spatial autocorrelation (Keitt et al. 2002). Neither of these two factors accurately represent the factors moose will select for in their habitat but are important spatial elements nonetheless. Of the ecological factors investigated, vegetation type was identified as the most important variable across the models. This is in accordance with previous studies on the subject, which have concluded that undergrowth and forest type have a large impact on moose distribution and are also an indication of other factors such as nutrient content and productivity of the soil (Tape et al. 2016, Zhou et al. 2017). Pine biomass is an indication of food quantity, while FSAV on the other hand is an indication of food quality (Manley et al. 1992, Stokke et al. 1999, Smeets 2014). Both are known to be selected for by moose, but to varying degrees throughout the year; selection is thought to shift towards browse quantity over quality as food resources are depleted in the winter (Beest et al. 2010a). This is in accordance with the results of this study, as pine biomass accounted for more variation in the winter distribution than did FSAV.

Resource selection is always dependent on which resources the animals can observe. Variation in feeding rates within the population are, as a result, dependent on individual perceptual ability (Godin and Keenleyside 1984). A moose may not, at a glance, be able to determine the total available pine biomass of a patch, but it can observe the vegetation type and make an estimate as to how much food may be found and of which forage species. It is therefore not surprising that vegetation class could account for more variation in distribution than forage availability and overall browse quality. This effect of perceptual ability, as a determinant of the strength of habitat selection, has previously been described in mice (Zollner and Lima 1999a), fish (Godin and

Keenleyside 1984) and invertebrates in the Coreoidae (Schooley and Wiens 2003) and Nymphalidae families (Merckx and Van Dyck 2007), though not in ungulates. In addition to this, coniferous trees are relatively nutrition poor and are selected for mainly due to the absence of higher quality deciduous trees (Smeets 2014). Undergrowth and ground vegetation constitute important additional sources of nutrients and are therefore expected to be important factors in selection for moose in Fennoscandia. The results from this study support this conclusion.

5.2 The ability of habitat factors to describe distribution

The factors investigated in this study explained moose distribution with a moderate degree of accuracy, according to Mukaka 2012. This implies that moose distribution is a result of habitat selection and that individuals select their habitat in a similar way across the population; moose appear to adhere to ecological principles and rules of selection. Previous attempts at modelling ungulate habitat selection have reported moderate success (Dussault et al. 2006, Laforge et al. 2016a, Dupke et al. 2016). However, a recurring feature is a large proportion of unexplained variation in results from studies attempting to create habitat selection models, sometimes even between model types, especially in those attempting to use them to create predictions (Dettki et al. 2003, Månsson et al. 2012). This is supported to some degree by the results of this study, as there was still a large proportion of unexplained variation. Reviews have alluded to the cause being a lack of understanding of ecological mechanisms determining distribution and abundance, as well as the assumption that all relevant factors have been included as predictors (Boyce et al. 2015).

A common problem in determining habitat selection is with the method of observation itself, as not all areas can be observed all of the time. This may result in false negatives, in which an area has, in fact, been utilised by an animal without it having been recorded (Tyre et al. 2003). This adds variation to data sets, often in the form of zero-inflation, and will weaken correlations (Martin et al. 2005, Potts and Elith 2006). It was explored in-depth by Pearce and Boyce 2005, who concluded that, although presence-only data can be useful for managers, the caveat is that researchers must be mindful of data bias and exercise caution when interpreting models. Using moose pellets as an indicator of moose distribution, as was used in this study, has the advantage that it accumulates and can be relied upon to display accurate positives only. However, the average defecation rate of 14 pellet groups per moose per day may mean that areas of activity go unrecorded and false negatives are therefore a very real possibility (Rönnegård et al. 2009). This may have been a source of variation in the data set used in this study.

A basic assumption when attempting to model habitat selection is that animals will always identify an optimal habitat and spend more time there than in less optimal patches. This is similar to the concept of ideal distribution. However, the requirements for an ideal distribution may not be met and animals do not know exactly where their optimal habitat is, but are instead reliant on discovering resources as they move through the landscape (Fretwell and Lucas 1969). This is especially true regarding predators, when moose have a limited ability to know where wolves and bears are in the landscape. Additionally, when factoring in the cost of travel, it may not be an optimal strategy to abandon an adequate food resource in the pursuit of one of higher quality (Dussault et al. 2005). These phenomena will result in optimal resources or patches not being sought out, or simply not found, with individuals selecting for less suitable yet adequate areas. This, again, weakens the relationship between moose distribution and habitat quality observed in this study, and adds an important spatial element to the analysis. In the case of moose, this was described in detail by Månsson et al. 2012 who found that the ability to explain moose distribution on a local scale based on food availability increased when adding spatial elements such as latitude and longitude into the model.

A final source of variation in the results from this study may be derived from the fact that the relationship between browsers and their environment is not always linear (Bjørneraas et al. 2012, Laforge et al. 2016a). A moose may seek out denser pine forest to increase cover from predators but avoid forest which is dense enough to impede movement for such a large animal. Similar patterns can be observed throughout ecology when the resource requirements of a species do not sit at either extremes of a scale. As many models rely on linear relationships, such as those used by Herfindal et al. 2009, Dupke et al. 2016 and the ones produced in this study, this nonlinear effect is likely to cause variation in the data set.

5.3 The number of years before the accuracy of data on habitat factors begins to fall

The data remained accurate for three years before the amount of variation in the data set accounted for by the models began to fall. This implies that management solutions based on environmental data will remain functional for up to 3 years before an updated set of data is required. This is similar to Månsson et al. 2012, who modelled moose habitat selection over multiple years using nonlinear, spatially-referenced models. Wildlife management based on habitat data or habitat models, therefore, require regular habitat surveys, though not necessarily as frequently as every year.

A possible explanation for this result is simply that, after three years, the habitat changes and moose will follow the resources available, rendering the data simply outdated. However, the boreal forest of Fennoscandia is slow-growing and despite the relatively intensive logging, 3 years is not much time for the habitat to change drastically (Bond-Lamberty et al. 2014). It is possible that the change is aggravated by climate change and, as moose are a species adapted to colder climates, this could alter the parameters by which moose select their environment (Soja et al. 2007, Glushkov and Kuznetsov 2015). The effect may also not be due to a changing environment at all and may instead be density dependent; studies find that ungulate habitat selection changes with the density of the population and selection may favour different factors as the population changes (Beest et al. 2016). As can be seen from the total number of moose pellet groups in the study sites, the populations appear to have been fluctuating in size. The selection may also have changed as a response to weather patterns; winters of low temperatures and high snow levels give a high cost to travel, causing selection to favour less optimal but more closely located resources (Joly et al. 2016). There are many studies indicating that this change in temperature and snow depth will impact both the factors selected for and the strength of selection; it strongly increases the stochasticity and spatial dependence of selection, as moose will select for whichever resource is the closest to their current location (Månsson et al. 2012). Temperature and snow level may also affect factors such as the distribution and abundance of the population as a whole, due to increased mortality or impeded migration. Both of these factors are strongly related to selection. This explanation is given some credence by the fact that 2014 and 2015 were the warmest years during the study and this is where the power of the descriptions began to fall drastically.

Regardless of the mechanism behind the changes, it seems likely that the relationship between moose and their environment has changed by 2015, 3 years into the study. Habitat selection may favour different factors with different strength than in earlier years, leading the habitat selection model to decline in accuracy. Though the effect may be present, the exact mechanisms driving this change are something that, at this point, can only be speculated upon.

5.4 Predicting future moose distribution based on habitat selection

The predictions for future distributions made in this study showed little resemblance to the moose distribution observed in the real world and, as such, were of poor quality. The habitat selection model could predict some distributions to a satisfactory degree in the year it was made, but in the following year, the predictive power fell by half before stabilising at around 5% accuracy. This was unexpected, as the models have been shown to be accurate in accounting for variation in moose distribution so far (Mukaka 2012).

It has long been assumed that, if a habitat selection model can accurately describe the distribution of a species, it must also be useful for predicting the future distribution. However, as these results show, this may not always be the case. Predictions are important for wildlife managers, as well as landowners and forestry resource managers; changes in distribution have been a cause for human-wildlife conflict all over the world and predictions are now used for everything from preventing wildlife-vehicle collisions in America (Snow et al. 2015) to predicting and preventing poaching on African elephants *Loxodonta africana* (Shaffer and Bishop 2016). Furthermore, prediction is the ultimate test of whether habitat selection models are robust and can, therefore, be of practical use to wildlife or conservation management (Gilliam and Fraser 1987, Guisan and Zimmermann 2000, Fielding and Bell 2002, Guisan and Thuiller 2005). The results from this study seem to indicate that though a model can accurately describe distribution, it may not be able to create accurate predictions for future distributions.

The failure to create accurate predictions may be a result of changes in the environment. However, as the results from this study show, predictions were not accurate in 2015, even when using the habitat data from the same year. Thus, environmental change is unlikely to be the cause. There are a variety of possible explanations, such as temperature or weather change, or density dependence. It can also be in response to variation in the predator populations across the sites; both bears and wolves have a high rate of hunting success on young moose and have been shown to influence many aspects of moose ecology (Berger 1999, Patterson et al 2016, Tallian et al. 2017). The same can be said for the intensity of hunting by humans, which can alter both patterns of habitat selection among moose and patterns of activity among their predators (Dussault et al. 2005, Laforge et al. 2016b, McCully et al. 2017, Nadeau et al. 2017, Neilson and Boutin 2017, Beeck Calkoen et al. 2018). It is also possible that the presence of competitors such as red deer, roe deer, or reindeer, though nearly non-present across the sites, could alter the result further (Anderson et al. 2017, Bao et al. 2017).

The unexplained variation could also be a response to density dependent factors. For example, density dependent selection behaviour of moose has previously been described, where low densities of moose cause specialised foraging strategies on high quality browse, and high densities show more generalised browsing behaviour. This favours tree species which are plentiful but lower in nutritional value such as pine (Beest et al. 2016). This then alters the functional response of the population to ecological situations, such as limiting factors; a population with low density will be more affected by a lower availability of high quality browse, when proportionally compared to a denser population (Dussault et al. 2005, Herfindal et al. 2009, Beest et al. 2010a, Beest et al. 2016). This will cause unexplained variation in all studies where density has not been included in analysis, such as this study.

However, the cause of this unexpected result is also likely to be derived from other factors included in analysis; out of all the habitat variables investigated, the spatial elements gave the highest explanatory power. Spatial factors can explain where an individual may be, but, if it is selected at random by the individual animals, then it cannot be predicted. This is in concurrence with Månsson et al. 2012 who also predicted moose distribution based on habitat selection. This is supported by the result of this study; that predictive power fell in parallel with the amount of variation explained by the spatial variables. Because of this, the habitat selection model and, potentially, similar models from other studies, can describe distribution exceedingly well but fail completely at prediction (Månsson et al. 2012).

The results of this investigation may indicate that it is erroneous to assume moose display an ideal distribution; that the population will distribute in a pattern proportional to the availability of resources in the landscape (Abrahams 1986, Kacelnik et al. 1992). A basic premise for ideal distribution is that individuals are aware of the relative resource abundance of each patch. However, it is not a given that animals will know where optimal resources are located; this is determined by an individual's perceptive ability, among other factors (Godin and Keenleyside 1984, Abrahams 1986, Zollner and Lima 1999b). Ideal distribution is also dependent on all individuals having the same competitive ability, which, for moose, is primarily mobility and perceptual ability (Parker and Sutherland 1986, Grant and Dill 1999). This is not realistic in a real-world scenario (Parker and Sutherland 1986, Grant and Dill 1999). When removing the assumption of ideal distribution or when factoring in that ideal distribution is state dependent and not always reliable, attempting to predict future distribution based on habitat selection becomes futile (Harper 1982, McNamara and Houston 1990, Kennedy and Gray 1993, Tyler and Gilliam 1995, Swain and Wade 2003).

There is an element of spatial autocorrelation to all habitat selection; where an individual chooses to go next largely depends on where it currently is, more so than where the best resources are in its home range (Lichstein et al. 2002, Keitt et al. 2002, Barry and Elith 2006). Low temperatures or high snow levels, as well as bad weather or a high predator density, are factors which can aggravate this effect, as they increase the cost of travel and encourage an increased residency time in an area rather than attempting to seek out resources of higher quality (Bastille-Rosseau et al. 2010). This effect will make distribution less dependent on resource availability and may be partly responsible for the low predictive ability of the models created in this study. The results of this study indicate that these effects are so strong in the Fennoscandian moose population during winter that even with an extensive habitat selection model, based on multiple habitat factors and several years of moose distribution information, it is still not possible to predict future distribution (Månsson et al. 2012).

Many studies have successfully attempted to create suitable habitat selection models, however, few of these have then been used to create predictions (Dettki et al. 2003, Dussault et al. 2006, Herfindal et al. 2009, Olsson and Bolin 2014, Dupke et al. 2016, Laforge et al. 2016a). As such, it may be that many management strategies around the world are, in fact, based on models which are erroneously believed to predict distribution. Researchers and managers alike must be made aware that this is not enough; without having tested a habitat selection model's ability to predict, but simply its ability to describe distribution, there is no guarantee that the model is useful or accurate in a practical context. It is highly recommended that future attempts at modelling distributions include predictions which can be tested and that factors such as spatial autocorrelation and an absence of ideal distribution have been accounted for.

It is a very real prospect that it is not possible to satisfactorily predict moose distribution based on habitat selection, no matter how detailed the investigation. This study has been a rigorous one; twenty different habitat and spatial factors were investigated and compared to five years of moose distribution. The models created were accurate across multiple sites and on two different scales, all in addition to being able to describe distribution to a satisfactory level for 3 years. Nevertheless, predictions were of low quality, which has also been reported previously in studies attempting to predict moose distribution (Månsson et al. 2012). Managers hoping to develop dependable management strategies for moose may have to acknowledge that moose habitat selection has a large degree of stochasticity and that distribution is, therefore, not possible to predict. Management must then focus on developing strategies which do not rely on predictions to be effective.

6 Conclusion

As shown in this study, moose select their habitat at a patch level, primarily based on the type of ground vegetation, food availability (specifically that of pine), as well as the overall quality of the patch. In decreasing order, tree density, accumulated browsing and bilberry cover are also selected for, as well as slope and age of trees. Between these environmental variables and the spatial factors included in the models, moose distribution could be described very well in all years of investigation. The parameters established as determinants of habitat selection in the first year of investigation adequately described moose distribution for three years, indicating that, though the subset of factors selected may be consistent, the parameters determining the extent to which a factor is selected for will change eventually. These results are useful for wildlife managers aiming to understand what governs moose distribution and how it changes over time and between different management areas.

Though the models created in this study explained moose distribution to a satisfactory degree, the predictions based on those models showed little accuracy when compared to the distribution of moose in the years following initial data collection. This is likely the result of spatial autocorrelation, as spatial factors, rather than the environmental variables, which can be measured and predicted, explained the majority of moose distribution. These results indicate that moose habitat selection is not strong enough to counteract spatial autocorrelation and is, therefore, not possible to predict. It is recommended that management strategies are designed in such a way as to be robust and resourceful enough not to be dependent on predictions for population distribution to function. Furthermore, this highlights an important potential shortcoming of past studies when dealing with modelling habitat selection; the results of this investigation show that, though models may accurately describe distribution, it is erroneous to assume that they must then be able to produce accurate predictions. It is recommended that future studies aiming to model habitat selection as a means by which to provide recommendations for wildlife management always test their predictions against real world results. It can then be ascertained whether or not the results are robust enough to inform management.

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8 Appendices

APPENDIX A – Letter of support

Letter of support

Hedmark University of Applied Sciences confirms that Miss Magnhild Sletten is undertaking research based on data collected by this institution. She has been given data on environmental variables from 2012 and 2015, and data on moose distribution from 2012, 2013, 2014 and 2015, which she, with our permission, will use to create a predictive model for moose distribution as requirements for her master's degree by research with Bournemouth University. She is collaborating with Karen Marie Mathisen, Associate Professor at Hedmark University, Department of Forestry and Wildlife Management, Campus Evenstad, who is assisting in a supervisory capacity.

In addition to the data already supplied, it is understood that Miss Sletten will undertake a field trip with practical students in June 2017. Hedmark University will supply training, transport between sites and accommodation for this field trip.

It is our agreement with Miss Sletten that she will produce a published article after completing her thesis, in which Karen Marie Mathisen will be named as co-author and Hedmark University as a collaborating institution.

25.11.2016

Sign.

APPENDIX B – GPS position of all plots

Plot	Latitude	Longitude	GPS notation
L_A1_1	378727.298243	6807891.63162	WP,UTM,L_A1_1,33V,378727.298243,6807891.63162
L_A1_2	378827.298243	6807891.63162	WP,UTM,L_A1_2,33V,378827.298243,6807891.63162
L_A1_3	378927.298243	6807891.63162	WP,UTM,L_A1_3,33V,378927.298243,6807891.63162
L_A1_4	379027.298243	6807891.63162	WP,UTM,L_A1_4,33V,379027.298243,6807891.63162
L_A1_16	378627.298243	6807791.63162	WP,UTM,L_A1_16,33V,378627.298243,6807791.63162
L_A1_5	379127.298243	6807791.63162	WP,UTM,L_A1_5,33V,379127.298243,6807791.63162
L_A1_15	378627.298243	6807691.63162	WP,UTM,L_A1_15,33V,378627.298243,6807691.63162
L_A1_6	379127.298243	6807691.63162	WP,UTM,L_A1_6,33V,379127.298243,6807691.63162
L_A1_14	378627.298243	6807591.63162	WP,UTM,L_A1_14,33V,378627.298243,6807591.63162
L_A1_7	379127.298243	6807591.63162	WP,UTM,L_A1_7,33V,379127.298243,6807591.63162
L_A1_13	378627.298243	6807491.63162	WP,UTM,L_A1_13,33V,378627.298243,6807491.63162
L_A1_8	379127.298243	6807491.63162	WP,UTM,L_A1_8,33V,379127.298243,6807491.63162
L_A1_12	378727.298243	6807391.63162	WP,UTM,L_A1_12,33V,378727.298243,6807391.63162
L_A1_11	378827.298243	6807391.63162	WP,UTM,L_A1_11,33V,378827.298243,6807391.63162
L_A1_10	378927.298243	6807391.63162	WP,UTM,L_A1_10,33V,378927.298243,6807391.63162
L_A1_9	379027.298243	6807391.63162	WP,UTM,L_A1_9,33V,379027.298243,6807391.63162
L_A2_1	380227.298243	6807891.63162	WP,UTM,L_A2_1,33V,380227.298243,6807891.63162
L_A2_2	380327.298243	6807891.63162	WP,UTM,L_A2_2,33V,380327.298243,6807891.63162
L_A2_3	380427.298243	6807891.63162	WP,UTM,L_A2_3,33V,380427.298243,6807891.63162
L_A2_4	380527.298243	6807891.63162	WP,UTM,L_A2_4,33V,380527.298243,6807891.63162
L_A2_16	380127.298243	6807791.63162	WP,UTM,L_A2_16,33V,380127.298243,6807791.63162
L_A2_5	380627.298243	6807791.63162	WP,UTM,L_A2_5,33V,380627.298243,6807791.63162
L_A2_15	380127.298243	6807691.63162	WP,UTM,L_A2_15,33V,380127.298243,6807691.63162
L_A2_6	380627.298243	6807691.63162	WP,UTM,L_A2_6,33V,380627.298243,6807691.63162
L_A2_14	380127.2982	6807591.631	WP,UTM,L_A2_14,33V,380127.298243,6807591.6

	43	62	3162
L_A2_7	380627.298243	6807591.63162	WP,UTM,L_A2_7,33V,380627.298243,6807591.63162
L_A2_13	380127.298243	6807491.63162	WP,UTM,L_A2_13,33V,380127.298243,6807491.63162
L_A2_8	380627.298243	6807491.63162	WP,UTM,L_A2_8,33V,380627.298243,6807491.63162
L_A2_12	380227.298243	6807391.63162	WP,UTM,L_A2_12,33V,380227.298243,6807391.63162
L_A2_11	380327.298243	6807391.63162	WP,UTM,L_A2_11,33V,380327.298243,6807391.63162
L_A2_10	380427.298243	6807391.63162	WP,UTM,L_A2_10,33V,380427.298243,6807391.63162
L_A2_9	380527.298243	6807391.63162	WP,UTM,L_A2_9,33V,380527.298243,6807391.63162
L_A4_1	379727.298243	6806891.63162	WP,UTM,L_A4_1,33V,379727.298243,6806891.63162
L_A4_2	379827.298243	6806891.63162	WP,UTM,L_A4_2,33V,379827.298243,6806891.63162
L_A4_3	379927.298243	6806891.63162	WP,UTM,L_A4_3,33V,379927.298243,6806891.63162
L_A4_4	380027.298243	6806891.63162	WP,UTM,L_A4_4,33V,380027.298243,6806891.63162
L_A4_16	379627.298243	6806791.63162	WP,UTM,L_A4_16,33V,379627.298243,6806791.63162
L_A4_5	380127.298243	6806791.63162	WP,UTM,L_A4_5,33V,380127.298243,6806791.63162
L_A4_15	379627.298243	6806691.63162	WP,UTM,L_A4_15,33V,379627.298243,6806691.63162
L_A4_6	380127.298243	6806691.63162	WP,UTM,L_A4_6,33V,380127.298243,6806691.63162
L_A4_14	379627.298243	6806591.63162	WP,UTM,L_A4_14,33V,379627.298243,6806591.63162
L_A4_7	380127.298243	6806591.63162	WP,UTM,L_A4_7,33V,380127.298243,6806591.63162
L_A4_13	379627.298243	6806491.63162	WP,UTM,L_A4_13,33V,379627.298243,6806491.63162
L_A4_8	380127.298243	6806491.63162	WP,UTM,L_A4_8,33V,380127.298243,6806491.63162
L_A4_12	379727.298243	6806391.63162	WP,UTM,L_A4_12,33V,379727.298243,6806391.63162
L_A4_11	379827.298243	6806391.63162	WP,UTM,L_A4_11,33V,379827.298243,6806391.63162
L_A4_10	379927.298243	6806391.63162	WP,UTM,L_A4_10,33V,379927.298243,6806391.63162
L_A4_9	380027.298243	6806391.63162	WP,UTM,L_A4_9,33V,380027.298243,6806391.63162
L_A5_1	382227.298243	6806891.63162	WP,UTM,L_A5_1,33V,382227.298243,6806891.63162
L_A5_2	382327.298243	6806891.63162	WP,UTM,L_A5_2,33V,382327.298243,6806891.63162

L_A5_3	382427.298243	6806891.63162	WP,UTM,L_A5_3,33V,382427.298243,6806891.63162
L_A5_4	382527.298243	6806891.63162	WP,UTM,L_A5_4,33V,382527.298243,6806891.63162
L_A5_16	382127.298243	6806791.63162	WP,UTM,L_A5_16,33V,382127.298243,6806791.63162
L_A5_5	382627.298243	6806791.63162	WP,UTM,L_A5_5,33V,382627.298243,6806791.63162
L_A5_15	382127.298243	6806691.63162	WP,UTM,L_A5_15,33V,382127.298243,6806691.63162
L_A5_6	382627.298243	6806691.63162	WP,UTM,L_A5_6,33V,382627.298243,6806691.63162
L_A5_14	382127.298243	6806591.63162	WP,UTM,L_A5_14,33V,382127.298243,6806591.63162
L_A5_7	382627.298243	6806591.63162	WP,UTM,L_A5_7,33V,382627.298243,6806591.63162
L_A5_13	382127.298243	6806491.63162	WP,UTM,L_A5_13,33V,382127.298243,6806491.63162
L_A5_8	382627.298243	6806491.63162	WP,UTM,L_A5_8,33V,382627.298243,6806491.63162
L_A5_12	382227.298243	6806391.63162	WP,UTM,L_A5_12,33V,382227.298243,6806391.63162
L_A5_11	382327.298243	6806391.63162	WP,UTM,L_A5_11,33V,382327.298243,6806391.63162
L_A5_10	382427.298243	6806391.63162	WP,UTM,L_A5_10,33V,382427.298243,6806391.63162
L_A5_9	382527.298243	6806391.63162	WP,UTM,L_A5_9,33V,382527.298243,6806391.63162
L_A6_1	383727.298243	6806891.63162	WP,UTM,L_A6_1,33V,383727.298243,6806891.63162
L_A6_2	383827.298243	6806891.63162	WP,UTM,L_A6_2,33V,383827.298243,6806891.63162
L_A6_3	383927.298243	6806891.63162	WP,UTM,L_A6_3,33V,383927.298243,6806891.63162
L_A6_4	384027.298243	6806891.63162	WP,UTM,L_A6_4,33V,384027.298243,6806891.63162
L_A6_16	383627.298243	6806791.63162	WP,UTM,L_A6_16,33V,383627.298243,6806791.63162
L_A6_5	384127.298243	6806791.63162	WP,UTM,L_A6_5,33V,384127.298243,6806791.63162
L_A6_15	383627.298243	6806691.63162	WP,UTM,L_A6_15,33V,383627.298243,6806691.63162
L_A6_6	384127.298243	6806691.63162	WP,UTM,L_A6_6,33V,384127.298243,6806691.63162
L_A6_14	383627.298243	6806591.63162	WP,UTM,L_A6_14,33V,383627.298243,6806591.63162
L_A6_7	384127.298243	6806591.63162	WP,UTM,L_A6_7,33V,384127.298243,6806591.63162
L_A6_13	383627.298243	6806491.63162	WP,UTM,L_A6_13,33V,383627.298243,6806491.63162
L_A6_8	384076	6806512	WP,UTM,L_A6_8,33V,384076,6806512

L_A6_12	383727.298243	6806391.63162	WP,UTM,L_A6_12,33V,383727.298243,6806391.63162
L_A6_11	383827.298243	6806391.63162	WP,UTM,L_A6_11,33V,383827.298243,6806391.63162
L_A6_10	383927.298243	6806391.63162	WP,UTM,L_A6_10,33V,383927.298243,6806391.63162
L_A6_9	384027.298243	6806391.63162	WP,UTM,L_A6_9,33V,384027.298243,6806391.63162
L_A7_1	380727.298243	6805891.63162	WP,UTM,L_A7_1,33V,380727.298243,6805891.63162
L_A7_2	380827.298243	6805891.63162	WP,UTM,L_A7_2,33V,380827.298243,6805891.63162
L_A7_3	380927.298243	6805891.63162	WP,UTM,L_A7_3,33V,380927.298243,6805891.63162
L_A7_4	381027.298243	6805891.63162	WP,UTM,L_A7_4,33V,381027.298243,6805891.63162
L_A7_16	380627.298243	6805791.63162	WP,UTM,L_A7_16,33V,380627.298243,6805791.63162
L_A7_5	381127.298243	6805791.63162	WP,UTM,L_A7_5,33V,381127.298243,6805791.63162
L_A7_15	380627.298243	6805691.63162	WP,UTM,L_A7_15,33V,380627.298243,6805691.63162
L_A7_6	381127.298243	6805691.63162	WP,UTM,L_A7_6,33V,381127.298243,6805691.63162
L_A7_14	380627.298243	6805591.63162	WP,UTM,L_A7_14,33V,380627.298243,6805591.63162
L_A7_7	381127.298243	6805591.63162	WP,UTM,L_A7_7,33V,381127.298243,6805591.63162
L_A7_13	380627.298243	6805491.63162	WP,UTM,L_A7_13,33V,380627.298243,6805491.63162
L_A7_8	381127.298243	6805491.63162	WP,UTM,L_A7_8,33V,381127.298243,6805491.63162
L_A7_12	380727.298243	6805391.63162	WP,UTM,L_A7_12,33V,380727.298243,6805391.63162
L_A7_11	380827.298243	6805391.63162	WP,UTM,L_A7_11,33V,380827.298243,6805391.63162
L_A7_10	380927.298243	6805391.63162	WP,UTM,L_A7_10,33V,380927.298243,6805391.63162
L_A7_9	381027.298243	6805391.63162	WP,UTM,L_A7_9,33V,381027.298243,6805391.63162
L_A8_1	382727.298243	6805891.63162	WP,UTM,L_A8_1,33V,382727.298243,6805891.63162
L_A8_2	382827.298243	6805891.63162	WP,UTM,L_A8_2,33V,382827.298243,6805891.63162
L_A8_3	382927.298243	6805891.63162	WP,UTM,L_A8_3,33V,382927.298243,6805891.63162
L_A8_4	383027.298243	6805891.63162	WP,UTM,L_A8_4,33V,383027.298243,6805891.63162
L_A8_16	382627.298243	6805791.63162	WP,UTM,L_A8_16,33V,382627.298243,6805791.63162
L_A8_5	383127.298243	6805791.63162	WP,UTM,L_A8_5,33V,383127.298243,6805791.63162

L_A8_15	382627.298243	6805691.63162	WP,UTM,L_A8_15,33V,382627.298243,6805691.63162
L_A8_6	383094	6805695	WP,UTM,L_A8_6,33V,383094,6805695
L_A8_14	382627.298243	6805591.63162	WP,UTM,L_A8_14,33V,382627.298243,6805591.63162
L_A8_7	383147	6805590	WP,UTM,L_A8_7,33V,383147,6805590
L_A8_13	382627	6805487	WP,UTM,L_A8_13,33V,382627,6805487
L_A8_8	383127.298243	6805491.63162	WP,UTM,L_A8_8,33V,383127.298243,6805491.63162
L_A8_12	382727.298243	6805391.63162	WP,UTM,L_A8_12,33V,382727.298243,6805391.63162
L_A8_11	382827.298243	6805391.63162	WP,UTM,L_A8_11,33V,382827.298243,6805391.63162
L_A8_10	382927.298243	6805391.63162	WP,UTM,L_A8_10,33V,382927.298243,6805391.63162
L_A8_9	383027.298243	6805391.63162	WP,UTM,L_A8_9,33V,383027.298243,6805391.63162
L_A9_1	384727.298243	6805891.63162	WP,UTM,L_A9_1,33V,384727.298243,6805891.63162
L_A9_2	384827.298243	6805891.63162	WP,UTM,L_A9_2,33V,384827.298243,6805891.63162
L_A9_3	384927.298243	6805891.63162	WP,UTM,L_A9_3,33V,384927.298243,6805891.63162
L_A9_4	385027.298243	6805891.63162	WP,UTM,L_A9_4,33V,385027.298243,6805891.63162
L_A9_16	384627.298243	6805791.63162	WP,UTM,L_A9_16,33V,384627.298243,6805791.63162
L_A9_5	385127.298243	6805791.63162	WP,UTM,L_A9_5,33V,385127.298243,6805791.63162
L_A9_15	384627.298243	6805691.63162	WP,UTM,L_A9_15,33V,384627.298243,6805691.63162
L_A9_6	385127.298243	6805691.63162	WP,UTM,L_A9_6,33V,385127.298243,6805691.63162
L_A9_14	384627.298243	6805591.63162	WP,UTM,L_A9_14,33V,384627.298243,6805591.63162
L_A9_7	385127.298243	6805591.63162	WP,UTM,L_A9_7,33V,385127.298243,6805591.63162
L_A9_13	384627.298243	6805491.63162	WP,UTM,L_A9_13,33V,384627.298243,6805491.63162
L_A9_8	385127.298243	6805491.63162	WP,UTM,L_A9_8,33V,385127.298243,6805491.63162
L_A9_12	384727.298243	6805391.63162	WP,UTM,L_A9_12,33V,384727.298243,6805391.63162
L_A9_11	384827.298243	6805391.63162	WP,UTM,L_A9_11,33V,384827.298243,6805391.63162
L_A9_10	384927.298243	6805391.63162	WP,UTM,L_A9_10,33V,384927.298243,6805391.63162
L_A9_9	385027.298243	6805391.63162	WP,UTM,L_A9_9,33V,385027.298243,6805391.63162
L_A10_1	381727.298243	6804891.63162	WP,UTM,L_A10_1,33V,381727.298243,6804891.63162

L_A10_2	381827.298243	6804891.63162	WP,UTM,L_A10_2,33V,381827.298243,6804891.63162
L_A10_3	381927.298243	6804891.63162	WP,UTM,L_A10_3,33V,381927.298243,6804891.63162
L_A10_4	382027.298243	6804891.63162	WP,UTM,L_A10_4,33V,382027.298243,6804891.63162
L_A10_16	381627.298243	6804791.63162	WP,UTM,L_A10_16,33V,381627.298243,6804791.63162
L_A10_5	382127.298243	6804791.63162	WP,UTM,L_A10_5,33V,382127.298243,6804791.63162
L_A10_15	381615	6804688	WP,UTM,L_A10_15,33V,381615,6804688
L_A10_6	382127.298243	6804691.63162	WP,UTM,L_A10_6,33V,382127.298243,6804691.63162
L_A10_14	381627.298243	6804591.63162	WP,UTM,L_A10_14,33V,381627.298243,6804591.63162
L_A10_7	382127.298243	6804591.63162	WP,UTM,L_A10_7,33V,382127.298243,6804591.63162
L_A10_13	381627.298243	6804491.63162	WP,UTM,L_A10_13,33V,381627.298243,6804491.63162
L_A10_8	382127.298243	6804491.63162	WP,UTM,L_A10_8,33V,382127.298243,6804491.63162
L_A10_12	381727.298243	6804391.63162	WP,UTM,L_A10_12,33V,381727.298243,6804391.63162
L_A10_11	381827.298243	6804391.63162	WP,UTM,L_A10_11,33V,381827.298243,6804391.63162
L_A10_10	381927.298243	6804391.63162	WP,UTM,L_A10_10,33V,381927.298243,6804391.63162
L_A10_9	382027.298243	6804391.63162	WP,UTM,L_A10_9,33V,382027.298243,6804391.63162
L_A11_1	383727.298243	6804891.63162	WP,UTM,L_A11_1,33V,383727.298243,6804891.63162
L_A11_2	383827.298243	6804891.63162	WP,UTM,L_A11_2,33V,383827.298243,6804891.63162
L_A11_3	383927.298243	6804891.63162	WP,UTM,L_A11_3,33V,383927.298243,6804891.63162
L_A11_4	384027.298243	6804891.63162	WP,UTM,L_A11_4,33V,384027.298243,6804891.63162
L_A11_16	383627.298243	6804791.63162	WP,UTM,L_A11_16,33V,383627.298243,6804791.63162
L_A11_5	384127.298243	6804791.63162	WP,UTM,L_A11_5,33V,384127.298243,6804791.63162
L_A11_15	383627.298243	6804691.63162	WP,UTM,L_A11_15,33V,383627.298243,6804691.63162
L_A11_6	384127.298243	6804691.63162	WP,UTM,L_A11_6,33V,384127.298243,6804691.63162
L_A11_14	383627.298243	6804591.63162	WP,UTM,L_A11_14,33V,383627.298243,6804591.63162
L_A11_7	384127.298243	6804591.63162	WP,UTM,L_A11_7,33V,384127.298243,6804591.63162
L_A11_13	383627.298243	6804491.63162	WP,UTM,L_A11_13,33V,383627.298243,6804491.63162

L_A11_8	384127.298243	6804491.63162	WP,UTM,L_A11_8,33V,384127.298243,6804491.63162
L_A11_12	383727.298243	6804391.63162	WP,UTM,L_A11_12,33V,383727.298243,6804391.63162
L_A11_11	383827.298243	6804391.63162	WP,UTM,L_A11_11,33V,383827.298243,6804391.63162
L_A11_10	383927.298243	6804391.63162	WP,UTM,L_A11_10,33V,383927.298243,6804391.63162
L_A11_9	384027.298243	6804391.63162	WP,UTM,L_A11_9,33V,384027.298243,6804391.63162
L_B1_1	380227.298243	6802391.63162	WP,UTM,L_B1_1,33V,380227.298243,6802391.63162
L_B1_2	380327.298243	6802391.63162	WP,UTM,L_B1_2,33V,380327.298243,6802391.63162
L_B1_3	380427.298243	6802391.63162	WP,UTM,L_B1_3,33V,380427.298243,6802391.63162
L_B1_4	380527.298243	6802391.63162	WP,UTM,L_B1_4,33V,380527.298243,6802391.63162
L_B1_16	380127.298243	6802291.63162	WP,UTM,L_B1_16,33V,380127.298243,6802291.63162
L_B1_5	380627.298243	6802291.63162	WP,UTM,L_B1_5,33V,380627.298243,6802291.63162
L_B1_15	380127.298243	6802191.63162	WP,UTM,L_B1_15,33V,380127.298243,6802191.63162
L_B1_6	380627.298243	6802191.63162	WP,UTM,L_B1_6,33V,380627.298243,6802191.63162
L_B1_14	380127.298243	6802091.63162	WP,UTM,L_B1_14,33V,380127.298243,6802091.63162
L_B1_7	380627.298243	6802091.63162	WP,UTM,L_B1_7,33V,380627.298243,6802091.63162
L_B1_13	380127.298243	6801991.63162	WP,UTM,L_B1_13,33V,380127.298243,6801991.63162
L_B1_8	380627.298243	6801991.63162	WP,UTM,L_B1_8,33V,380627.298243,6801991.63162
L_B1_12	380227.298243	6801891.63162	WP,UTM,L_B1_12,33V,380227.298243,6801891.63162
L_B1_11	380327.298243	6801891.63162	WP,UTM,L_B1_11,33V,380327.298243,6801891.63162
L_B1_10	380427.298243	6801891.63162	WP,UTM,L_B1_10,33V,380427.298243,6801891.63162
L_B1_9	380527.298243	6801891.63162	WP,UTM,L_B1_9,33V,380527.298243,6801891.63162
L_B2_1	381227.298243	6801391.63162	WP,UTM,L_B2_1,33V,381227.298243,6801391.63162
L_B2_2	381327.298243	6801391.63162	WP,UTM,L_B2_2,33V,381327.298243,6801391.63162
L_B2_3	381427.298243	6801391.63162	WP,UTM,L_B2_3,33V,381427.298243,6801391.63162
L_B2_4	381527.298243	6801391.63162	WP,UTM,L_B2_4,33V,381527.298243,6801391.63162
L_B2_16	381127.298243	6801291.63162	WP,UTM,L_B2_16,33V,381127.298243,6801291.63162

L_B2_5	381627.298243	6801291.63162	WP,UTM,L_B2_5,33V,381627.298243,6801291.63162
L_B2_15	381127.298243	6801191.63162	WP,UTM,L_B2_15,33V,381127.298243,6801191.63162
L_B2_6	381627.298243	6801191.63162	WP,UTM,L_B2_6,33V,381627.298243,6801191.63162
L_B2_14	381127.298243	6801091.63162	WP,UTM,L_B2_14,33V,381127.298243,6801091.63162
L_B2_7	381627.298243	6801091.63162	WP,UTM,L_B2_7,33V,381627.298243,6801091.63162
L_B2_13	381127.298243	6800991.63162	WP,UTM,L_B2_13,33V,381127.298243,6800991.63162
L_B2_8	381627.298243	6800991.63162	WP,UTM,L_B2_8,33V,381627.298243,6800991.63162
L_B2_12	381227.298243	6800891.63162	WP,UTM,L_B2_12,33V,381227.298243,6800891.63162
L_B2_11	381327.298243	6800891.63162	WP,UTM,L_B2_11,33V,381327.298243,6800891.63162
L_B2_10	381427.298243	6800891.63162	WP,UTM,L_B2_10,33V,381427.298243,6800891.63162
L_B2_9	381527.298243	6800891.63162	WP,UTM,L_B2_9,33V,381527.298243,6800891.63162
L_B3_1	380227.298243	6800391.63162	WP,UTM,L_B3_1,33V,380227.298243,6800391.63162
L_B3_2	380327.298243	6800391.63162	WP,UTM,L_B3_2,33V,380327.298243,6800391.63162
L_B3_3	380427.298243	6800391.63162	WP,UTM,L_B3_3,33V,380427.298243,6800391.63162
L_B3_4	380527.298243	6800391.63162	WP,UTM,L_B3_4,33V,380527.298243,6800391.63162
L_B3_16	380127.298243	6800291.63162	WP,UTM,L_B3_16,33V,380127.298243,6800291.63162
L_B3_5	380627.298243	6800291.63162	WP,UTM,L_B3_5,33V,380627.298243,6800291.63162
L_B3_15	380127.298243	6800191.63162	WP,UTM,L_B3_15,33V,380127.298243,6800191.63162
L_B3_6	380627.298243	6800191.63162	WP,UTM,L_B3_6,33V,380627.298243,6800191.63162
L_B3_14	380158	6800093	WP,UTM,L_B3_14,33V,380158,6800093
L_B3_7	380627.298243	6800091.63162	WP,UTM,L_B3_7,33V,380627.298243,6800091.63162
L_B3_13	380165	6800001	WP,UTM,L_B3_13,33V,380165,6800001
L_B3_8	380627.298243	6799991.63162	WP,UTM,L_B3_8,33V,380627.298243,6799991.63162
L_B3_12	380227.298243	6799891.63162	WP,UTM,L_B3_12,33V,380227.298243,6799891.63162
L_B3_11	380327.298243	6799891.63162	WP,UTM,L_B3_11,33V,380327.298243,6799891.63162
L_B3_10	380427.298243	6799891.63162	WP,UTM,L_B3_10,33V,380427.298243,6799891.63162
L_B3_9	380527.2982	6799891.631	WP,UTM,L_B3_9,33V,380527.298243,6799891.63

	43	62	162
L_B4_1	382227.298243	6800391.63162	WP,UTM,L_B4_1,33V,382227.298243,6800391.63162
L_B4_2	382327.298243	6800391.63162	WP,UTM,L_B4_2,33V,382327.298243,6800391.63162
L_B4_3	382427.298243	6800391.63162	WP,UTM,L_B4_3,33V,382427.298243,6800391.63162
L_B4_4	382527.298243	6800391.63162	WP,UTM,L_B4_4,33V,382527.298243,6800391.63162
L_B4_16	382127.298243	6800291.63162	WP,UTM,L_B4_16,33V,382127.298243,6800291.63162
L_B4_5	382627.298243	6800291.63162	WP,UTM,L_B4_5,33V,382627.298243,6800291.63162
L_B4_15	382127.298243	6800191.63162	WP,UTM,L_B4_15,33V,382127.298243,6800191.63162
L_B4_6	382627.298243	6800191.63162	WP,UTM,L_B4_6,33V,382627.298243,6800191.63162
L_B4_14	382127.298243	6800091.63162	WP,UTM,L_B4_14,33V,382127.298243,6800091.63162
L_B4_7	382627.298243	6800091.63162	WP,UTM,L_B4_7,33V,382627.298243,6800091.63162
L_B4_13	382127.298243	6799991.63162	WP,UTM,L_B4_13,33V,382127.298243,6799991.63162
L_B4_8	382627.298243	6799991.63162	WP,UTM,L_B4_8,33V,382627.298243,6799991.63162
L_B4_12	382227.298243	6799891.63162	WP,UTM,L_B4_12,33V,382227.298243,6799891.63162
L_B4_11	382327.298243	6799891.63162	WP,UTM,L_B4_11,33V,382327.298243,6799891.63162
L_B4_10	382427.298243	6799891.63162	WP,UTM,L_B4_10,33V,382427.298243,6799891.63162
L_B4_9	382527.298243	6799891.63162	WP,UTM,L_B4_9,33V,382527.298243,6799891.63162
L_B5_1	384227.298243	6800391.63162	WP,UTM,L_B5_1,33V,384227.298243,6800391.63162
L_B5_2	384327.298243	6800391.63162	WP,UTM,L_B5_2,33V,384327.298243,6800391.63162
L_B5_3	384427.298243	6800391.63162	WP,UTM,L_B5_3,33V,384427.298243,6800391.63162
L_B5_4	384527.298243	6800391.63162	WP,UTM,L_B5_4,33V,384527.298243,6800391.63162
L_B5_16	384127.298243	6800291.63162	WP,UTM,L_B5_16,33V,384127.298243,6800291.63162
L_B5_5	384627.298243	6800291.63162	WP,UTM,L_B5_5,33V,384627.298243,6800291.63162
L_B5_15	384127.298243	6800191.63162	WP,UTM,L_B5_15,33V,384127.298243,6800191.63162
L_B5_6	384627.298243	6800191.63162	WP,UTM,L_B5_6,33V,384627.298243,6800191.63162
L_B5_14	384127.298243	6800091.63162	WP,UTM,L_B5_14,33V,384127.298243,6800091.63162

L_B5_7	384627.298243	6800091.63162	WP,UTM,L_B5_7,33V,384627.298243,6800091.63162
L_B5_13	384127.298243	6799991.63162	WP,UTM,L_B5_13,33V,384127.298243,6799991.63162
L_B5_8	384627.298243	6799991.63162	WP,UTM,L_B5_8,33V,384627.298243,6799991.63162
L_B5_12	384227.298243	6799891.63162	WP,UTM,L_B5_12,33V,384227.298243,6799891.63162
L_B5_11	384327.298243	6799891.63162	WP,UTM,L_B5_11,33V,384327.298243,6799891.63162
L_B5_10	384427.298243	6799891.63162	WP,UTM,L_B5_10,33V,384427.298243,6799891.63162
L_B5_9	384527.298243	6799891.63162	WP,UTM,L_B5_9,33V,384527.298243,6799891.63162
L_B6_1	381227.298243	6799391.63162	WP,UTM,L_B6_1,33V,381227.298243,6799391.63162
L_B6_2	381327.298243	6799391.63162	WP,UTM,L_B6_2,33V,381327.298243,6799391.63162
L_B6_3	381427.298243	6799391.63162	WP,UTM,L_B6_3,33V,381427.298243,6799391.63162
L_B6_4	381527.298243	6799391.63162	WP,UTM,L_B6_4,33V,381527.298243,6799391.63162
L_B6_16	381127.298243	6799291.63162	WP,UTM,L_B6_16,33V,381127.298243,6799291.63162
L_B6_5	381627.298243	6799291.63162	WP,UTM,L_B6_5,33V,381627.298243,6799291.63162
L_B6_15	381127.298243	6799191.63162	WP,UTM,L_B6_15,33V,381127.298243,6799191.63162
L_B6_6	381627.298243	6799191.63162	WP,UTM,L_B6_6,33V,381627.298243,6799191.63162
L_B6_14	381127.298243	6799091.63162	WP,UTM,L_B6_14,33V,381127.298243,6799091.63162
L_B6_7	381627.298243	6799091.63162	WP,UTM,L_B6_7,33V,381627.298243,6799091.63162
L_B6_13	381127.298243	6798991.63162	WP,UTM,L_B6_13,33V,381127.298243,6798991.63162
L_B6_8	381627.298243	6798991.63162	WP,UTM,L_B6_8,33V,381627.298243,6798991.63162
L_B6_12	381227.298243	6798891.63162	WP,UTM,L_B6_12,33V,381227.298243,6798891.63162
L_B6_11	381327.298243	6798891.63162	WP,UTM,L_B6_11,33V,381327.298243,6798891.63162
L_B6_10	381426	6798932	WP,UTM,L_B6_10,33V,381426,6798932
L_B6_9	381527.298243	6798891.63162	WP,UTM,L_B6_9,33V,381527.298243,6798891.63162
L_B7_1	383227.298243	6799391.63162	WP,UTM,L_B7_1,33V,383227.298243,6799391.63162
L_B7_2	383327.298243	6799391.63162	WP,UTM,L_B7_2,33V,383327.298243,6799391.63162
L_B7_3	383427.298243	6799391.63162	WP,UTM,L_B7_3,33V,383427.298243,6799391.63162

L_B7_4	383527.298243	6799391.63162	WP,UTM,L_B7_4,33V,383527.298243,6799391.63162
L_B7_16	383127.298243	6799291.63162	WP,UTM,L_B7_16,33V,383127.298243,6799291.63162
L_B7_5	383627.298243	6799291.63162	WP,UTM,L_B7_5,33V,383627.298243,6799291.63162
L_B7_15	383127.298243	6799191.63162	WP,UTM,L_B7_15,33V,383127.298243,6799191.63162
L_B7_6	383627.298243	6799191.63162	WP,UTM,L_B7_6,33V,383627.298243,6799191.63162
L_B7_14	383127.298243	6799091.63162	WP,UTM,L_B7_14,33V,383127.298243,6799091.63162
L_B7_7	383627.298243	6799091.63162	WP,UTM,L_B7_7,33V,383627.298243,6799091.63162
L_B7_13	383127.298243	6798991.63162	WP,UTM,L_B7_13,33V,383127.298243,6798991.63162
L_B7_8	383627.298243	6798991.63162	WP,UTM,L_B7_8,33V,383627.298243,6798991.63162
L_B7_12	383227.298243	6798891.63162	WP,UTM,L_B7_12,33V,383227.298243,6798891.63162
L_B7_11	383327.298243	6798891.63162	WP,UTM,L_B7_11,33V,383327.298243,6798891.63162
L_B7_10	383427.298243	6798891.63162	WP,UTM,L_B7_10,33V,383427.298243,6798891.63162
L_B7_9	383527.298243	6798891.63162	WP,UTM,L_B7_9,33V,383527.298243,6798891.63162
L_B8_1	382227.298243	6798391.63162	WP,UTM,L_B8_1,33V,382227.298243,6798391.63162
L_B8_2	382327.298243	6798391.63162	WP,UTM,L_B8_2,33V,382327.298243,6798391.63162
L_B8_3	382427.298243	6798391.63162	WP,UTM,L_B8_3,33V,382427.298243,6798391.63162
L_B8_4	382527.298243	6798391.63162	WP,UTM,L_B8_4,33V,382527.298243,6798391.63162
L_B8_16	382127.298243	6798291.63162	WP,UTM,L_B8_16,33V,382127.298243,6798291.63162
L_B8_5	382627.298243	6798291.63162	WP,UTM,L_B8_5,33V,382627.298243,6798291.63162
L_B8_15	382127.298243	6798191.63162	WP,UTM,L_B8_15,33V,382127.298243,6798191.63162
L_B8_6	382627.298243	6798191.63162	WP,UTM,L_B8_6,33V,382627.298243,6798191.63162
L_B8_14	382127.298243	6798091.63162	WP,UTM,L_B8_14,33V,382127.298243,6798091.63162
L_B8_7	382627.298243	6798091.63162	WP,UTM,L_B8_7,33V,382627.298243,6798091.63162
L_B8_13	382127.298243	6797991.63162	WP,UTM,L_B8_13,33V,382127.298243,6797991.63162
L_B8_8	382627.298243	6797991.63162	WP,UTM,L_B8_8,33V,382627.298243,6797991.63162
L_B8_12	382227.298243	6797891.63162	WP,UTM,L_B8_12,33V,382227.298243,6797891.63162

L_B8_11	382327.298243	6797891.63162	WP,UTM,L_B8_11,33V,382327.298243,6797891.63162
L_B8_10	382427.298243	6797891.63162	WP,UTM,L_B8_10,33V,382427.298243,6797891.63162
L_B8_9	382527.298243	6797891.63162	WP,UTM,L_B8_9,33V,382527.298243,6797891.63162
L_B9_1	381227.298243	6797391.63162	WP,UTM,L_B9_1,33V,381227.298243,6797391.63162
L_B9_2	381327.298243	6797391.63162	WP,UTM,L_B9_2,33V,381327.298243,6797391.63162
L_B9_3	381427.298243	6797391.63162	WP,UTM,L_B9_3,33V,381427.298243,6797391.63162
L_B9_4	381527.298243	6797391.63162	WP,UTM,L_B9_4,33V,381527.298243,6797391.63162
L_B9_16	381127.298243	6797291.63162	WP,UTM,L_B9_16,33V,381127.298243,6797291.63162
L_B9_5	381627.298243	6797291.63162	WP,UTM,L_B9_5,33V,381627.298243,6797291.63162
L_B9_15	381127.298243	6797191.63162	WP,UTM,L_B9_15,33V,381127.298243,6797191.63162
L_B9_6	381627.298243	6797191.63162	WP,UTM,L_B9_6,33V,381627.298243,6797191.63162
L_B9_14	381127.298243	6797091.63162	WP,UTM,L_B9_14,33V,381127.298243,6797091.63162
L_B9_7	381627.298243	6797091.63162	WP,UTM,L_B9_7,33V,381627.298243,6797091.63162
L_B9_13	381127.298243	6796991.63162	WP,UTM,L_B9_13,33V,381127.298243,6796991.63162
L_B9_8	381627.298243	6796991.63162	WP,UTM,L_B9_8,33V,381627.298243,6796991.63162
L_B9_12	381227.298243	6796891.63162	WP,UTM,L_B9_12,33V,381227.298243,6796891.63162
L_B9_11	381327.298243	6796891.63162	WP,UTM,L_B9_11,33V,381327.298243,6796891.63162
L_B9_10	381427.298243	6796891.63162	WP,UTM,L_B9_10,33V,381427.298243,6796891.63162
L_B9_9	381527.298243	6796891.63162	WP,UTM,L_B9_9,33V,381527.298243,6796891.63162
L_B10_1	383227.298243	6797391.63162	WP,UTM,L_B10_1,33V,383227.298243,6797391.63162
L_B10_2	383327.298243	6797391.63162	WP,UTM,L_B10_2,33V,383327.298243,6797391.63162
L_B10_3	383427.298243	6797391.63162	WP,UTM,L_B10_3,33V,383427.298243,6797391.63162
L_B10_4	383527.298243	6797391.63162	WP,UTM,L_B10_4,33V,383527.298243,6797391.63162
L_B10_16	383127.298243	6797291.63162	WP,UTM,L_B10_16,33V,383127.298243,6797291.63162
L_B10_5	383627.298243	6797291.63162	WP,UTM,L_B10_5,33V,383627.298243,6797291.63162
L_B10_15	383127.298243	6797191.63162	WP,UTM,L_B10_15,33V,383127.298243,6797191.63162

L_B10_6	383627.298243	6797191.63162	WP,UTM,L_B10_6,33V,383627.298243,6797191.63162
L_B10_14	383127.298243	6797091.63162	WP,UTM,L_B10_14,33V,383127.298243,6797091.63162
L_B10_7	383627.298243	6797091.63162	WP,UTM,L_B10_7,33V,383627.298243,6797091.63162
L_B10_13	383127.298243	6796991.63162	WP,UTM,L_B10_13,33V,383127.298243,6796991.63162
L_B10_8	383627.298243	6796991.63162	WP,UTM,L_B10_8,33V,383627.298243,6796991.63162
L_B10_12	383227.298243	6796891.63162	WP,UTM,L_B10_12,33V,383227.298243,6796891.63162
L_B10_11	383327.298243	6796891.63162	WP,UTM,L_B10_11,33V,383327.298243,6796891.63162
L_B10_10	383427.298243	6796891.63162	WP,UTM,L_B10_10,33V,383427.298243,6796891.63162
L_B10_9	383527.298243	6796891.63162	WP,UTM,L_B10_9,33V,383527.298243,6796891.63162
L_A12_1	380227.298243	6804391.63162	WP,UTM,L_A12_1,33V,380227.298243,6804391.63162
L_A12_2	380327.298243	6804391.63162	WP,UTM,L_A12_2,33V,380327.298243,6804391.63162
L_A12_3	380427.298243	6804391.63162	WP,UTM,L_A12_3,33V,380427.298243,6804391.63162
L_A12_4	380527.298243	6804391.63162	WP,UTM,L_A12_4,33V,380527.298243,6804391.63162
L_A12_16	380127.298243	6804291.63162	WP,UTM,L_A12_16,33V,380127.298243,6804291.63162
L_A12_5	380627.298243	6804291.63162	WP,UTM,L_A12_5,33V,380627.298243,6804291.63162
L_A12_15	380127.298243	6804191.63162	WP,UTM,L_A12_15,33V,380127.298243,6804191.63162
L_A12_6	380627.298243	6804191.63162	WP,UTM,L_A12_6,33V,380627.298243,6804191.63162
L_A12_14	380127.298243	6804091.63162	WP,UTM,L_A12_14,33V,380127.298243,6804091.63162
L_A12_7	380627.298243	6804091.63162	WP,UTM,L_A12_7,33V,380627.298243,6804091.63162
L_A12_13	380127.298243	6803991.63162	WP,UTM,L_A12_13,33V,380127.298243,6803991.63162
L_A12_8	380627.298243	6803991.63162	WP,UTM,L_A12_8,33V,380627.298243,6803991.63162
L_A12_12	380227.298243	6803891.63162	WP,UTM,L_A12_12,33V,380227.298243,6803891.63162
L_A12_11	380327.298243	6803891.63162	WP,UTM,L_A12_11,33V,380327.298243,6803891.63162
L_A12_10	380427.298243	6803891.63162	WP,UTM,L_A12_10,33V,380427.298243,6803891.63162
L_A12_9	380527.298243	6803891.63162	WP,UTM,L_A12_9,33V,380527.298243,6803891.63162
L_B11_1	383227.298243	6795891.63162	WP,UTM,L_B11_1,33V,383227.298243,6795891.63162

L_B11_10	383427.298243	6795391.63162	WP,UTM,L_B11_10,33V,383427.298243,6795391.63162
L_B11_11	383327.298243	6795391.63162	WP,UTM,L_B11_11,33V,383327.298243,6795391.63162
L_B11_12	383227.298243	6795391.63162	WP,UTM,L_B11_12,33V,383227.298243,6795391.63162
L_B11_13	383127.298243	6795491.63162	WP,UTM,L_B11_13,33V,383127.298243,6795491.63162
L_B11_14	383127.298243	6795591.63162	WP,UTM,L_B11_14,33V,383127.298243,6795591.63162
L_B11_15	383127.298243	6795691.63162	WP,UTM,L_B11_15,33V,383127.298243,6795691.63162
L_B11_16	383127.298243	6795791.63162	WP,UTM,L_B11_16,33V,383127.298243,6795791.63162
L_B11_2	383327.298243	6795891.63162	WP,UTM,L_B11_2,33V,383327.298243,6795891.63162
L_B11_3	383427.298243	6795891.63162	WP,UTM,L_B11_3,33V,383427.298243,6795891.63162
L_B11_4	383527.298243	6795891.63162	WP,UTM,L_B11_4,33V,383527.298243,6795891.63162
L_B11_5	383627.298243	6795791.63162	WP,UTM,L_B11_5,33V,383627.298243,6795791.63162
L_B11_6	383627.298243	6795691.63162	WP,UTM,L_B11_6,33V,383627.298243,6795691.63162
L_B11_7	383627.298243	6795591.63162	WP,UTM,L_B11_7,33V,383627.298243,6795591.63162
L_B11_8	383627.298243	6795491.63162	WP,UTM,L_B11_8,33V,383627.298243,6795491.63162
L_B11_9	383527.298243	6795391.63162	WP,UTM,L_B11_9,33V,383527.298243,6795391.63162
G_A1_1	354727.2982	6750391.632	WP,UTM,G_A1_1,33V,354727.2982,6750391.632
G_A1_10	354927.2982	6749891.632	WP,UTM,G_A1_10,33V,354927.2982,6749891.632
G_A1_11	354827.2982	6749891.632	WP,UTM,G_A1_11,33V,354827.2982,6749891.632
G_A1_12	354727.2982	6749891.632	WP,UTM,G_A1_12,33V,354727.2982,6749891.632
G_A1_13	354627.2982	6749991.632	WP,UTM,G_A1_13,33V,354627.2982,6749991.632
G_A1_14	354627.2982	6750091.632	WP,UTM,G_A1_14,33V,354627.2982,6750091.632
G_A1_15	354627.2982	6750191.632	WP,UTM,G_A1_15,33V,354627.2982,6750191.632
G_A1_16	354627.2982	6750291.632	WP,UTM,G_A1_16,33V,354627.2982,6750291.632
G_A1_2	354827.2982	6750391.632	WP,UTM,G_A1_2,33V,354827.2982,6750391.632
G_A1_3	354927.2982	6750391.632	WP,UTM,G_A1_3,33V,354927.2982,6750391.632
G_A1_4	355027.2982	6750391.632	WP,UTM,G_A1_4,33V,355027.2982,6750391.632
G_A1_5	355127.2982	6750291.632	WP,UTM,G_A1_5,33V,355127.2982,6750291.632
G_A1_6	355127.2982	6750191.632	WP,UTM,G_A1_6,33V,355127.2982,6750191.632
G_A1_7	355127.2982	6750091.632	WP,UTM,G_A1_7,33V,355127.2982,6750091.632

G_A1_8	355127.2982	6749991.632	WP,UTM,G_A1_8,33V,355127.2982,6749991.632
G_A1_9	355027.2982	6749891.632	WP,UTM,G_A1_9,33V,355027.2982,6749891.632
G_A10_1	353227.2982	6745391.632	WP,UTM,G_A10_1,33V,353227.2982,6745391.632
G_A10_10	353427.2982	6744891.632	WP,UTM,G_A10_10,33V,353427.2982,6744891.632
G_A10_11	353327.2982	6744891.632	WP,UTM,G_A10_11,33V,353327.2982,6744891.632
G_A10_12	353245.2982	6744991.632	WP,UTM,G_A10_12,33V,353245.2982,6744991.632
G_A10_13	353127.2982	6744991.632	WP,UTM,G_A10_13,33V,353127.2982,6744991.632
G_A10_14	353127.2982	6745091.632	WP,UTM,G_A10_14,33V,353127.2982,6745091.632
G_A10_15	353127.2982	6745191.632	WP,UTM,G_A10_15,33V,353127.2982,6745191.632
G_A10_16	353127.2982	6745291.632	WP,UTM,G_A10_16,33V,353127.2982,6745291.632
G_A10_2	353327.2982	6745391.632	WP,UTM,G_A10_2,33V,353327.2982,6745391.632
G_A10_3	353427.2982	6745391.632	WP,UTM,G_A10_3,33V,353427.2982,6745391.632
G_A10_4	353527.2982	6745391.632	WP,UTM,G_A10_4,33V,353527.2982,6745391.632
G_A10_5	353627.2982	6745291.632	WP,UTM,G_A10_5,33V,353627.2982,6745291.632
G_A10_6	353627.2982	6745191.632	WP,UTM,G_A10_6,33V,353627.2982,6745191.632
G_A10_7	353627.2982	6745091.632	WP,UTM,G_A10_7,33V,353627.2982,6745091.632
G_A10_8	353627.2982	6744991.632	WP,UTM,G_A10_8,33V,353627.2982,6744991.632
G_A10_9	353527.2982	6744891.632	WP,UTM,G_A10_9,33V,353527.2982,6744891.632
G_A2_1	350727.2982	6748891.632	WP,UTM,G_A2_1,33V,350727.2982,6748891.632
G_A2_10	350927.2982	6748391.632	WP,UTM,G_A2_10,33V,350927.2982,6748391.632
G_A2_11	350827.2982	6748391.632	WP,UTM,G_A2_11,33V,350827.2982,6748391.632
G_A2_12	350727.2982	6748391.632	WP,UTM,G_A2_12,33V,350727.2982,6748391.632
G_A2_13	350627.2982	6748491.632	WP,UTM,G_A2_13,33V,350627.2982,6748491.632
G_A2_14	350627.2982	6748591.632	WP,UTM,G_A2_14,33V,350627.2982,6748591.632
G_A2_15	350627.2982	6748691.632	WP,UTM,G_A2_15,33V,350627.2982,6748691.632
G_A2_16	350627.2982	6748791.632	WP,UTM,G_A2_16,33V,350627.2982,6748791.632
G_A2_2	350827.2982	6748891.632	WP,UTM,G_A2_2,33V,350827.2982,6748891.632
G_A2_3	350927.2982	6748891.632	WP,UTM,G_A2_3,33V,350927.2982,6748891.632

G_A2_4	351027.2982	6748891.632	WP,UTM,G_A2_4,33V,351027.2982,6748891.632
G_A2_5	351127.2982	6748791.632	WP,UTM,G_A2_5,33V,351127.2982,6748791.632
G_A2_6	351127.2982	6748691.632	WP,UTM,G_A2_6,33V,351127.2982,6748691.632
G_A2_7	351127.2982	6748591.632	WP,UTM,G_A2_7,33V,351127.2982,6748591.632
G_A2_8	351127.2982	6748491.632	WP,UTM,G_A2_8,33V,351127.2982,6748491.632
G_A2_9	351027.2982	6748391.632	WP,UTM,G_A2_9,33V,351027.2982,6748391.632
G_A3_1	352727.2982	6748891.632	WP,UTM,G_A3_1,33V,352727.2982,6748891.632
G_A3_10	352927.2982	6748391.632	WP,UTM,G_A3_10,33V,352927.2982,6748391.632
G_A3_11	352827.2982	6748391.632	WP,UTM,G_A3_11,33V,352827.2982,6748391.632
G_A3_12	352727.2982	6748391.632	WP,UTM,G_A3_12,33V,352727.2982,6748391.632
G_A3_13	352627.2982	6748491.632	WP,UTM,G_A3_13,33V,352627.2982,6748491.632
G_A3_14	352627.2982	6748591.632	WP,UTM,G_A3_14,33V,352627.2982,6748591.632
G_A3_15	352627.2982	6748691.632	WP,UTM,G_A3_15,33V,352627.2982,6748691.632
G_A3_16	352627.2982	6748791.632	WP,UTM,G_A3_16,33V,352627.2982,6748791.632
G_A3_2	352827.2982	6748891.632	WP,UTM,G_A3_2,33V,352827.2982,6748891.632
G_A3_3	352927.2982	6748891.632	WP,UTM,G_A3_3,33V,352927.2982,6748891.632
G_A3_4	353027.2982	6748891.632	WP,UTM,G_A3_4,33V,353027.2982,6748891.632
G_A3_5	353127.2982	6748791.632	WP,UTM,G_A3_5,33V,353127.2982,6748791.632
G_A3_6	353127.2982	6748691.632	WP,UTM,G_A3_6,33V,353127.2982,6748691.632
G_A3_7	353127.2982	6748591.632	WP,UTM,G_A3_7,33V,353127.2982,6748591.632
G_A3_8	353127.2982	6748491.632	WP,UTM,G_A3_8,33V,353127.2982,6748491.632
G_A3_9	353027.2982	6748391.632	WP,UTM,G_A3_9,33V,353027.2982,6748391.632
G_A4_1	354727.2982	6748891.632	WP,UTM,G_A4_1,33V,354727.2982,6748891.632
G_A4_10	354927.2982	6748391.632	WP,UTM,G_A4_10,33V,354927.2982,6748391.632
G_A4_11	354827.2982	6748391.632	WP,UTM,G_A4_11,33V,354827.2982,6748391.632
G_A4_12	354727.2982	6748391.632	WP,UTM,G_A4_12,33V,354727.2982,6748391.632
G_A4_13	354627.2982	6748491.632	WP,UTM,G_A4_13,33V,354627.2982,6748491.632
G_A4_14	354627.2982	6748591.632	WP,UTM,G_A4_14,33V,354627.2982,6748591.632
G_A4_15	354627.2982	6748691.632	WP,UTM,G_A4_15,33V,354627.2982,6748691.632
G_A4_16	354627.2982	6748791.632	WP,UTM,G_A4_16,33V,354627.2982,6748791.632
G_A4_2	354827.2982	6748891.632	WP,UTM,G_A4_2,33V,354827.2982,6748891.632
G_A4_3	354927.2982	6748891.632	WP,UTM,G_A4_3,33V,354927.2982,6748891.632
G_A4_4	355027.2982	6748891.632	WP,UTM,G_A4_4,33V,355027.2982,6748891.632
G_A4_5	355127.2982	6748791.632	WP,UTM,G_A4_5,33V,355127.2982,6748791.632
G_A4_6	355127.2982	6748691.632	WP,UTM,G_A4_6,33V,355127.2982,6748691.632

G_A4_7	355127.2982	6748591.632	WP,UTM,G_A4_7,33V,355127.2982,6748591.632
G_A4_8	355127.2982	6748491.632	WP,UTM,G_A4_8,33V,355127.2982,6748491.632
G_A4_9	355027.2982	6748391.632	WP,UTM,G_A4_9,33V,355027.2982,6748391.632
G_A5_1	351727.2982	6747891.632	WP,UTM,G_A5_1,33V,351727.2982,6747891.632
G_A5_10	351927.2982	6747391.632	WP,UTM,G_A5_10,33V,351927.2982,6747391.632
G_A5_11	351827.2982	6747391.632	WP,UTM,G_A5_11,33V,351827.2982,6747391.632
G_A5_12	351727.2982	6747391.632	WP,UTM,G_A5_12,33V,351727.2982,6747391.632
G_A5_13	351627.2982	6747491.632	WP,UTM,G_A5_13,33V,351627.2982,6747491.632
G_A5_14	351627.2982	6747591.632	WP,UTM,G_A5_14,33V,351627.2982,6747591.632
G_A5_15	351627.2982	6747691.632	WP,UTM,G_A5_15,33V,351627.2982,6747691.632
G_A5_16	351627.2982	6747791.632	WP,UTM,G_A5_16,33V,351627.2982,6747791.632
G_A5_2	351827.2982	6747891.632	WP,UTM,G_A5_2,33V,351827.2982,6747891.632
G_A5_3	351927.2982	6747891.632	WP,UTM,G_A5_3,33V,351927.2982,6747891.632
G_A5_4	352106,0000	6747936,000	WP,UTM,G_A5_4,33V,352106,6747936
G_A5_5	352127.2982	6747791.632	WP,UTM,G_A5_5,33V,352127.2982,6747791.632
G_A5_6	352127.2982	6747691.632	WP,UTM,G_A5_6,33V,352127.2982,6747691.632
G_A5_7	352127.2982	6747591.632	WP,UTM,G_A5_7,33V,352127.2982,6747591.632
G_A5_8	352127.2982	6747491.632	WP,UTM,G_A5_8,33V,352127.2982,6747491.632
G_A5_9	352027.2982	6747391.632	WP,UTM,G_A5_9,33V,352027.2982,6747391.632
G_A6_1	353727.2982	6747891.632	WP,UTM,G_A6_1,33V,353727.2982,6747891.632
G_A6_10	353927.2982	6747391.632	WP,UTM,G_A6_10,33V,353927.2982,6747391.632
G_A6_11	353827.2982	6747391.632	WP,UTM,G_A6_11,33V,353827.2982,6747391.632
G_A6_12	353727.2982	6747391.632	WP,UTM,G_A6_12,33V,353727.2982,6747391.632
G_A6_13	353627.2982	6747491.632	WP,UTM,G_A6_13,33V,353627.2982,6747491.632
G_A6_14	353627.2982	6747591.632	WP,UTM,G_A6_14,33V,353627.2982,6747591.632
G_A6_15	353627.2982	6747691.632	WP,UTM,G_A6_15,33V,353627.2982,6747691.632
G_A6_16	353627.2982	6747791.632	WP,UTM,G_A6_16,33V,353627.2982,6747791.632
G_A6_2	353827.2982	6747891.632	WP,UTM,G_A6_2,33V,353827.2982,6747891.632
G_A6_3	353927.2982	6747891.632	WP,UTM,G_A6_3,33V,353927.2982,6747891.632
G_A6_4	354027.2982	6747891.632	WP,UTM,G_A6_4,33V,354027.2982,6747891.632
G_A6_5	354127.2982	6747791.632	WP,UTM,G_A6_5,33V,354127.2982,6747791.632
G_A6_6	354127.2982	6747691.632	WP,UTM,G_A6_6,33V,354127.2982,6747691.632
G_A6_7	354127.2982	6747591.632	WP,UTM,G_A6_7,33V,354127.2982,6747591.632
G_A6_8	354127.2982	6747491.632	WP,UTM,G_A6_8,33V,354127.2982,6747491.632
G_A6_9	354027.2982	6747391.632	WP,UTM,G_A6_9,33V,354027.2982,6747391.632

G_A7_1	351227.2982	6746891.632	WP,UTM,G_A7_1,33V,351227.2982,6746891.632
G_A7_10	351427.2982	6746391.632	WP,UTM,G_A7_10,33V,351427.2982,6746391.632
G_A7_11	351327.2982	6746391.632	WP,UTM,G_A7_11,33V,351327.2982,6746391.632
G_A7_12	351227.2982	6746391.632	WP,UTM,G_A7_12,33V,351227.2982,6746391.632
G_A7_13	351127.2982	6746491.632	WP,UTM,G_A7_13,33V,351127.2982,6746491.632
G_A7_14	351127.2982	6746591.632	WP,UTM,G_A7_14,33V,351127.2982,6746591.632
G_A7_15	351127.2982	6746691.632	WP,UTM,G_A7_15,33V,351127.2982,6746691.632
G_A7_16	351127.2982	6746791.632	WP,UTM,G_A7_16,33V,351127.2982,6746791.632
G_A7_2	351327.2982	6746891.632	WP,UTM,G_A7_2,33V,351327.2982,6746891.632
G_A7_3	351427.2982	6746891.632	WP,UTM,G_A7_3,33V,351427.2982,6746891.632
G_A7_4	351527.2982	6746891.632	WP,UTM,G_A7_4,33V,351527.2982,6746891.632
G_A7_5	351627.2982	6746791.632	WP,UTM,G_A7_5,33V,351627.2982,6746791.632
G_A7_6	351627.2982	6746691.632	WP,UTM,G_A7_6,33V,351627.2982,6746691.632
G_A7_7	351627.2982	6746591.632	WP,UTM,G_A7_7,33V,351627.2982,6746591.632
G_A7_8	351627.2982	6746491.632	WP,UTM,G_A7_8,33V,351627.2982,6746491.632
G_A7_9	351527.2982	6746391.632	WP,UTM,G_A7_9,33V,351527.2982,6746391.632
G_A8_1	352727.2982	6746891.632	WP,UTM,G_A8_1,33V,352727.2982,6746891.632
G_A8_10	352927.2982	6746391.632	WP,UTM,G_A8_10,33V,352927.2982,6746391.632
G_A8_11	352827.2982	6746391.632	WP,UTM,G_A8_11,33V,352827.2982,6746391.632
G_A8_12	352727.2982	6746391.632	WP,UTM,G_A8_12,33V,352727.2982,6746391.632
G_A8_13	352627.2982	6746491.632	WP,UTM,G_A8_13,33V,352627.2982,6746491.632
G_A8_14	352627.2982	6746591.632	WP,UTM,G_A8_14,33V,352627.2982,6746591.632
G_A8_15	352627.2982	6746691.632	WP,UTM,G_A8_15,33V,352627.2982,6746691.632
G_A8_16	352627.2982	6746791.632	WP,UTM,G_A8_16,33V,352627.2982,6746791.632
G_A8_2	352827.2982	6746891.632	WP,UTM,G_A8_2,33V,352827.2982,6746891.632
G_A8_3	352927.2982	6746891.632	WP,UTM,G_A8_3,33V,352927.2982,6746891.632
G_A8_4	353027.2982	6746891.632	WP,UTM,G_A8_4,33V,353027.2982,6746891.632
G_A8_5	353127.2982	6746791.632	WP,UTM,G_A8_5,33V,353127.2982,6746791.632
G_A8_6	353127.2982	6746691.632	WP,UTM,G_A8_6,33V,353127.2982,6746691.632
G_A8_7	353127.2982	6746591.632	WP,UTM,G_A8_7,33V,353127.2982,6746591.632
G_A8_8	353127.2982	6746491.632	WP,UTM,G_A8_8,33V,353127.2982,6746491.632
G_A8_9	353027.2982	6746391.632	WP,UTM,G_A8_9,33V,353027.2982,6746391.632
G_A9_1	351727.2982	6745391.632	WP,UTM,G_A9_1,33V,351727.2982,6745391.632
G_A9_10	351927.2982	6744891.632	WP,UTM,G_A9_10,33V,351927.2982,6744891.632

G_A9_11	351827.2982	6744891.632	WP,UTM,G_A9_11,33V,351827.2982,6744891.632
G_A9_12	351727.2982	6744891.632	WP,UTM,G_A9_12,33V,351727.2982,6744891.632
G_A9_13	351627.2982	6744991.632	WP,UTM,G_A9_13,33V,351627.2982,6744991.632
G_A9_14	351627.2982	6745091.632	WP,UTM,G_A9_14,33V,351627.2982,6745091.632
G_A9_15	351627.2982	6745191.632	WP,UTM,G_A9_15,33V,351627.2982,6745191.632
G_A9_16	351627.2982	6745291.632	WP,UTM,G_A9_16,33V,351627.2982,6745291.632
G_A9_2	351827.2982	6745391.632	WP,UTM,G_A9_2,33V,351827.2982,6745391.632
G_A9_3	351927.2982	6745391.632	WP,UTM,G_A9_3,33V,351927.2982,6745391.632
G_A9_4	352027.2982	6745391.632	WP,UTM,G_A9_4,33V,352027.2982,6745391.632
G_A9_5	352127.2982	6745291.632	WP,UTM,G_A9_5,33V,352127.2982,6745291.632
G_A9_6	352127.2982	6745191.632	WP,UTM,G_A9_6,33V,352127.2982,6745191.632
G_A9_7	352127.2982	6745091.632	WP,UTM,G_A9_7,33V,352127.2982,6745091.632
G_A9_8	352127.2982	6744991.632	WP,UTM,G_A9_8,33V,352127.2982,6744991.632
G_A9_9	352027.2982	6744891.632	WP,UTM,G_A9_9,33V,352027.2982,6744891.632
G_B1_1	347227.2982	6753891.632	WP,UTM,G_B1_1,33V,347227.2982,6753891.632
G_B1_10	347427.2982	6753391.632	WP,UTM,G_B1_10,33V,347427.2982,6753391.632
G_B1_11	347327.2982	6753391.632	WP,UTM,G_B1_11,33V,347327.2982,6753391.632
G_B1_12	347227.2982	6753391.632	WP,UTM,G_B1_12,33V,347227.2982,6753391.632
G_B1_13	347127.2982	6753491.632	WP,UTM,G_B1_13,33V,347127.2982,6753491.632
G_B1_14	347127.2982	6753591.632	WP,UTM,G_B1_14,33V,347127.2982,6753591.632
G_B1_15	347127.2982	6753691.632	WP,UTM,G_B1_15,33V,347127.2982,6753691.632
G_B1_16	347127.2982	6753791.632	WP,UTM,G_B1_16,33V,347127.2982,6753791.632
G_B1_2	347327.2982	6753891.632	WP,UTM,G_B1_2,33V,347327.2982,6753891.632
G_B1_3	347427.2982	6753891.632	WP,UTM,G_B1_3,33V,347427.2982,6753891.632
G_B1_4	347527.2982	6753891.632	WP,UTM,G_B1_4,33V,347527.2982,6753891.632
G_B1_5	347627.2982	6753791.632	WP,UTM,G_B1_5,33V,347627.2982,6753791.632
G_B1_6	347627.2982	6753691.632	WP,UTM,G_B1_6,33V,347627.2982,6753691.632
G_B1_7	347627.2982	6753591.632	WP,UTM,G_B1_7,33V,347627.2982,6753591.632
G_B1_8	347627.2982	6753491.632	WP,UTM,G_B1_8,33V,347627.2982,6753491.632
G_B1_9	347527.2982	6753391.632	WP,UTM,G_B1_9,33V,347527.2982,6753391.632
G_B10_1	351227.2982	6749891.632	WP,UTM,G_B10_1,33V,351227.2982,6749891.632
G_B10_10	351427.2982	6749391.632	WP,UTM,G_B10_10,33V,351427.2982,6749391.632
G_B10_11	351327.2982	6749391.632	WP,UTM,G_B10_11,33V,351327.2982,6749391.632
G_B10_1	351227.2982	6749391.632	WP,UTM,G_B10_12,33V,351227.2982,6749391.6

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G_B10_13	351127.2982	6749491.632	WP,UTM,G_B10_13,33V,351127.2982,6749491.632
G_B10_14	351127.2982	6749591.632	WP,UTM,G_B10_14,33V,351127.2982,6749591.632
G_B10_15	351127.2982	6749691.632	WP,UTM,G_B10_15,33V,351127.2982,6749691.632
G_B10_16	351127.2982	6749791.632	WP,UTM,G_B10_16,33V,351127.2982,6749791.632
G_B10_2	351327.2982	6749891.632	WP,UTM,G_B10_2,33V,351327.2982,6749891.632
G_B10_3	351427.2982	6749891.632	WP,UTM,G_B10_3,33V,351427.2982,6749891.632
G_B10_4	351527.2982	6749891.632	WP,UTM,G_B10_4,33V,351527.2982,6749891.632
G_B10_5	351627.2982	6749791.632	WP,UTM,G_B10_5,33V,351627.2982,6749791.632
G_B10_6	351627.2982	6749691.632	WP,UTM,G_B10_6,33V,351627.2982,6749691.632
G_B10_7	351627.2982	6749591.632	WP,UTM,G_B10_7,33V,351627.2982,6749591.632
G_B10_8	351627.2982	6749491.632	WP,UTM,G_B10_8,33V,351627.2982,6749491.632
G_B10_9	351527.2982	6749391.632	WP,UTM,G_B10_9,33V,351527.2982,6749391.632
G_B2_1	353227.2982	6753891.632	WP,UTM,G_B2_1,33V,353227.2982,6753891.632
G_B2_10	353427.2982	6753391.632	WP,UTM,G_B2_10,33V,353427.2982,6753391.632
G_B2_11	353327.2982	6753391.632	WP,UTM,G_B2_11,33V,353327.2982,6753391.632
G_B2_12	353227.2982	6753391.632	WP,UTM,G_B2_12,33V,353227.2982,6753391.632
G_B2_13	353127.2982	6753491.632	WP,UTM,G_B2_13,33V,353127.2982,6753491.632
G_B2_14	353127.2982	6753591.632	WP,UTM,G_B2_14,33V,353127.2982,6753591.632
G_B2_15	353127.2982	6753691.632	WP,UTM,G_B2_15,33V,353127.2982,6753691.632
G_B2_16	353127.2982	6753791.632	WP,UTM,G_B2_16,33V,353127.2982,6753791.632
G_B2_2	353327.2982	6753891.632	WP,UTM,G_B2_2,33V,353327.2982,6753891.632
G_B2_3	353427.2982	6753891.632	WP,UTM,G_B2_3,33V,353427.2982,6753891.632
G_B2_4	353527.2982	6753891.632	WP,UTM,G_B2_4,33V,353527.2982,6753891.632
G_B2_5	353627.2982	6753791.632	WP,UTM,G_B2_5,33V,353627.2982,6753791.632
G_B2_6	353627.2982	6753691.632	WP,UTM,G_B2_6,33V,353627.2982,6753691.632
G_B2_7	353627.2982	6753591.632	WP,UTM,G_B2_7,33V,353627.2982,6753591.632
G_B2_8	353627.2982	6753491.632	WP,UTM,G_B2_8,33V,353627.2982,6753491.632
G_B2_9	353527.2982	6753391.632	WP,UTM,G_B2_9,33V,353527.2982,6753391.632
G_B3_1	348227.2982	6752891.632	WP,UTM,G_B3_1,33V,348227.2982,6752891.632
G_B3_10	348427.2982	6752391.632	WP,UTM,G_B3_10,33V,348427.2982,6752391.63

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G_B3_11	348327.2982	6752391.632	WP,UTM,G_B3_11,33V,348327.2982,6752391.632
G_B3_12	348227.2982	6752391.632	WP,UTM,G_B3_12,33V,348227.2982,6752391.632
G_B3_13	348127.2982	6752491.632	WP,UTM,G_B3_13,33V,348127.2982,6752491.632
G_B3_14	348127.2982	6752591.632	WP,UTM,G_B3_14,33V,348127.2982,6752591.632
G_B3_15	348150,0000	6752690,000	WP,UTM,G_B3_15,33V,348150,6752690
G_B3_16	348127.2982	6752791.632	WP,UTM,G_B3_16,33V,348127.2982,6752791.632
G_B3_2	348327.2982	6752891.632	WP,UTM,G_B3_2,33V,348327.2982,6752891.632
G_B3_3	348427.2982	6752891.632	WP,UTM,G_B3_3,33V,348427.2982,6752891.632
G_B3_4	348527.2982	6752891.632	WP,UTM,G_B3_4,33V,348527.2982,6752891.632
G_B3_5	348627.2982	6752791.632	WP,UTM,G_B3_5,33V,348627.2982,6752791.632
G_B3_6	348627.2982	6752691.632	WP,UTM,G_B3_6,33V,348627.2982,6752691.632
G_B3_7	348627.2982	6752591.632	WP,UTM,G_B3_7,33V,348627.2982,6752591.632
G_B3_8	348567,0000	6752574,000	WP,UTM,G_B3_8,33V,348567,6752574
G_B3_9	348527.2982	6752391.632	WP,UTM,G_B3_9,33V,348527.2982,6752391.632
G_B4_1	352227.2982	6752891.632	WP,UTM,G_B4_1,33V,352227.2982,6752891.632
G_B4_10	352427.2982	6752391.632	WP,UTM,G_B4_10,33V,352427.2982,6752391.632
G_B4_11	352327.2982	6752391.632	WP,UTM,G_B4_11,33V,352327.2982,6752391.632
G_B4_12	352227.2982	6752391.632	WP,UTM,G_B4_12,33V,352227.2982,6752391.632
G_B4_13	352127.2982	6752491.632	WP,UTM,G_B4_13,33V,352127.2982,6752491.632
G_B4_14	352127.2982	6752591.632	WP,UTM,G_B4_14,33V,352127.2982,6752591.632
G_B4_15	352127.2982	6752691.632	WP,UTM,G_B4_15,33V,352127.2982,6752691.632
G_B4_16	352127.2982	6752791.632	WP,UTM,G_B4_16,33V,352127.2982,6752791.632
G_B4_2	352327.2982	6752891.632	WP,UTM,G_B4_2,33V,352327.2982,6752891.632
G_B4_3	352427.2982	6752891.632	WP,UTM,G_B4_3,33V,352427.2982,6752891.632
G_B4_4	352527.2982	6752891.632	WP,UTM,G_B4_4,33V,352527.2982,6752891.632
G_B4_5	352599,0000	6752802,000	WP,UTM,G_B4_5,33V,352599,6752802
G_B4_6	352627.2982	6752691.632	WP,UTM,G_B4_6,33V,352627.2982,6752691.632
G_B4_7	352627.2982	6752591.632	WP,UTM,G_B4_7,33V,352627.2982,6752591.632
G_B4_8	352627.2982	6752491.632	WP,UTM,G_B4_8,33V,352627.2982,6752491.632
G_B4_9	352527.2982	6752391.632	WP,UTM,G_B4_9,33V,352527.2982,6752391.632
G_B5_1	351227.2982	6751891.632	WP,UTM,G_B5_1,33V,351227.2982,6751891.632
G_B5_10	351427.2982	6751391.632	WP,UTM,G_B5_10,33V,351427.2982,6751391.632
G_B5_11	351327.2982	6751391.632	WP,UTM,G_B5_11,33V,351327.2982,6751391.632
G_B5_12	351227.2982	6751391.632	WP,UTM,G_B5_12,33V,351227.2982,6751391.63

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G_B5_13	351127.2982	6751491.632	WP,UTM,G_B5_13,33V,351127.2982,6751491.632
G_B5_14	351127.2982	6751591.632	WP,UTM,G_B5_14,33V,351127.2982,6751591.632
G_B5_15	351127.2982	6751691.632	WP,UTM,G_B5_15,33V,351127.2982,6751691.632
G_B5_16	351127.2982	6751791.632	WP,UTM,G_B5_16,33V,351127.2982,6751791.632
G_B5_2	351327.2982	6751891.632	WP,UTM,G_B5_2,33V,351327.2982,6751891.632
G_B5_3	351427.2982	6751891.632	WP,UTM,G_B5_3,33V,351427.2982,6751891.632
G_B5_4	351527.2982	6751891.632	WP,UTM,G_B5_4,33V,351527.2982,6751891.632
G_B5_5	351627.2982	6751791.632	WP,UTM,G_B5_5,33V,351627.2982,6751791.632
G_B5_6	351627.2982	6751691.632	WP,UTM,G_B5_6,33V,351627.2982,6751691.632
G_B5_7	351627.2982	6751591.632	WP,UTM,G_B5_7,33V,351627.2982,6751591.632
G_B5_8	351627.2982	6751491.632	WP,UTM,G_B5_8,33V,351627.2982,6751491.632
G_B5_9	351527.2982	6751391.632	WP,UTM,G_B5_9,33V,351527.2982,6751391.632
G_B6_1	353227.2982	6751891.632	WP,UTM,G_B6_1,33V,353227.2982,6751891.632
G_B6_10	353427.2982	6751391.632	WP,UTM,G_B6_10,33V,353427.2982,6751391.632
G_B6_11	353327.2982	6751391.632	WP,UTM,G_B6_11,33V,353327.2982,6751391.632
G_B6_12	353227.2982	6751391.632	WP,UTM,G_B6_12,33V,353227.2982,6751391.632
G_B6_13	353127.2982	6751491.632	WP,UTM,G_B6_13,33V,353127.2982,6751491.632
G_B6_14	353127.2982	6751591.632	WP,UTM,G_B6_14,33V,353127.2982,6751591.632
G_B6_15	353127.2982	6751691.632	WP,UTM,G_B6_15,33V,353127.2982,6751691.632
G_B6_16	353127.2982	6751791.632	WP,UTM,G_B6_16,33V,353127.2982,6751791.632
G_B6_2	353327.2982	6751891.632	WP,UTM,G_B6_2,33V,353327.2982,6751891.632
G_B6_3	353427.2982	6751891.632	WP,UTM,G_B6_3,33V,353427.2982,6751891.632
G_B6_4	353527.2982	6751891.632	WP,UTM,G_B6_4,33V,353527.2982,6751891.632
G_B6_5	353627.2982	6751791.632	WP,UTM,G_B6_5,33V,353627.2982,6751791.632
G_B6_6	353627.2982	6751691.632	WP,UTM,G_B6_6,33V,353627.2982,6751691.632
G_B6_7	353627.2982	6751591.632	WP,UTM,G_B6_7,33V,353627.2982,6751591.632
G_B6_8	353627.2982	6751491.632	WP,UTM,G_B6_8,33V,353627.2982,6751491.632
G_B6_9	353527.2982	6751391.632	WP,UTM,G_B6_9,33V,353527.2982,6751391.632
G_B7_1	350227.2982	6750891.632	WP,UTM,G_B7_1,33V,350227.2982,6750891.632
G_B7_10	350427.2982	6750391.632	WP,UTM,G_B7_10,33V,350427.2982,6750391.632
G_B7_11	350327.2982	6750391.632	WP,UTM,G_B7_11,33V,350327.2982,6750391.632
G_B7_12	350227.2982	6750391.632	WP,UTM,G_B7_12,33V,350227.2982,6750391.632
G_B7_13	350127.2982	6750491.632	WP,UTM,G_B7_13,33V,350127.2982,6750491.632

G_B7_14	350127.2982	6750591.632	WP,UTM,G_B7_14,33V,350127.2982,6750591.632
G_B7_15	350127.2982	6750691.632	WP,UTM,G_B7_15,33V,350127.2982,6750691.632
G_B7_16	350127.2982	6750791.632	WP,UTM,G_B7_16,33V,350127.2982,6750791.632
G_B7_2	350327.2982	6750891.632	WP,UTM,G_B7_2,33V,350327.2982,6750891.632
G_B7_3	350427.2982	6750891.632	WP,UTM,G_B7_3,33V,350427.2982,6750891.632
G_B7_4	350527.2982	6750891.632	WP,UTM,G_B7_4,33V,350527.2982,6750891.632
G_B7_5	350627.2982	6750791.632	WP,UTM,G_B7_5,33V,350627.2982,6750791.632
G_B7_6	350627.2982	6750691.632	WP,UTM,G_B7_6,33V,350627.2982,6750691.632
G_B7_7	350627.2982	6750591.632	WP,UTM,G_B7_7,33V,350627.2982,6750591.632
G_B7_8	350627.2982	6750491.632	WP,UTM,G_B7_8,33V,350627.2982,6750491.632
G_B7_9	350527.2982	6750391.632	WP,UTM,G_B7_9,33V,350527.2982,6750391.632
G_B8_1	352227.2982	6750891.632	WP,UTM,G_B8_1,33V,352227.2982,6750891.632
G_B8_10	352427.2982	6750391.632	WP,UTM,G_B8_10,33V,352427.2982,6750391.632
G_B8_11	352327.2982	6750391.632	WP,UTM,G_B8_11,33V,352327.2982,6750391.632
G_B8_12	352227.2982	6750391.632	WP,UTM,G_B8_12,33V,352227.2982,6750391.632
G_B8_13	352127.2982	6750491.632	WP,UTM,G_B8_13,33V,352127.2982,6750491.632
G_B8_14	352127.2982	6750591.632	WP,UTM,G_B8_14,33V,352127.2982,6750591.632
G_B8_15	352127.2982	6750691.632	WP,UTM,G_B8_15,33V,352127.2982,6750691.632
G_B8_16	352127.2982	6750791.632	WP,UTM,G_B8_16,33V,352127.2982,6750791.632
G_B8_2	352327.2982	6750891.632	WP,UTM,G_B8_2,33V,352327.2982,6750891.632
G_B8_3	352427.2982	6750891.632	WP,UTM,G_B8_3,33V,352427.2982,6750891.632
G_B8_4	352527.2982	6750891.632	WP,UTM,G_B8_4,33V,352527.2982,6750891.632
G_B8_5	352627.2982	6750791.632	WP,UTM,G_B8_5,33V,352627.2982,6750791.632
G_B8_6	352627.2982	6750691.632	WP,UTM,G_B8_6,33V,352627.2982,6750691.632
G_B8_7	352627.2982	6750591.632	WP,UTM,G_B8_7,33V,352627.2982,6750591.632
G_B8_8	352627.2982	6750491.632	WP,UTM,G_B8_8,33V,352627.2982,6750491.632
G_B8_9	352527.2982	6750391.632	WP,UTM,G_B8_9,33V,352527.2982,6750391.632
G_B9_1	349227.2982	6749891.632	WP,UTM,G_B9_1,33V,349227.2982,6749891.632
G_B9_10	349427.2982	6749391.632	WP,UTM,G_B9_10,33V,349427.2982,6749391.632
G_B9_11	349327.2982	6749391.632	WP,UTM,G_B9_11,33V,349327.2982,6749391.632
G_B9_12	349227.2982	6749391.632	WP,UTM,G_B9_12,33V,349227.2982,6749391.632
G_B9_13	349127.2982	6749491.632	WP,UTM,G_B9_13,33V,349127.2982,6749491.632
G_B9_14	349127.2982	6749591.632	WP,UTM,G_B9_14,33V,349127.2982,6749591.632
G_B9_15	349127.2982	6749691.632	WP,UTM,G_B9_15,33V,349127.2982,6749691.632

G_B9_16	349127.2982	6749791.632	WP,UTM,G_B9_16,33V,349127.2982,6749791.632
G_B9_2	349327.2982	6749891.632	WP,UTM,G_B9_2,33V,349327.2982,6749891.632
G_B9_3	349427.2982	6749891.632	WP,UTM,G_B9_3,33V,349427.2982,6749891.632
G_B9_4	349527.2982	6749891.632	WP,UTM,G_B9_4,33V,349527.2982,6749891.632
G_B9_5	349627.2982	6749791.632	WP,UTM,G_B9_5,33V,349627.2982,6749791.632
G_B9_6	349627.2982	6749691.632	WP,UTM,G_B9_6,33V,349627.2982,6749691.632
G_B9_7	349627.2982	6749591.632	WP,UTM,G_B9_7,33V,349627.2982,6749591.632
G_B9_8	349627.2982	6749491.632	WP,UTM,G_B9_8,33V,349627.2982,6749491.632
G_B9_9	349527.2982	6749391.632	WP,UTM,G_B9_9,33V,349527.2982,6749391.632
P_A1_1	368727.2982	6790891.632	WP,UTM,P_A1_1,33V,368727.2982,6790891.632
P_A1_2	368827.2982	6790891.632	WP,UTM,P_A1_2,33V,368827.2982,6790891.632
P_A1_3	368927.2982	6790891.632	WP,UTM,P_A1_3,33V,368927.2982,6790891.632
P_A1_4	369027.2982	6790891.632	WP,UTM,P_A1_4,33V,369027.2982,6790891.632
P_A1_16	368627.2982	6790791.632	WP,UTM,P_A1_16,33V,368627.2982,6790791.632
P_A1_5	369127.2982	6790791.632	WP,UTM,P_A1_5,33V,369127.2982,6790791.632
P_A1_15	368627.2982	6790691.632	WP,UTM,P_A1_15,33V,368627.2982,6790691.632
P_A1_6	369127.2982	6790691.632	WP,UTM,P_A1_6,33V,369127.2982,6790691.632
P_A1_14	368627.2982	6790591.632	WP,UTM,P_A1_14,33V,368627.2982,6790591.632
P_A1_7	369127.2982	6790591.632	WP,UTM,P_A1_7,33V,369127.2982,6790591.632
P_A1_13	368627.2982	6790491.632	WP,UTM,P_A1_13,33V,368627.2982,6790491.632
P_A1_8	369127.2982	6790491.632	WP,UTM,P_A1_8,33V,369127.2982,6790491.632
P_A1_12	368727.2982	6790391.632	WP,UTM,P_A1_12,33V,368727.2982,6790391.632
P_A1_11	368827.2982	6790391.632	WP,UTM,P_A1_11,33V,368827.2982,6790391.632
P_A1_10	368927.2982	6790391.632	WP,UTM,P_A1_10,33V,368927.2982,6790391.632
P_A1_9	369027.2982	6790391.632	WP,UTM,P_A1_9,33V,369027.2982,6790391.632
P_A2_1	370727.2982	6790891.632	WP,UTM,P_A2_1,33V,370727.2982,6790891.632
P_A2_2	370827.2982	6790891.632	WP,UTM,P_A2_2,33V,370827.2982,6790891.632
P_A2_3	370927.2982	6790891.632	WP,UTM,P_A2_3,33V,370927.2982,6790891.632
P_A2_4	371027.2982	6790891.632	WP,UTM,P_A2_4,33V,371027.2982,6790891.632
P_A2_16	370627.2982	6790791.632	WP,UTM,P_A2_16,33V,370627.2982,6790791.632
P_A2_5	371127.2982	6790791.632	WP,UTM,P_A2_5,33V,371127.2982,6790791.632
P_A2_15	370627.2982	6790691.632	WP,UTM,P_A2_15,33V,370627.2982,6790691.632
P_A2_6	371127.2982	6790691.632	WP,UTM,P_A2_6,33V,371127.2982,6790691.632
P_A2_14	370627.2982	6790591.632	WP,UTM,P_A2_14,33V,370627.2982,6790591.632
P_A2_7	371127.2982	6790591.632	WP,UTM,P_A2_7,33V,371127.2982,6790591.632
P_A2_13	370627.2982	6790491.632	WP,UTM,P_A2_13,33V,370627.2982,6790491.632
P_A2_8	371127.2982	6790491.632	WP,UTM,P_A2_8,33V,371127.2982,6790491.632
P_A2_12	370727.2982	6790391.632	WP,UTM,P_A2_12,33V,370727.2982,6790391.632
P_A2_11	370827.2982	6790391.632	WP,UTM,P_A2_11,33V,370827.2982,6790391.632
P_A2_10	370927.2982	6790391.632	WP,UTM,P_A2_10,33V,370927.2982,6790391.632
P_A2_9	371027.2982	6790391.632	WP,UTM,P_A2_9,33V,371027.2982,6790391.632
P_B1_1	372727.2982	6790891.632	WP,UTM,P_B1_1,33V,372727.2982,6790891.632
P_B1_2	372827.2982	6790891.632	WP,UTM,P_B1_2,33V,372827.2982,6790891.632
P_B1_3	372927.2982	6790891.632	WP,UTM,P_B1_3,33V,372927.2982,6790891.632
P_B1_4	373027.2982	6790891.632	WP,UTM,P_B1_4,33V,373027.2982,6790891.632

P_B1_16	372627.2982	6790791.632	WP,UTM,P_B1_16,33V,372627.2982,6790791.632
P_B1_5	373127.2982	6790791.632	WP,UTM,P_B1_5,33V,373127.2982,6790791.632
P_B1_15	372627.2982	6790691.632	WP,UTM,P_B1_15,33V,372627.2982,6790691.632
P_B1_6	373127.2982	6790691.632	WP,UTM,P_B1_6,33V,373127.2982,6790691.632
P_B1_14	372627.2982	6790591.632	WP,UTM,P_B1_14,33V,372627.2982,6790591.632
P_B1_7	373127.2982	6790591.632	WP,UTM,P_B1_7,33V,373127.2982,6790591.632
P_B1_13	372627.2982	6790491.632	WP,UTM,P_B1_13,33V,372627.2982,6790491.632
P_B1_8	373127.2982	6790491.632	WP,UTM,P_B1_8,33V,373127.2982,6790491.632
P_B1_12	372727.2982	6790391.632	WP,UTM,P_B1_12,33V,372727.2982,6790391.632
P_B1_11	372827.2982	6790391.632	WP,UTM,P_B1_11,33V,372827.2982,6790391.632
P_B1_10	372927.2982	6790391.632	WP,UTM,P_B1_10,33V,372927.2982,6790391.632
P_B1_9	373027.2982	6790391.632	WP,UTM,P_B1_9,33V,373027.2982,6790391.632
P_A3_1	369727.2982	6789891.632	WP,UTM,P_A3_1,33V,369727.2982,6789891.632
P_A3_2	369827.2982	6789891.632	WP,UTM,P_A3_2,33V,369827.2982,6789891.632
P_A3_3	369927.2982	6789891.632	WP,UTM,P_A3_3,33V,369927.2982,6789891.632
P_A3_4	370027.2982	6789891.632	WP,UTM,P_A3_4,33V,370027.2982,6789891.632
P_A3_16	369627.2982	6789791.632	WP,UTM,P_A3_16,33V,369627.2982,6789791.632
P_A3_5	370127.2982	6789791.632	WP,UTM,P_A3_5,33V,370127.2982,6789791.632
P_A3_15	369627.2982	6789691.632	WP,UTM,P_A3_15,33V,369627.2982,6789691.632
P_A3_6	370127.2982	6789691.632	WP,UTM,P_A3_6,33V,370127.2982,6789691.632
P_A3_14	369627.2982	6789591.632	WP,UTM,P_A3_14,33V,369627.2982,6789591.632
P_A3_7	370127.2982	6789591.632	WP,UTM,P_A3_7,33V,370127.2982,6789591.632
P_A3_13	369627.2982	6789491.632	WP,UTM,P_A3_13,33V,369627.2982,6789491.632
P_A3_8	370127.2982	6789491.632	WP,UTM,P_A3_8,33V,370127.2982,6789491.632
P_A3_12	369727.2982	6789391.632	WP,UTM,P_A3_12,33V,369727.2982,6789391.632
P_A3_11	369827.2982	6789391.632	WP,UTM,P_A3_11,33V,369827.2982,6789391.632
P_A3_10	369927.2982	6789391.632	WP,UTM,P_A3_10,33V,369927.2982,6789391.632
P_A3_9	370027.2982	6789391.632	WP,UTM,P_A3_9,33V,370027.2982,6789391.632
P_A4_1	371727.2982	6789891.632	WP,UTM,P_A4_1,33V,371727.2982,6789891.632
P_A4_2	371827.2982	6789891.632	WP,UTM,P_A4_2,33V,371827.2982,6789891.632
P_A4_3	371927.2982	6789891.632	WP,UTM,P_A4_3,33V,371927.2982,6789891.632
P_A4_4	372027.2982	6789891.632	WP,UTM,P_A4_4,33V,372027.2982,6789891.632
P_A4_16	371627.2982	6789791.632	WP,UTM,P_A4_16,33V,371627.2982,6789791.632
P_A4_5	372127.2982	6789791.632	WP,UTM,P_A4_5,33V,372127.2982,6789791.632
P_A4_15	371627.2982	6789691.632	WP,UTM,P_A4_15,33V,371627.2982,6789691.632
P_A4_6	372127.2982	6789691.632	WP,UTM,P_A4_6,33V,372127.2982,6789691.632
P_A4_14	371627.2982	6789591.632	WP,UTM,P_A4_14,33V,371627.2982,6789591.632
P_A4_7	372127.2982	6789591.632	WP,UTM,P_A4_7,33V,372127.2982,6789591.632
P_A4_13	371627.2982	6789491.632	WP,UTM,P_A4_13,33V,371627.2982,6789491.632
P_A4_8	372127.2982	6789491.632	WP,UTM,P_A4_8,33V,372127.2982,6789491.632
P_A4_12	371727.2982	6789391.632	WP,UTM,P_A4_12,33V,371727.2982,6789391.632
P_A4_11	371827.2982	6789391.632	WP,UTM,P_A4_11,33V,371827.2982,6789391.632
P_A4_10	371927.2982	6789391.632	WP,UTM,P_A4_10,33V,371927.2982,6789391.632
P_A4_9	372027.2982	6789391.632	WP,UTM,P_A4_9,33V,372027.2982,6789391.632
P_B2_1	373727.2982	6789891.632	WP,UTM,P_B2_1,33V,373727.2982,6789891.632
P_B2_2	373827.2982	6789891.632	WP,UTM,P_B2_2,33V,373827.2982,6789891.632

P_B2_3	373927.2982	6789891.632	WP,UTM,P_B2_3,33V,373927.2982,6789891.632
P_B2_4	374027.2982	6789891.632	WP,UTM,P_B2_4,33V,374027.2982,6789891.632
P_B2_16	373627.2982	6789791.632	WP,UTM,P_B2_16,33V,373627.2982,6789791.632
P_B2_5	374127.2982	6789791.632	WP,UTM,P_B2_5,33V,374127.2982,6789791.632
P_B2_15	373627.2982	6789691.632	WP,UTM,P_B2_15,33V,373627.2982,6789691.632
P_B2_6	374127.2982	6789691.632	WP,UTM,P_B2_6,33V,374127.2982,6789691.632
P_B2_14	373627.2982	6789591.632	WP,UTM,P_B2_14,33V,373627.2982,6789591.632
P_B2_7	374127.2982	6789591.632	WP,UTM,P_B2_7,33V,374127.2982,6789591.632
P_B2_13	373627.2982	6789491.632	WP,UTM,P_B2_13,33V,373627.2982,6789491.632
P_B2_8	374127.2982	6789491.632	WP,UTM,P_B2_8,33V,374127.2982,6789491.632
P_B2_12	373727.2982	6789391.632	WP,UTM,P_B2_12,33V,373727.2982,6789391.632
P_B2_11	373827.2982	6789391.632	WP,UTM,P_B2_11,33V,373827.2982,6789391.632
P_B2_10	373927.2982	6789391.632	WP,UTM,P_B2_10,33V,373927.2982,6789391.632
P_B2_9	374027.2982	6789391.632	WP,UTM,P_B2_9,33V,374027.2982,6789391.632
P_B3_1	375727.2982	6789891.632	WP,UTM,P_B3_1,33V,375727.2982,6789891.632
P_B3_2	375827.2982	6789891.632	WP,UTM,P_B3_2,33V,375827.2982,6789891.632
P_B3_3	375927.2982	6789891.632	WP,UTM,P_B3_3,33V,375927.2982,6789891.632
P_B3_4	376027.2982	6789891.632	WP,UTM,P_B3_4,33V,376027.2982,6789891.632
P_B3_16	375627.2982	6789791.632	WP,UTM,P_B3_16,33V,375627.2982,6789791.632
P_B3_5	376105	6789788	WP,UTM,P_B3_5,33V,376105,6789788
P_B3_15	375627.2982	6789691.632	WP,UTM,P_B3_15,33V,375627.2982,6789691.632
P_B3_6	376127.2982	6789691.632	WP,UTM,P_B3_6,33V,376127.2982,6789691.632
P_B3_14	375627.2982	6789591.632	WP,UTM,P_B3_14,33V,375627.2982,6789591.632
P_B3_7	376127.2982	6789591.632	WP,UTM,P_B3_7,33V,376127.2982,6789591.632
P_B3_13	375627.2982	6789491.632	WP,UTM,P_B3_13,33V,375627.2982,6789491.632
P_B3_8	376127.2982	6789491.632	WP,UTM,P_B3_8,33V,376127.2982,6789491.632
P_B3_12	375727.2982	6789391.632	WP,UTM,P_B3_12,33V,375727.2982,6789391.632
P_B3_11	375827.2982	6789391.632	WP,UTM,P_B3_11,33V,375827.2982,6789391.632
P_B3_10	375927.2982	6789391.632	WP,UTM,P_B3_10,33V,375927.2982,6789391.632
P_B3_9	376027.2982	6789391.632	WP,UTM,P_B3_9,33V,376027.2982,6789391.632
P_B4_1	377727.2982	6789891.632	WP,UTM,P_B4_1,33V,377727.2982,6789891.632
P_B4_2	377827.2982	6789891.632	WP,UTM,P_B4_2,33V,377827.2982,6789891.632
P_B4_3	377927.2982	6789891.632	WP,UTM,P_B4_3,33V,377927.2982,6789891.632
P_B4_4	378027.2982	6789891.632	WP,UTM,P_B4_4,33V,378027.2982,6789891.632
P_B4_16	377627.2982	6789791.632	WP,UTM,P_B4_16,33V,377627.2982,6789791.632
P_B4_5	378127.2982	6789791.632	WP,UTM,P_B4_5,33V,378127.2982,6789791.632
P_B4_15	377627.2982	6789691.632	WP,UTM,P_B4_15,33V,377627.2982,6789691.632
P_B4_6	378127.2982	6789691.632	WP,UTM,P_B4_6,33V,378127.2982,6789691.632
P_B4_14	377627.2982	6789591.632	WP,UTM,P_B4_14,33V,377627.2982,6789591.632
P_B4_7	378127.2982	6789591.632	WP,UTM,P_B4_7,33V,378127.2982,6789591.632
P_B4_13	377627.2982	6789491.632	WP,UTM,P_B4_13,33V,377627.2982,6789491.632
P_B4_8	378127.2982	6789491.632	WP,UTM,P_B4_8,33V,378127.2982,6789491.632
P_B4_12	377727.2982	6789391.632	WP,UTM,P_B4_12,33V,377727.2982,6789391.632
P_B4_11	377827.2982	6789391.632	WP,UTM,P_B4_11,33V,377827.2982,6789391.632
P_B4_10	377927.2982	6789391.632	WP,UTM,P_B4_10,33V,377927.2982,6789391.632
P_B4_9	378027.2982	6789391.632	WP,UTM,P_B4_9,33V,378027.2982,6789391.632

P_A5_1	368727.2982	6788891.632	WP,UTM,P_A5_1,33V,368727.2982,6788891.632
P_A5_2	368827.2982	6788891.632	WP,UTM,P_A5_2,33V,368827.2982,6788891.632
P_A5_3	368927.2982	6788891.632	WP,UTM,P_A5_3,33V,368927.2982,6788891.632
P_A5_4	369027.2982	6788891.632	WP,UTM,P_A5_4,33V,369027.2982,6788891.632
P_A5_16	368627.2982	6788791.632	WP,UTM,P_A5_16,33V,368627.2982,6788791.632
P_A5_5	369127.2982	6788791.632	WP,UTM,P_A5_5,33V,369127.2982,6788791.632
P_A5_15	368627.2982	6788691.632	WP,UTM,P_A5_15,33V,368627.2982,6788691.632
P_A5_6	369127.2982	6788691.632	WP,UTM,P_A5_6,33V,369127.2982,6788691.632
P_A5_14	368650	6788601	WP,UTM,P_A5_14,33V,368650,6788601
P_A5_7	369127.2982	6788591.632	WP,UTM,P_A5_7,33V,369127.2982,6788591.632
P_A5_13	368627.2982	6788491.632	WP,UTM,P_A5_13,33V,368627.2982,6788491.632
P_A5_8	369127.2982	6788491.632	WP,UTM,P_A5_8,33V,369127.2982,6788491.632
P_A5_12	368727.2982	6788391.632	WP,UTM,P_A5_12,33V,368727.2982,6788391.632
P_A5_11	368827.2982	6788391.632	WP,UTM,P_A5_11,33V,368827.2982,6788391.632
P_A5_10	368927.2982	6788391.632	WP,UTM,P_A5_10,33V,368927.2982,6788391.632
P_A5_9	369027.2982	6788391.632	WP,UTM,P_A5_9,33V,369027.2982,6788391.632
P_A6_1	370727.2982	6788891.632	WP,UTM,P_A6_1,33V,370727.2982,6788891.632
P_A6_2	370827.2982	6788891.632	WP,UTM,P_A6_2,33V,370827.2982,6788891.632
P_A6_3	370927.2982	6788891.632	WP,UTM,P_A6_3,33V,370927.2982,6788891.632
P_A6_4	371027.2982	6788891.632	WP,UTM,P_A6_4,33V,371027.2982,6788891.632
P_A6_16	370627.2982	6788791.632	WP,UTM,P_A6_16,33V,370627.2982,6788791.632
P_A6_5	371127.2982	6788791.632	WP,UTM,P_A6_5,33V,371127.2982,6788791.632
P_A6_15	370657	6788690	WP,UTM,P_A6_15,33V,370657,6788690
P_A6_6	371127.2982	6788691.632	WP,UTM,P_A6_6,33V,371127.2982,6788691.632
P_A6_14	370627.2982	6788591.632	WP,UTM,P_A6_14,33V,370627.2982,6788591.632
P_A6_7	371113	6788602	WP,UTM,P_A6_7,33V,371113,6788602
P_A6_13	370685	6788511	WP,UTM,P_A6_13,33V,370685,6788511
P_A6_8	371127.2982	6788491.632	WP,UTM,P_A6_8,33V,371127.2982,6788491.632
P_A6_12	370727.2982	6788391.632	WP,UTM,P_A6_12,33V,370727.2982,6788391.632
P_A6_11	370827.2982	6788391.632	WP,UTM,P_A6_11,33V,370827.2982,6788391.632
P_A6_10	370927.2982	6788391.632	WP,UTM,P_A6_10,33V,370927.2982,6788391.632
P_A6_9	371027.2982	6788391.632	WP,UTM,P_A6_9,33V,371027.2982,6788391.632
P_B5_1	374727.2982	6788891.632	WP,UTM,P_B5_1,33V,374727.2982,6788891.632
P_B5_2	374827.2982	6788891.632	WP,UTM,P_B5_2,33V,374827.2982,6788891.632
P_B5_3	374927.2982	6788891.632	WP,UTM,P_B5_3,33V,374927.2982,6788891.632
P_B5_4	375027.2982	6788891.632	WP,UTM,P_B5_4,33V,375027.2982,6788891.632
P_B5_16	374627.2982	6788791.632	WP,UTM,P_B5_16,33V,374627.2982,6788791.632
P_B5_5	375127.2982	6788791.632	WP,UTM,P_B5_5,33V,375127.2982,6788791.632
P_B5_15	374627.2982	6788691.632	WP,UTM,P_B5_15,33V,374627.2982,6788691.632
P_B5_6	375127.2982	6788691.632	WP,UTM,P_B5_6,33V,375127.2982,6788691.632
P_B5_14	374627.2982	6788591.632	WP,UTM,P_B5_14,33V,374627.2982,6788591.632
P_B5_7	375127.2982	6788591.632	WP,UTM,P_B5_7,33V,375127.2982,6788591.632
P_B5_13	374627.2982	6788491.632	WP,UTM,P_B5_13,33V,374627.2982,6788491.632
P_B5_8	375127.2982	6788491.632	WP,UTM,P_B5_8,33V,375127.2982,6788491.632
P_B5_12	374727.2982	6788391.632	WP,UTM,P_B5_12,33V,374727.2982,6788391.632
P_B5_11	374827.2982	6788391.632	WP,UTM,P_B5_11,33V,374827.2982,6788391.632

P_B5_10	374927.2982	6788391.632	WP,UTM,P_B5_10,33V,374927.2982,6788391.632
P_B5_9	375027.2982	6788391.632	WP,UTM,P_B5_9,33V,375027.2982,6788391.632
P_B6_1	376727.2982	6788891.632	WP,UTM,P_B6_1,33V,376727.2982,6788891.632
P_B6_2	376827.2982	6788891.632	WP,UTM,P_B6_2,33V,376827.2982,6788891.632
P_B6_3	376927.2982	6788891.632	WP,UTM,P_B6_3,33V,376927.2982,6788891.632
P_B6_4	377027.2982	6788891.632	WP,UTM,P_B6_4,33V,377027.2982,6788891.632
P_B6_16	376627.2982	6788791.632	WP,UTM,P_B6_16,33V,376627.2982,6788791.632
P_B6_5	377127.2982	6788791.632	WP,UTM,P_B6_5,33V,377127.2982,6788791.632
P_B6_15	376652	6788696	WP,UTM,P_B6_15,33V,376652,6788696
P_B6_6	377127.2982	6788691.632	WP,UTM,P_B6_6,33V,377127.2982,6788691.632
P_B6_14	376627.2982	6788591.632	WP,UTM,P_B6_14,33V,376627.2982,6788591.632
P_B6_7	377127.2982	6788591.632	WP,UTM,P_B6_7,33V,377127.2982,6788591.632
P_B6_13	376627.2982	6788491.632	WP,UTM,P_B6_13,33V,376627.2982,6788491.632
P_B6_8	377127.2982	6788491.632	WP,UTM,P_B6_8,33V,377127.2982,6788491.632
P_B6_12	376727.2982	6788391.632	WP,UTM,P_B6_12,33V,376727.2982,6788391.632
P_B6_11	376827.2982	6788391.632	WP,UTM,P_B6_11,33V,376827.2982,6788391.632
P_B6_10	376927.2982	6788391.632	WP,UTM,P_B6_10,33V,376927.2982,6788391.632
P_B6_9	377027.2982	6788391.632	WP,UTM,P_B6_9,33V,377027.2982,6788391.632
P_A7_1	369727.2982	6787891.632	WP,UTM,P_A7_1,33V,369727.2982,6787891.632
P_A7_2	369827.2982	6787891.632	WP,UTM,P_A7_2,33V,369827.2982,6787891.632
P_A7_3	369927.2982	6787891.632	WP,UTM,P_A7_3,33V,369927.2982,6787891.632
P_A7_4	370027.2982	6787891.632	WP,UTM,P_A7_4,33V,370027.2982,6787891.632
P_A7_16	369627.2982	6787791.632	WP,UTM,P_A7_16,33V,369627.2982,6787791.632
P_A7_5	370127.2982	6787791.632	WP,UTM,P_A7_5,33V,370127.2982,6787791.632
P_A7_15	369627.2982	6787691.632	WP,UTM,P_A7_15,33V,369627.2982,6787691.632
P_A7_6	370127.2982	6787691.632	WP,UTM,P_A7_6,33V,370127.2982,6787691.632
P_A7_14	369627.2982	6787591.632	WP,UTM,P_A7_14,33V,369627.2982,6787591.632
P_A7_7	370127.2982	6787591.632	WP,UTM,P_A7_7,33V,370127.2982,6787591.632
P_A7_13	369627.2982	6787491.632	WP,UTM,P_A7_13,33V,369627.2982,6787491.632
P_A7_8	370127.2982	6787491.632	WP,UTM,P_A7_8,33V,370127.2982,6787491.632
P_A7_12	369727.2982	6787391.632	WP,UTM,P_A7_12,33V,369727.2982,6787391.632
P_A7_11	369827.2982	6787391.632	WP,UTM,P_A7_11,33V,369827.2982,6787391.632
P_A7_10	369927.2982	6787391.632	WP,UTM,P_A7_10,33V,369927.2982,6787391.632
P_A7_9	370027.2982	6787391.632	WP,UTM,P_A7_9,33V,370027.2982,6787391.632
P_A8_1	371727.2982	6787891.632	WP,UTM,P_A8_1,33V,371727.2982,6787891.632
P_A8_2	371827.2982	6787891.632	WP,UTM,P_A8_2,33V,371827.2982,6787891.632
P_A8_3	371927.2982	6787891.632	WP,UTM,P_A8_3,33V,371927.2982,6787891.632
P_A8_4	372027.2982	6787891.632	WP,UTM,P_A8_4,33V,372027.2982,6787891.632
P_A8_16	371627.2982	6787791.632	WP,UTM,P_A8_16,33V,371627.2982,6787791.632
P_A8_5	372127.2982	6787791.632	WP,UTM,P_A8_5,33V,372127.2982,6787791.632
P_A8_15	371627.2982	6787691.632	WP,UTM,P_A8_15,33V,371627.2982,6787691.632
P_A8_6	372127.2982	6787691.632	WP,UTM,P_A8_6,33V,372127.2982,6787691.632
P_A8_14	371627.2982	6787591.632	WP,UTM,P_A8_14,33V,371627.2982,6787591.632
P_A8_7	372127.2982	6787591.632	WP,UTM,P_A8_7,33V,372127.2982,6787591.632
P_A8_13	371627.2982	6787491.632	WP,UTM,P_A8_13,33V,371627.2982,6787491.632
P_A8_8	372127.2982	6787491.632	WP,UTM,P_A8_8,33V,372127.2982,6787491.632

P_A8_12	371727.2982	6787391.632	WP,UTM,P_A8_12,33V,371727.2982,6787391.632
P_A8_11	371827.2982	6787391.632	WP,UTM,P_A8_11,33V,371827.2982,6787391.632
P_A8_10	371927.2982	6787391.632	WP,UTM,P_A8_10,33V,371927.2982,6787391.632
P_A8_9	372027.2982	6787391.632	WP,UTM,P_A8_9,33V,372027.2982,6787391.632
P_B7_1	373727.2982	6787891.632	WP,UTM,P_B7_1,33V,373727.2982,6787891.632
P_B7_2	373827.2982	6787891.632	WP,UTM,P_B7_2,33V,373827.2982,6787891.632
P_B7_3	373927.2982	6787891.632	WP,UTM,P_B7_3,33V,373927.2982,6787891.632
P_B7_4	374027.2982	6787891.632	WP,UTM,P_B7_4,33V,374027.2982,6787891.632
P_B7_16	373627.2982	6787791.632	WP,UTM,P_B7_16,33V,373627.2982,6787791.632
P_B7_5	374127.2982	6787791.632	WP,UTM,P_B7_5,33V,374127.2982,6787791.632
P_B7_15	373627.2982	6787691.632	WP,UTM,P_B7_15,33V,373627.2982,6787691.632
P_B7_6	374127.2982	6787691.632	WP,UTM,P_B7_6,33V,374127.2982,6787691.632
P_B7_14	373627.2982	6787591.632	WP,UTM,P_B7_14,33V,373627.2982,6787591.632
P_B7_7	374127.2982	6787591.632	WP,UTM,P_B7_7,33V,374127.2982,6787591.632
P_B7_13	373627.2982	6787491.632	WP,UTM,P_B7_13,33V,373627.2982,6787491.632
P_B7_8	374127.2982	6787491.632	WP,UTM,P_B7_8,33V,374127.2982,6787491.632
P_B7_12	373727.2982	6787391.632	WP,UTM,P_B7_12,33V,373727.2982,6787391.632
P_B7_11	373827.2982	6787391.632	WP,UTM,P_B7_11,33V,373827.2982,6787391.632
P_B7_10	373927.2982	6787391.632	WP,UTM,P_B7_10,33V,373927.2982,6787391.632
P_B7_9	374027.2982	6787391.632	WP,UTM,P_B7_9,33V,374027.2982,6787391.632
P_B8_1	375727.2982	6787891.632	WP,UTM,P_B8_1,33V,375727.2982,6787891.632
P_B8_2	375827.2982	6787891.632	WP,UTM,P_B8_2,33V,375827.2982,6787891.632
P_B8_3	375927.2982	6787891.632	WP,UTM,P_B8_3,33V,375927.2982,6787891.632
P_B8_4	376027.2982	6787891.632	WP,UTM,P_B8_4,33V,376027.2982,6787891.632
P_B8_16	375627.2982	6787791.632	WP,UTM,P_B8_16,33V,375627.2982,6787791.632
P_B8_5	376127.2982	6787791.632	WP,UTM,P_B8_5,33V,376127.2982,6787791.632
P_B8_15	375627.2982	6787691.632	WP,UTM,P_B8_15,33V,375627.2982,6787691.632
P_B8_6	376107	6787686	WP,UTM,P_B8_6,33V,376107,6787686
P_B8_14	375627.2982	6787591.632	WP,UTM,P_B8_14,33V,375627.2982,6787591.632
P_B8_7	376127.2982	6787591.632	WP,UTM,P_B8_7,33V,376127.2982,6787591.632
P_B8_13	375627.2982	6787491.632	WP,UTM,P_B8_13,33V,375627.2982,6787491.632
P_B8_8	376127.2982	6787491.632	WP,UTM,P_B8_8,33V,376127.2982,6787491.632
P_B8_12	375727.2982	6787391.632	WP,UTM,P_B8_12,33V,375727.2982,6787391.632
P_B8_11	375827.2982	6787391.632	WP,UTM,P_B8_11,33V,375827.2982,6787391.632
P_B8_10	375927.2982	6787391.632	WP,UTM,P_B8_10,33V,375927.2982,6787391.632
P_B8_9	376027.2982	6787391.632	WP,UTM,P_B8_9,33V,376027.2982,6787391.632
P_B9_1	377727.2982	6787891.632	WP,UTM,P_B9_1,33V,377727.2982,6787891.632
P_B9_2	377827.2982	6787891.632	WP,UTM,P_B9_2,33V,377827.2982,6787891.632
P_B9_3	377927.2982	6787891.632	WP,UTM,P_B9_3,33V,377927.2982,6787891.632
P_B9_4	378027.2982	6787891.632	WP,UTM,P_B9_4,33V,378027.2982,6787891.632
P_B9_16	377627.2982	6787791.632	WP,UTM,P_B9_16,33V,377627.2982,6787791.632
P_B9_5	378127.2982	6787791.632	WP,UTM,P_B9_5,33V,378127.2982,6787791.632
P_B9_15	377627.2982	6787691.632	WP,UTM,P_B9_15,33V,377627.2982,6787691.632
P_B9_6	378127.2982	6787691.632	WP,UTM,P_B9_6,33V,378127.2982,6787691.632
P_B9_14	377627.2982	6787591.632	WP,UTM,P_B9_14,33V,377627.2982,6787591.632
P_B9_7	378127.2982	6787591.632	WP,UTM,P_B9_7,33V,378127.2982,6787591.632

P_B9_13	377627.2982	6787491.632	WP,UTM,P_B9_13,33V,377627.2982,6787491.632
P_B9_8	378127.2982	6787491.632	WP,UTM,P_B9_8,33V,378127.2982,6787491.632
P_B9_12	377727.2982	6787391.632	WP,UTM,P_B9_12,33V,377727.2982,6787391.632
P_B9_11	377827.2982	6787391.632	WP,UTM,P_B9_11,33V,377827.2982,6787391.632
P_B9_10	377927.2982	6787391.632	WP,UTM,P_B9_10,33V,377927.2982,6787391.632
P_B9_9	378027.2982	6787391.632	WP,UTM,P_B9_9,33V,378027.2982,6787391.632
P_A9_1	370727.2982	6786891.632	WP,UTM,P_A9_1,33V,370727.2982,6786891.632
P_A9_2	370827.2982	6786891.632	WP,UTM,P_A9_2,33V,370827.2982,6786891.632
P_A9_3	370927.2982	6786891.632	WP,UTM,P_A9_3,33V,370927.2982,6786891.632
P_A9_4	371027.2982	6786891.632	WP,UTM,P_A9_4,33V,371027.2982,6786891.632
P_A9_16	370627.2982	6786791.632	WP,UTM,P_A9_16,33V,370627.2982,6786791.632
P_A9_5	371127.2982	6786791.632	WP,UTM,P_A9_5,33V,371127.2982,6786791.632
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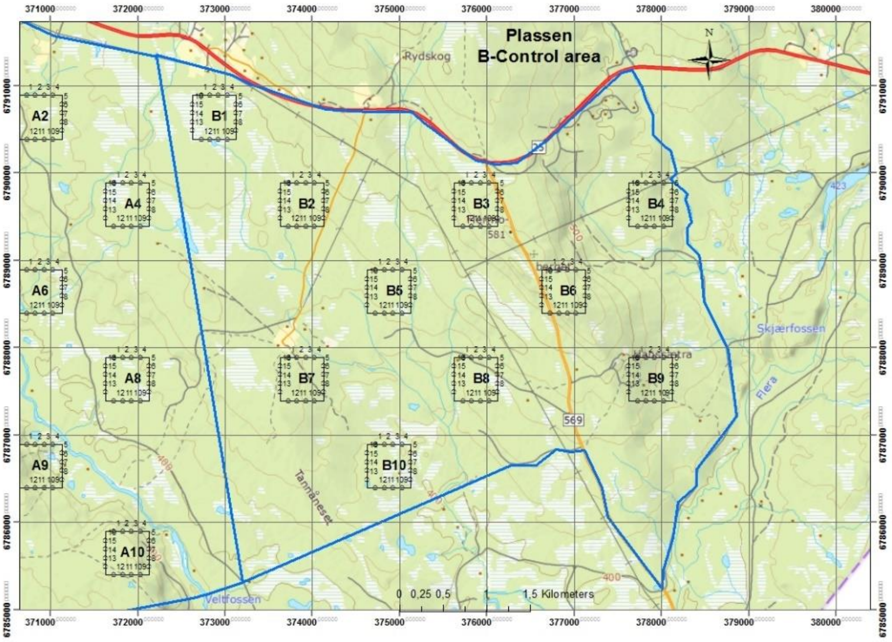
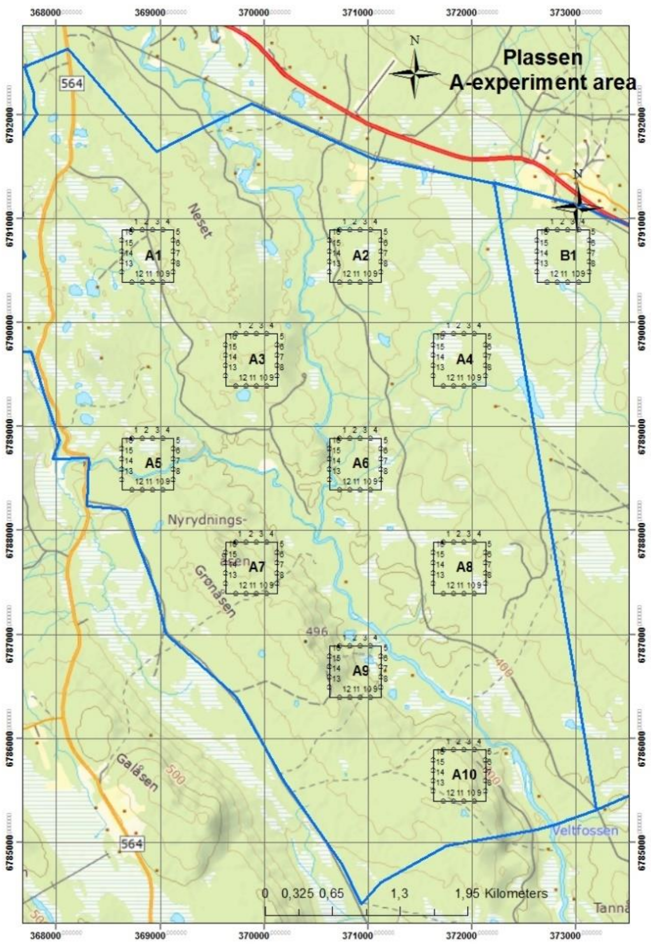
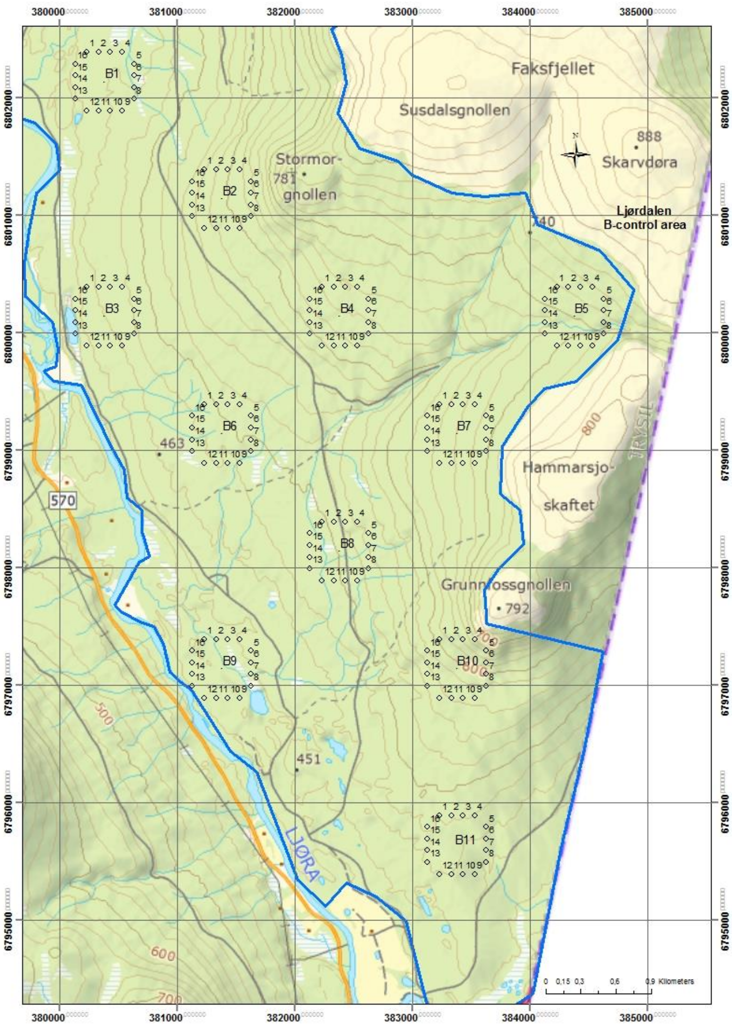
P_A9_6	371127.2982	6786691.632	WP,UTM,P_A9_6,33V,371127.2982,6786691.632
P_A9_14	370627.2982	6786591.632	WP,UTM,P_A9_14,33V,370627.2982,6786591.632
P_A9_7	371127.2982	6786591.632	WP,UTM,P_A9_7,33V,371127.2982,6786591.632
P_A9_13	370627.2982	6786491.632	WP,UTM,P_A9_13,33V,370627.2982,6786491.632
P_A9_8	371127.2982	6786491.632	WP,UTM,P_A9_8,33V,371127.2982,6786491.632
P_A9_12	370727.2982	6786391.632	WP,UTM,P_A9_12,33V,370727.2982,6786391.632
P_A9_11	370827.2982	6786391.632	WP,UTM,P_A9_11,33V,370827.2982,6786391.632
P_A9_10	370927.2982	6786391.632	WP,UTM,P_A9_10,33V,370927.2982,6786391.632
P_A9_9	371027.2982	6786391.632	WP,UTM,P_A9_9,33V,371027.2982,6786391.632
P_B10_1	374727.2982	6786891.632	WP,UTM,P_B10_1,33V,374727.2982,6786891.632
P_B10_2	374827.2982	6786891.632	WP,UTM,P_B10_2,33V,374827.2982,6786891.632
P_B10_3	374927.2982	6786891.632	WP,UTM,P_B10_3,33V,374927.2982,6786891.632
P_B10_4	375027.2982	6786891.632	WP,UTM,P_B10_4,33V,375027.2982,6786891.632
P_B10_16	374627.2982	6786791.632	WP,UTM,P_B10_16,33V,374627.2982,6786791.632
P_B10_5	375127.2982	6786791.632	WP,UTM,P_B10_5,33V,375127.2982,6786791.632
P_B10_15	374627.2982	6786691.632	WP,UTM,P_B10_15,33V,374627.2982,6786691.632
P_B10_6	375127.2982	6786691.632	WP,UTM,P_B10_6,33V,375127.2982,6786691.632
P_B10_14	374627.2982	6786591.632	WP,UTM,P_B10_14,33V,374627.2982,6786591.632
P_B10_7	375127.2982	6786591.632	WP,UTM,P_B10_7,33V,375127.2982,6786591.632
P_B10_13	374627.2982	6786491.632	WP,UTM,P_B10_13,33V,374627.2982,6786491.632
P_B10_8	375127.2982	6786491.632	WP,UTM,P_B10_8,33V,375127.2982,6786491.632
P_B10_12	374727.2982	6786391.632	WP,UTM,P_B10_12,33V,374727.2982,6786391.632
P_B10_11	374827.2982	6786391.632	WP,UTM,P_B10_11,33V,374827.2982,6786391.632
P_B10_10	374927.2982	6786391.632	WP,UTM,P_B10_10,33V,374927.2982,6786391.632
P_B10_9	375027.2982	6786391.632	WP,UTM,P_B10_9,33V,375027.2982,6786391.632
P_A10_1	371727.2982	6785891.632	WP,UTM,P_A10_1,33V,371727.2982,6785891.632
P_A10_2	371827.2982	6785891.632	WP,UTM,P_A10_2,33V,371827.2982,6785891.632
P_A10_3	371927.2982	6785891.632	WP,UTM,P_A10_3,33V,371927.2982,6785891.632

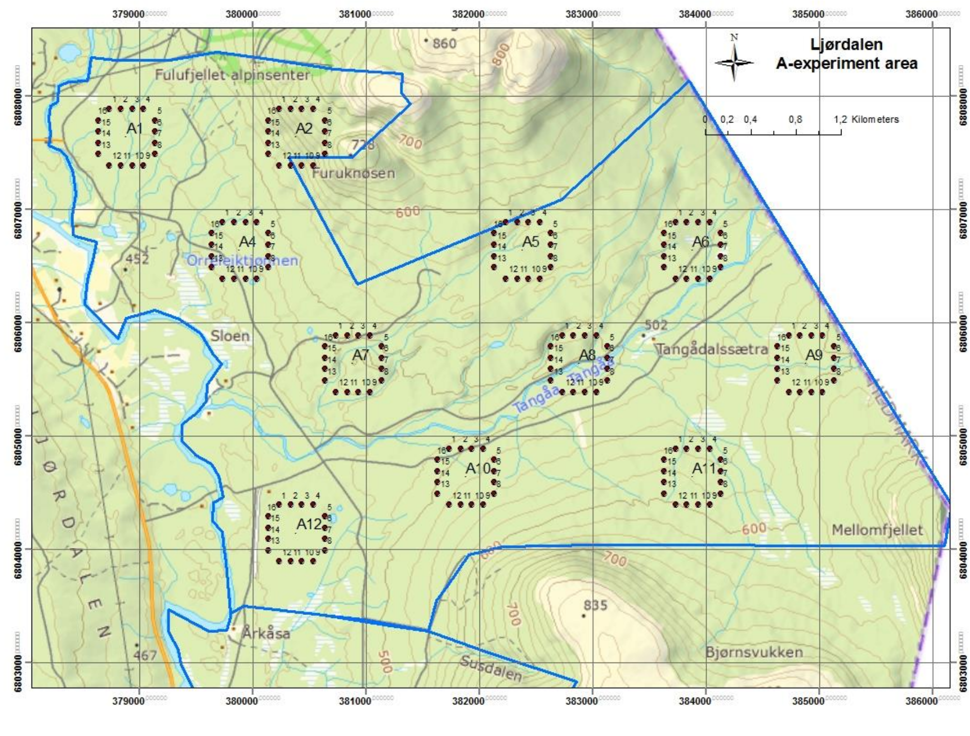
P_A10_4	372027.2982	6785891.632	WP,UTM,P_A10_4,33V,372027.2982,6785891.632
P_A10_16	371627.2982	6785791.632	WP,UTM,P_A10_16,33V,371627.2982,6785791.632
P_A10_5	372127.2982	6785791.632	WP,UTM,P_A10_5,33V,372127.2982,6785791.632
P_A10_15	371627.2982	6785691.632	WP,UTM,P_A10_15,33V,371627.2982,6785691.632
P_A10_6	372127.2982	6785691.632	WP,UTM,P_A10_6,33V,372127.2982,6785691.632
P_A10_14	371627.2982	6785591.632	WP,UTM,P_A10_14,33V,371627.2982,6785591.632
P_A10_7	372127.2982	6785591.632	WP,UTM,P_A10_7,33V,372127.2982,6785591.632
P_A10_13	371627.2982	6785491.632	WP,UTM,P_A10_13,33V,371627.2982,6785491.632
P_A10_8	372127.2982	6785491.632	WP,UTM,P_A10_8,33V,372127.2982,6785491.632
P_A10_12	371727.2982	6785391.632	WP,UTM,P_A10_12,33V,371727.2982,6785391.632
P_A10_11	371827.2982	6785391.632	WP,UTM,P_A10_11,33V,371827.2982,6785391.632
P_A10_10	371927.2982	6785391.632	WP,UTM,P_A10_10,33V,371927.2982,6785391.632
P_A10_9	372027.2982	6785391.632	WP,UTM,P_A10_9,33V,372027.2982,6785391.632

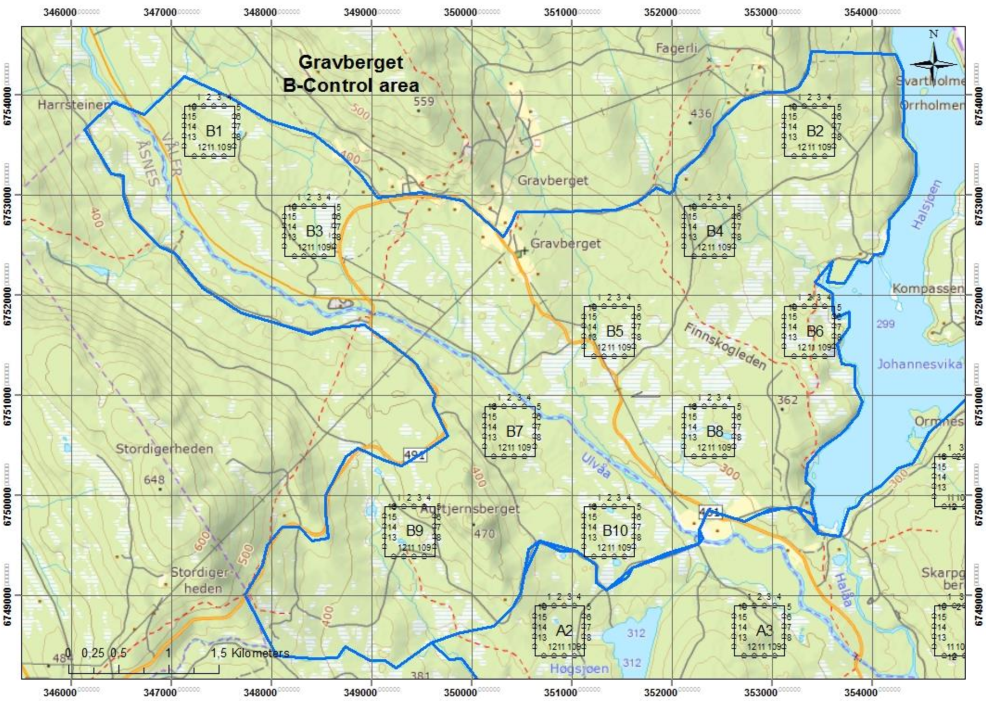
APPENDIX C – Maps of all study sites

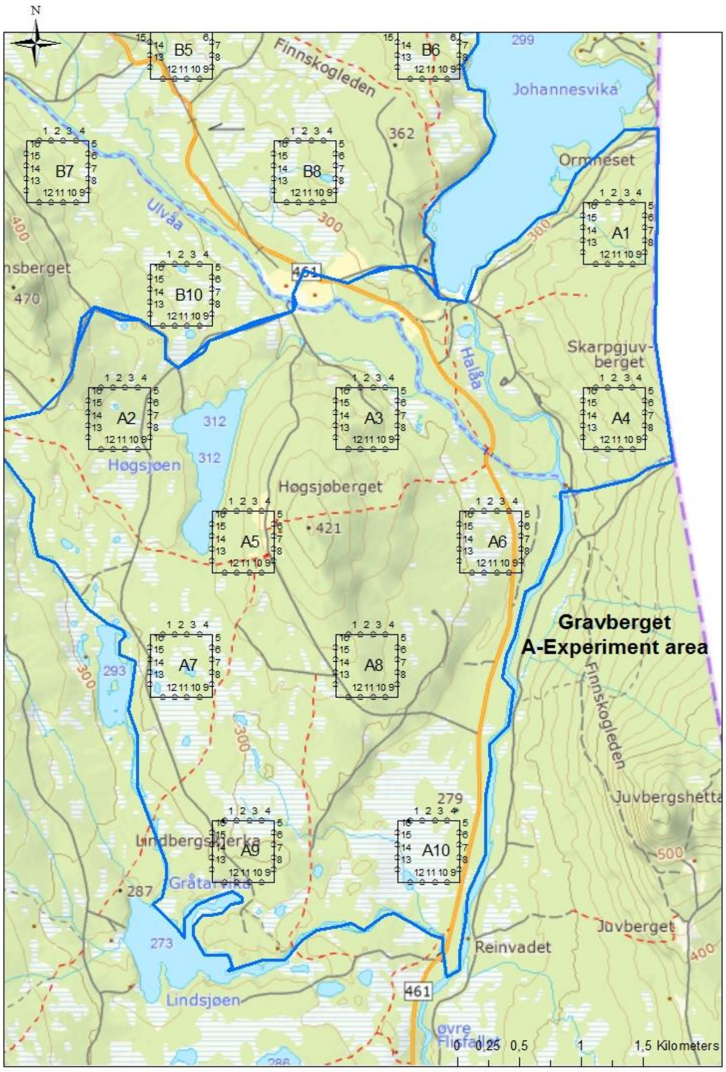





Ljørdalen
B-control area
Faksfjellet
Susdalsgnollen
Skarvdøra
888
Stormor-
gnollen
781
740
B1
B2
B3
B4
B5
B6
B7
B8
B9
B10
B11
463
570
Hammarsjo-
skaftet
800
Grunnfossgnollen
792
451
500
600
700
LJØRA
0 0.15 0.3 0.6 0.9 Kilometers


Ljørdalen
A-experiment area
0 0,2 0,4 0,8 1,2 Kilometers
860
Fulufjellet alpinsenter
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
728
Furuknøsen
700
600
452
Sloen
502
Tangådalssætra
Tangåa
Mellomfjellet
835
Bjørnsvukken
Årkåsa
467
500
Susdalen
LJØRDALEN


Gravberget
B-Control area
B1
B2
B3
B4
B5
B6
B7
B8
B9
B10
A2
A3
1,5 Kilometers


Gravberget
A-Experiment area
A1
A2
A3
A4
A5
A6
A7
A8
A10
1,5 Kilometers

APPENDIX D – Correlation between independent variables

		Accumulated browsing	Accumulated browsing on pine	Total available biomass	Available pine biomass	Feeding Site Attractiveness Value	Cutting class	Bilberry cover	Number of trees	Distance to nearest road	Distance to nearest house	Latitude	Longitude	Altitude (m.a.s.l.)	Slope	Aspect
Accumulated browsing	Correlation Coefficient	1,000	,550**	,185**	,092**	,245**	,006	,037	,295**	-,029	-,019	,039	,017	,007	,022	-,012
	Sig. (2-tailed)		,000	,000	,004	,000	,853	,249	,000	,368	,550	,223	,610	,830	,496	,703
	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
Accumulated browsing on pine	Correlation Coefficient	,550**	1,000	,216**	,223**	,169**	-,121**	-,102**	,209**	-,121**	-,072*	-,017	-,037	-,073*	-,148**	-,019
	Sig. (2-tailed)	,000		,000	,000	,000	,000	,002	,000	,000	,025	,593	,247	,023	,000	,549
	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
Total available biomass	Correlation Coefficient	,185**	,216**	1,000	,873**	,690**	-,223**	-,245**	,434**	-,006	,048	,155**	,145**	,120**	-,086**	,058
	Sig. (2-tailed)	,000	,000		,000	,000	,000	,000	,000	,851	,139	,000	,000	,000	,008	,073
	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
Available pine biomass	Correlation Coefficient	,092**	,223**	,873**	1,000	,524**	-,269**	-,318**	,285**	-,009	,043	,135**	,113**	,091**	-,118**	,055
	Sig. (2-tailed)	,004	,000	,000		,000	,000	,000	,000	,787	,183	,000	,000	,005	,000	,087
	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
Feeding Site Attractiveness Value	Correlation Coefficient	,245**	,169**	,690**	,524**	1,000	-,105**	-,078*	,647**	-,098**	-,078*	-,050	-,052	-,074*	-,077*	-,054
	Sig. (2-tailed)	,000	,000	,000	,000		,001	,016	,000	,002	,016	,120	,109	,022	,017	,097
	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
Cutting class	Correlation Coefficient	,006	-,121**	-,223**	-,269**	-,105**	1,000	,312**	-,039	,150**	,142**	,162**	,136**	,181**	,241**	,024
	Sig. (2-tailed)	,853	,000	,000	,000	,001		,000	,228	,000	,000	,000	,000	,000	,000	,462
	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
Bilberry cover	Correlation Coefficient	,037	-,102**	-,245**	-,318**	-,078*	,312**	1,000	,030	-,049	-,103**	-,188**	-,169**	-,109**	,143**	-,029
	Sig. (2-tailed)	,249	,002	,000	,000	,016	,000		,359	,126	,001	,000	,000	,001	,000	,375
	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
Number of trees	Correlation Coefficient	,295**	,209**	,434**	,285**	,647**	-,039	,030	1,000	-,130**	-,099**	-,114**	-,083*	-,135**	-,152**	-,078*
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,228	,359		,000	,002	,000	,011	,000	,000	,016

	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
Distance to nearest road	Correlation Coefficient	-,029	-,121**	-,006	-,009	-,098**	,150**	-,049	-,130**	1,000	,454**	,508**	,413**	,437**	,198**	,140**
	Sig. (2-tailed)	,368	,000	,851	,787	,002	,000	,126	,000		,000	,000	,000	,000	,000	,000
	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
Distance to nearest house	Correlation Coefficient	-,019	-,072*	,048	,043	-,078*	,142**	-,103**	-,099**	,454**	1,000	,639**	,500**	,502**	,301**	,170**
	Sig. (2-tailed)	,550	,025	,139	,183	,016	,000	,001	,002	,000		,000	,000	,000	,000	,000
	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
Latitude	Correlation Coefficient	,039	-,017	,155**	,135**	-,050	,162**	-,188**	-,114**	,508**	,639**	1,000	,865**	,881**	,300**	,250**
	Sig. (2-tailed)	,223	,593	,000	,000	,120	,000	,000	,000	,000	,000		,000	0,000	,000	,000
	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
Longitude	Correlation Coefficient	,017	-,037	,145**	,113**	-,052	,136**	-,169**	-,083*	,413**	,500**	,865**	1,000	,853**	,220**	,272**
	Sig. (2-tailed)	,610	,247	,000	,000	,109	,000	,000	,011	,000	,000	,000		,000	,000	,000
	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
Altitude	Correlation Coefficient	,007	-,073*	,120**	,091**	-,074*	,181**	-,109**	-,135**	,437**	,502**	,881**	,853**	1,000	,293**	,262**
	Sig. (2-tailed)	,830	,023	,000	,005	,022	,000	,001	,000	,000	,000	0,000	,000		,000	,000
	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
Slope	Correlation Coefficient	,022	-,148**	-,086**	-,118**	-,077*	,241**	,143**	-,152**	,198**	,301**	,300**	,220**	,293**	1,000	,121**
	Sig. (2-tailed)	,496	,000	,008	,000	,017	,000	,000	,000	,000	,000	,000	,000	,000		,000
	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959
Aspect	Correlation Coefficient	-,012	-,019	,058	,055	-,054	,024	-,029	-,078*	,140**	,170**	,250**	,272**	,262**	,121**	1,000
	Sig. (2-tailed)	,703	,549	,073	,087	,097	,462	,375	,016	,000	,000	,000	,000	,000	,000	
	N	959	959	959	959	959	959	959	959	959	959	959	959	959	959	959

APPENDIX E – Model values and parameters

All sites, 2012

```
<
   Min       1Q   Median       3Q      Max  
-2.7274  -0.6057  -0.3409  -0.0001   4.7825  

Coefficients: (120 not defined because of singularities)
                             Estimate Std. Error z value Pr(>|z|)    
(Intercept)                -4.217e+01  5.015e+03  -0.008 0.993290    
psy                         2.041e-03  4.390e-04   4.648 3.35e-06 ***
siteLjørdalen               2.675e+01  3.448e+03   0.008 0.993808    
sitePlassen                 2.175e+01  2.821e+03   0.008 0.993847    
vegDwarf shrub              2.585e+00  7.278e-01   3.553 0.000381 ***
vegFen                      6.347e-01  1.231e+00   0.515 0.606268    
vegGrass                    2.425e+00  8.073e-01   3.003 0.002671 ** 
vegLichen                   2.466e+00  7.678e-01   3.212 0.001318 ** 
vegMoss                     1.793e+00  8.431e-01   2.127 0.033411 *  
vegRocks                    3.050e+00  1.062e+00   2.871 0.004095 ** 
vegSmall Fern              -1.550e+01  4.187e+03  -0.004 0.997046    
class                      -1.303e-01  9.141e-02  -1.426 0.153944    
acc                         5.363e-01  2.490e-01   2.154 0.031249 *  
trees                       5.886e-03  4.043e-03   1.456 0.145475    
road                        2.418e+01  3.134e+03   0.008 0.993845    
siteGravberget:quadratGA10  2.123e+01  5.471e+03   0.004 0.996904    
siteLjørdalen:quadratGA10          NA         NA      NA       NA    
sitePlassen:quadratGA10            NA         NA      NA       NA    
siteGravberget:quadratGA2   3.503e-01  5.928e-01   0.591 0.554544    
siteLjørdalen:quadratGA2           NA         NA      NA       NA    
sitePlassen:quadratGA2             NA         NA      NA       NA    
siteGravberget:quadratGA3   2.575e+01  3.448e+03   0.007 0.994041    
siteLjørdalen:quadratGA3           NA         NA      NA       NA    
sitePlassen:quadratGA3             NA         NA      NA       NA    
siteGravberget:quadratGA4   1.948e+01  2.507e+03   0.008 0.993802    
siteLjørdalen:quadratGA4           NA         NA      NA       NA    
sitePlassen:quadratGA4             NA         NA      NA       NA    
siteGravberget:quadratGA5  -8.613e+00  9.402e+02  -0.009 0.992692    
siteLjørdalen:quadratGA5           NA         NA      NA       NA    
sitePlassen:quadratGA5             NA         NA      NA       NA    
siteGravberget:quadratGA6   3.815e+01  5.015e+03   0.008 0.993931    
siteLjørdalen:quadratGA6           NA         NA      NA       NA    
sitePlassen:quadratGA6             NA         NA      NA       NA    
siteGravberget:quadratGA7  -1.610e+01  1.880e+03  -0.009 0.993167    
siteLjørdalen:quadratGA7           NA         NA      NA       NA    
sitePlassen:quadratGA7             NA         NA      NA       NA    
siteGravberget:quadratGA8   3.090e+00  3.617e+03   0.001 0.999318    
siteLjørdalen:quadratGA8           NA         NA      NA       NA    
```

sitePlassen:quadratGA8	NA	NA	NA	NA
siteGravberget:quadratGA9	5.390e+00	9.402e+02	0.006	0.995426
siteLjørdalen:quadratGA9	NA	NA	NA	NA
sitePlassen:quadratGA9	NA	NA	NA	NA
siteGravberget:quadratGB1	3.618e+00	6.268e+02	0.006	0.995395
siteLjørdalen:quadratGB1	NA	NA	NA	NA
sitePlassen:quadratGB1	NA	NA	NA	NA
siteGravberget:quadratGB10	2.734e+01	3.448e+03	0.008	0.993673
siteLjørdalen:quadratGB10	NA	NA	NA	NA
sitePlassen:quadratGB10	NA	NA	NA	NA
siteGravberget:quadratGB2	-3.260e+01	4.074e+03	-0.008	0.993616
siteLjørdalen:quadratGB2	NA	NA	NA	NA
sitePlassen:quadratGB2	NA	NA	NA	NA
siteGravberget:quadratGB3	2.836e+01	3.761e+03	0.008	0.993983
siteLjørdalen:quadratGB3	NA	NA	NA	NA
sitePlassen:quadratGB3	NA	NA	NA	NA
siteGravberget:quadratGB4	3.360e+00	3.134e+02	0.011	0.991445
siteLjørdalen:quadratGB4	NA	NA	NA	NA
sitePlassen:quadratGB4	NA	NA	NA	NA
siteGravberget:quadratGB5	1.816e+01	5.183e+03	0.004	0.997204
siteLjørdalen:quadratGB5	NA	NA	NA	NA
sitePlassen:quadratGB5	NA	NA	NA	NA
siteGravberget:quadratGB6	-4.943e+00	6.268e+02	-0.008	0.993709
siteLjørdalen:quadratGB6	NA	NA	NA	NA
sitePlassen:quadratGB6	NA	NA	NA	NA
siteGravberget:quadratGB7	2.682e+01	3.448e+03	0.008	0.993792
siteLjørdalen:quadratGB7	NA	NA	NA	NA
sitePlassen:quadratGB7	NA	NA	NA	NA
siteGravberget:quadratGB8	2.638e+01	3.448e+03	0.008	0.993894
siteLjørdalen:quadratGB8	NA	NA	NA	NA
sitePlassen:quadratGB8	NA	NA	NA	NA
siteGravberget:quadratGB9	2.733e+01	3.448e+03	0.008	0.993676
siteLjørdalen:quadratGB9	NA	NA	NA	NA
sitePlassen:quadratGB9	NA	NA	NA	NA
siteGravberget:quadratLA1	NA	NA	NA	NA
siteLjørdalen:quadratLA1	-1.897e+01	2.194e+03	-0.009	0.993102
sitePlassen:quadratLA1	NA	NA	NA	NA
siteGravberget:quadratLA10	NA	NA	NA	NA
siteLjørdalen:quadratLA10	-5.557e+01	6.895e+03	-0.008	0.993570
sitePlassen:quadratLA10	NA	NA	NA	NA
siteGravberget:quadratLA11	NA	NA	NA	NA
siteLjørdalen:quadratLA11	-1.221e+02	1.365e+04	-0.009	0.992859
sitePlassen:quadratLA11	NA	NA	NA	NA
siteGravberget:quadratLA2	NA	NA	NA	NA
siteLjørdalen:quadratLA2	-6.224e+01	6.087e+03	-0.010	0.991841
sitePlassen:quadratLA2	NA	NA	NA	NA

siteGravberget:quadratLA4	NA	NA	NA	NA
siteLjørdalen:quadratLA4	-2.473e+01	3.134e+03	-0.008	0.993705
sitePlassen:quadratLA4	NA	NA	NA	NA
siteGravberget:quadratLA5	NA	NA	NA	NA
siteLjørdalen:quadratLA5	-8.008e+01	1.034e+04	-0.008	0.993822
sitePlassen:quadratLA5	NA	NA	NA	NA
siteGravberget:quadratLA6	NA	NA	NA	NA
siteLjørdalen:quadratLA6	-1.319e+02	1.489e+04	-0.009	0.992932
sitePlassen:quadratLA6	NA	NA	NA	NA
siteGravberget:quadratLA7	NA	NA	NA	NA
siteLjørdalen:quadratLA7	-3.845e+01	4.701e+03	-0.008	0.993474
sitePlassen:quadratLA7	NA	NA	NA	NA
siteGravberget:quadratLA8	NA	NA	NA	NA
siteLjørdalen:quadratLA8	-8.490e+01	1.097e+04	-0.008	0.993825
sitePlassen:quadratLA8	NA	NA	NA	NA
siteGravberget:quadratLA9	NA	NA	NA	NA
siteLjørdalen:quadratLA9	-1.491e+02	1.707e+04	-0.009	0.993031
sitePlassen:quadratLA9	NA	NA	NA	NA
siteGravberget:quadratLB1	NA	NA	NA	NA
siteLjørdalen:quadratLB1	-1.412e+01	1.567e+03	-0.009	0.992809
sitePlassen:quadratLB1	NA	NA	NA	NA
siteGravberget:quadratLB10	NA	NA	NA	NA
siteLjørdalen:quadratLB10	-4.699e+01	5.955e+03	-0.008	0.993705
sitePlassen:quadratLB10	NA	NA	NA	NA
siteGravberget:quadratLB2	NA	NA	NA	NA
siteLjørdalen:quadratLB2	-3.502e+01	4.388e+03	-0.008	0.993632
sitePlassen:quadratLB2	NA	NA	NA	NA
siteGravberget:quadratLB3	NA	NA	NA	NA
siteLjørdalen:quadratLB3	-3.714e+00	3.134e+02	-0.012	0.990546
sitePlassen:quadratLB3	NA	NA	NA	NA
siteGravberget:quadratLB4	NA	NA	NA	NA
siteLjørdalen:quadratLB4	-6.931e+01	6.973e+03	-0.010	0.992069
sitePlassen:quadratLB4	NA	NA	NA	NA
siteGravberget:quadratLB5	NA	NA	NA	NA
siteLjørdalen:quadratLB5	-9.872e+01	1.254e+04	-0.008	0.993717
sitePlassen:quadratLB5	NA	NA	NA	NA
siteGravberget:quadratLB6	NA	NA	NA	NA
siteLjørdalen:quadratLB6	-2.040e+01	2.507e+03	-0.008	0.993510
sitePlassen:quadratLB6	NA	NA	NA	NA
siteGravberget:quadratLB7	NA	NA	NA	NA
siteLjørdalen:quadratLB7	-6.684e+01	8.462e+03	-0.008	0.993698
sitePlassen:quadratLB7	NA	NA	NA	NA
siteGravberget:quadratLB8	NA	NA	NA	NA
siteLjørdalen:quadratLB8	-3.240e+01	4.074e+03	-0.008	0.993654
sitePlassen:quadratLB8	NA	NA	NA	NA
siteGravberget:quadratLB9	NA	NA	NA	NA

siteLjørdalen:quadratLB9	NA	NA	NA	NA
sitePlassen:quadratLB9	NA	NA	NA	NA
siteGravberget:quadratPA1	NA	NA	NA	NA
siteLjørdalen:quadratPA1	NA	NA	NA	NA
sitePlassen:quadratPA1	-2.067e+01	2.320e+03	-0.009	0.992893
siteGravberget:quadratPA10	NA	NA	NA	NA
siteLjørdalen:quadratPA10	NA	NA	NA	NA
sitePlassen:quadratPA10	-5.569e+01	7.209e+03	-0.008	0.993836
siteGravberget:quadratPA2	NA	NA	NA	NA
siteLjørdalen:quadratPA2	NA	NA	NA	NA
sitePlassen:quadratPA2	-9.059e+00	9.402e+02	-0.010	0.992313
siteGravberget:quadratPA3	NA	NA	NA	NA
siteLjørdalen:quadratPA3	NA	NA	NA	NA
sitePlassen:quadratPA3	-3.983e+01	3.664e+03	-0.011	0.991327
siteGravberget:quadratPA4	NA	NA	NA	NA
siteLjørdalen:quadratPA4	NA	NA	NA	NA
sitePlassen:quadratPA4	-2.490e+01	3.134e+03	-0.008	0.993660
siteGravberget:quadratPA5	NA	NA	NA	NA
siteLjørdalen:quadratPA5	NA	NA	NA	NA
sitePlassen:quadratPA5	-1.065e+01	2.418e+03	-0.004	0.996486
siteGravberget:quadratPA6	NA	NA	NA	NA
siteLjørdalen:quadratPA6	NA	NA	NA	NA
sitePlassen:quadratPA6	-4.255e+01	5.328e+03	-0.008	0.993628
siteGravberget:quadratPA7	NA	NA	NA	NA
siteLjørdalen:quadratPA7	NA	NA	NA	NA
sitePlassen:quadratPA7	-2.035e+01	2.507e+03	-0.008	0.993524
siteGravberget:quadratPA8	NA	NA	NA	NA
siteLjørdalen:quadratPA8	NA	NA	NA	NA
sitePlassen:quadratPA8	-6.579e+01	8.462e+03	-0.008	0.993797
siteGravberget:quadratPA9	NA	NA	NA	NA
siteLjørdalen:quadratPA9	NA	NA	NA	NA
sitePlassen:quadratPA9	-6.404e+01	8.462e+03	-0.008	0.993962
siteGravberget:quadratPB1	NA	NA	NA	NA
siteLjørdalen:quadratPB1	NA	NA	NA	NA
sitePlassen:quadratPB1	8.116e+00	1.254e+03	0.006	0.994834
siteGravberget:quadratPB10	NA	NA	NA	NA
siteLjørdalen:quadratPB10	NA	NA	NA	NA
sitePlassen:quadratPB10	-6.915e+01	8.776e+03	-0.008	0.993713
siteGravberget:quadratPB2	NA	NA	NA	NA
siteLjørdalen:quadratPB2	NA	NA	NA	NA
sitePlassen:quadratPB2	-5.979e+00	6.268e+02	-0.010	0.992389
siteGravberget:quadratPB3	NA	NA	NA	NA
siteLjørdalen:quadratPB3	NA	NA	NA	NA
sitePlassen:quadratPB3	-3.807e+00	2.972e+03	-0.001	0.998978
siteGravberget:quadratPB4	NA	NA	NA	NA
siteLjørdalen:quadratPB4	NA	NA	NA	NA

```
sitePlassen:quadratPB4     -1.039e+01  1.254e+03  -0.008 0.993387
siteGravberget:quadratPB5         NA         NA      NA       NA
siteLjørdalen:quadratPB5          NA         NA      NA       NA
sitePlassen:quadratPB5     -1.868e+01  2.507e+03  -0.007 0.994056
siteGravberget:quadratPB6         NA         NA      NA       NA
siteLjørdalen:quadratPB6          NA         NA      NA       NA
sitePlassen:quadratPB6      1.530e+01  2.194e+03   0.007 0.994436
siteGravberget:quadratPB7         NA         NA      NA       NA
siteLjørdalen:quadratPB7          NA         NA      NA       NA
sitePlassen:quadratPB7     -5.095e+01  6.582e+03  -0.008 0.993823
siteGravberget:quadratPB8         NA         NA      NA       NA
siteLjørdalen:quadratPB8          NA         NA      NA       NA
sitePlassen:quadratPB8     -2.338e+00  3.134e+02  -0.007 0.994047
siteGravberget:quadratPB9         NA         NA      NA       NA
siteLjørdalen:quadratPB9          NA         NA      NA       NA
sitePlassen:quadratPB9            NA         NA      NA       NA
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

    Null deviance: 880.14  on 958  degrees of freedom
Residual deviance: 573.19  on 887  degrees of freedom
AIC: 1006.5

Number of Fisher Scoring iterations: 17
```

All sites, 2015

```
Deviance Residuals:
     Min        1Q    Median        3Q       Max
-2.00322  -0.70883  -0.45790  -0.00015   3.02336

Coefficients: (120 not defined because of singularities)
                          Estimate Std. Error z value Pr(>|z|)
(Intercept)             -1.904e+00  3.905e-01  -4.875 1.09e-06 ***
siteLjørdalen           -4.935e-01  4.629e-01  -1.066 0.286368
sitePlassen             -4.310e-02  4.042e-01  -0.107 0.915078
psy                      8.267e-04  2.715e-04   3.045 0.002327 **
FSAV                     6.215e-03  2.545e-03   2.442 0.014595 *
vegDwarf shrub           1.176e+00  2.431e-01   4.838 1.31e-06 ***
vegFen                   4.146e-01  1.055e+00   0.393 0.694353
vegGrass                 1.219e+00  3.379e-01   3.608 0.000308 ***
vegLichen                1.389e+00  2.936e-01   4.731 2.23e-06 ***
vegRocks                 1.402e+00  5.359e-01   2.617 0.008873 **
vegSmall Fern           -1.986e-01  1.041e+00  -0.191 0.848668
trees                    2.907e-02  8.751e-03   3.321 0.000896 ***
```

siteGravberget:quadratGA10	-1.295e+00	7.786e-01	-1.663	0.096318	.
siteLjørdalen:quadratGA10	NA	NA	NA	NA	
sitePlassen:quadratGA10	NA	NA	NA	NA	
siteGravberget:quadratGA2	-1.995e-01	4.334e-01	-0.460	0.645286	
siteLjørdalen:quadratGA2	NA	NA	NA	NA	
sitePlassen:quadratGA2	NA	NA	NA	NA	
siteGravberget:quadratGA3	-5.687e-01	5.391e-01	-1.055	0.291442	
siteLjørdalen:quadratGA3	NA	NA	NA	NA	
sitePlassen:quadratGA3	NA	NA	NA	NA	
siteGravberget:quadratGA4	-2.096e-01	3.959e-01	-0.529	0.596598	
siteLjørdalen:quadratGA4	NA	NA	NA	NA	
sitePlassen:quadratGA4	NA	NA	NA	NA	
siteGravberget:quadratGA5	-5.848e-01	5.114e-01	-1.143	0.252864	
siteLjørdalen:quadratGA5	NA	NA	NA	NA	
sitePlassen:quadratGA5	NA	NA	NA	NA	
siteGravberget:quadratGA6	-2.131e-01	4.291e-01	-0.497	0.619430	
siteLjørdalen:quadratGA6	NA	NA	NA	NA	
sitePlassen:quadratGA6	NA	NA	NA	NA	
siteGravberget:quadratGA7	-2.280e+00	1.046e+00	-2.179	0.029315	*
siteLjørdalen:quadratGA7	NA	NA	NA	NA	
sitePlassen:quadratGA7	NA	NA	NA	NA	
siteGravberget:quadratGA8	-1.448e-01	3.888e-01	-0.372	0.709631	
siteLjørdalen:quadratGA8	NA	NA	NA	NA	
sitePlassen:quadratGA8	NA	NA	NA	NA	
siteGravberget:quadratGA9	6.571e-02	3.906e-01	0.168	0.866419	
siteLjørdalen:quadratGA9	NA	NA	NA	NA	
sitePlassen:quadratGA9	NA	NA	NA	NA	
siteGravberget:quadratGB1	1.848e-01	4.658e-01	0.397	0.691563	
siteLjørdalen:quadratGB1	NA	NA	NA	NA	
sitePlassen:quadratGB1	NA	NA	NA	NA	
siteGravberget:quadratGB10	-5.547e-01	5.090e-01	-1.090	0.275748	
siteLjørdalen:quadratGB10	NA	NA	NA	NA	
sitePlassen:quadratGB10	NA	NA	NA	NA	
siteGravberget:quadratGB2	-6.444e-01	4.635e-01	-1.390	0.164493	
siteLjørdalen:quadratGB2	NA	NA	NA	NA	
sitePlassen:quadratGB2	NA	NA	NA	NA	
siteGravberget:quadratGB3	-4.849e-01	4.723e-01	-1.027	0.304495	
siteLjørdalen:quadratGB3	NA	NA	NA	NA	
sitePlassen:quadratGB3	NA	NA	NA	NA	
siteGravberget:quadratGB4	-1.783e+01	1.326e+03	-0.013	0.989266	
siteLjørdalen:quadratGB4	NA	NA	NA	NA	
sitePlassen:quadratGB4	NA	NA	NA	NA	
siteGravberget:quadratGB5	-6.914e-01	5.445e-01	-1.270	0.204127	
siteLjørdalen:quadratGB5	NA	NA	NA	NA	
sitePlassen:quadratGB5	NA	NA	NA	NA	
siteGravberget:quadratGB6	-1.374e+00	6.506e-01	-2.112	0.034672	*

siteLjørdalen:quadratGB6	NA	NA	NA	NA	
sitePlassen:quadratGB6	NA	NA	NA	NA	
siteGravberget:quadratGB7	-5.825e-01	5.088e-01	-1.145	0.252307	
siteLjørdalen:quadratGB7	NA	NA	NA	NA	
sitePlassen:quadratGB7	NA	NA	NA	NA	
siteGravberget:quadratGB8	-5.577e-01	5.084e-01	-1.097	0.272721	
siteLjørdalen:quadratGB8	NA	NA	NA	NA	
sitePlassen:quadratGB8	NA	NA	NA	NA	
siteGravberget:quadratGB9	-1.245e+00	6.484e-01	-1.920	0.054871	.
siteLjørdalen:quadratGB9	NA	NA	NA	NA	
sitePlassen:quadratGB9	NA	NA	NA	NA	
siteGravberget:quadratLA1	NA	NA	NA	NA	
siteLjørdalen:quadratLA1	-5.188e-01	5.666e-01	-0.916	0.359879	
sitePlassen:quadratLA1	NA	NA	NA	NA	
siteGravberget:quadratLA10	NA	NA	NA	NA	
siteLjørdalen:quadratLA10	-1.035e+00	6.863e-01	-1.509	0.131353	
sitePlassen:quadratLA10	NA	NA	NA	NA	
siteGravberget:quadratLA11	NA	NA	NA	NA	
siteLjørdalen:quadratLA11	-1.461e+00	7.957e-01	-1.837	0.066256	.
sitePlassen:quadratLA11	NA	NA	NA	NA	
siteGravberget:quadratLA2	NA	NA	NA	NA	
siteLjørdalen:quadratLA2	-1.745e+01	1.420e+03	-0.012	0.990192	
sitePlassen:quadratLA2	NA	NA	NA	NA	
siteGravberget:quadratLA4	NA	NA	NA	NA	
siteLjørdalen:quadratLA4	-7.379e-01	6.799e-01	-1.085	0.277815	
sitePlassen:quadratLA4	NA	NA	NA	NA	
siteGravberget:quadratLA5	NA	NA	NA	NA	
siteLjørdalen:quadratLA5	-1.986e-01	5.396e-01	-0.368	0.712810	
sitePlassen:quadratLA5	NA	NA	NA	NA	
siteGravberget:quadratLA6	NA	NA	NA	NA	
siteLjørdalen:quadratLA6	-1.580e+00	8.001e-01	-1.975	0.048255	*
sitePlassen:quadratLA6	NA	NA	NA	NA	
siteGravberget:quadratLA7	NA	NA	NA	NA	
siteLjørdalen:quadratLA7	-1.418e+00	7.844e-01	-1.808	0.070602	.
sitePlassen:quadratLA7	NA	NA	NA	NA	
siteGravberget:quadratLA8	NA	NA	NA	NA	
siteLjørdalen:quadratLA8	-9.044e-01	6.781e-01	-1.334	0.182265	
sitePlassen:quadratLA8	NA	NA	NA	NA	
siteGravberget:quadratLA9	NA	NA	NA	NA	
siteLjørdalen:quadratLA9	-2.088e+00	1.063e+00	-1.965	0.049414	*
sitePlassen:quadratLA9	NA	NA	NA	NA	
siteGravberget:quadratLB1	NA	NA	NA	NA	
siteLjørdalen:quadratLB1	-1.917e+00	1.056e+00	-1.816	0.069328	.
sitePlassen:quadratLB1	NA	NA	NA	NA	
siteGravberget:quadratLB10	NA	NA	NA	NA	
siteLjørdalen:quadratLB10	1.764e-01	5.153e-01	0.342	0.732083	

sitePlassen:quadratLB10	NA	NA	NA	NA	
siteGravberget:quadratLB2	NA	NA	NA	NA	
siteLjørdalen:quadratLB2	-9.544e-01	6.241e-01	-1.529	0.126172	
sitePlassen:quadratLB2	NA	NA	NA	NA	
siteGravberget:quadratLB3	NA	NA	NA	NA	
siteLjørdalen:quadratLB3	-1.646e+00	7.859e-01	-2.095	0.036199	*
sitePlassen:quadratLB3	NA	NA	NA	NA	
siteGravberget:quadratLB4	NA	NA	NA	NA	
siteLjørdalen:quadratLB4	-1.731e+01	1.405e+03	-0.012	0.990170	
sitePlassen:quadratLB4	NA	NA	NA	NA	
siteGravberget:quadratLB5	NA	NA	NA	NA	
siteLjørdalen:quadratLB5	-1.945e+00	1.064e+00	-1.828	0.067530	.
sitePlassen:quadratLB5	NA	NA	NA	NA	
siteGravberget:quadratLB6	NA	NA	NA	NA	
siteLjørdalen:quadratLB6	-1.271e+00	7.879e-01	-1.613	0.106817	
sitePlassen:quadratLB6	NA	NA	NA	NA	
siteGravberget:quadratLB7	NA	NA	NA	NA	
siteLjørdalen:quadratLB7	-9.794e-01	7.931e-01	-1.235	0.216886	
sitePlassen:quadratLB7	NA	NA	NA	NA	
siteGravberget:quadratLB8	NA	NA	NA	NA	
siteLjørdalen:quadratLB8	-5.077e-01	5.673e-01	-0.895	0.370835	
sitePlassen:quadratLB8	NA	NA	NA	NA	
siteGravberget:quadratLB9	NA	NA	NA	NA	
siteLjørdalen:quadratLB9	NA	NA	NA	NA	
sitePlassen:quadratLB9	NA	NA	NA	NA	
siteGravberget:quadratPA1	NA	NA	NA	NA	
siteLjørdalen:quadratPA1	NA	NA	NA	NA	
sitePlassen:quadratPA1	-1.773e+01	1.340e+03	-0.013	0.989447	
siteGravberget:quadratPA10	NA	NA	NA	NA	
siteLjørdalen:quadratPA10	NA	NA	NA	NA	
sitePlassen:quadratPA10	-1.168e+00	5.715e-01	-2.044	0.040944	*
siteGravberget:quadratPA2	NA	NA	NA	NA	
siteLjørdalen:quadratPA2	NA	NA	NA	NA	
sitePlassen:quadratPA2	-2.295e+00	1.040e+00	-2.207	0.027338	*
siteGravberget:quadratPA3	NA	NA	NA	NA	
siteLjørdalen:quadratPA3	NA	NA	NA	NA	
sitePlassen:quadratPA3	-2.376e+00	1.049e+00	-2.265	0.023488	*
siteGravberget:quadratPA4	NA	NA	NA	NA	
siteLjørdalen:quadratPA4	NA	NA	NA	NA	
sitePlassen:quadratPA4	-1.020e+00	5.815e-01	-1.754	0.079348	.
siteGravberget:quadratPA5	NA	NA	NA	NA	
siteLjørdalen:quadratPA5	NA	NA	NA	NA	
sitePlassen:quadratPA5	-2.983e+00	1.061e+00	-2.812	0.004923	**
siteGravberget:quadratPA6	NA	NA	NA	NA	
siteLjørdalen:quadratPA6	NA	NA	NA	NA	
sitePlassen:quadratPA6	-1.433e+00	6.659e-01	-2.152	0.031383	*

```
siteGravberget:quadratPA7          NA         NA      NA       NA
siteLjørdalen:quadratPA7           NA         NA      NA       NA
sitePlassen:quadratPA7     -6.716e-01  5.428e-01  -1.237 0.215977
siteGravberget:quadratPA8          NA         NA      NA       NA
siteLjørdalen:quadratPA8           NA         NA      NA       NA
sitePlassen:quadratPA8     -1.630e+00  7.702e-01  -2.116 0.034311 *
siteGravberget:quadratPA9          NA         NA      NA       NA
siteLjørdalen:quadratPA9           NA         NA      NA       NA
sitePlassen:quadratPA9     -1.770e+01  1.448e+03  -0.012 0.990245
siteGravberget:quadratPB1          NA         NA      NA       NA
siteLjørdalen:quadratPB1           NA         NA      NA       NA
sitePlassen:quadratPB1     -1.747e+01  1.246e+03  -0.014 0.988815
siteGravberget:quadratPB10         NA         NA      NA       NA
siteLjørdalen:quadratPB10          NA         NA      NA       NA
sitePlassen:quadratPB10    -2.513e-01  4.771e-01  -0.527 0.598422
siteGravberget:quadratPB2          NA         NA      NA       NA
siteLjørdalen:quadratPB2           NA         NA      NA       NA
sitePlassen:quadratPB2     -1.363e+00  6.425e-01  -2.122 0.033847 *
siteGravberget:quadratPB3          NA         NA      NA       NA
siteLjørdalen:quadratPB3           NA         NA      NA       NA
sitePlassen:quadratPB3     -3.047e-01  4.995e-01  -0.610 0.541805
siteGravberget:quadratPB4          NA         NA      NA       NA
siteLjørdalen:quadratPB4           NA         NA      NA       NA
sitePlassen:quadratPB4     -2.478e+00  1.041e+00  -2.380 0.017304 *
siteGravberget:quadratPB5          NA         NA      NA       NA
siteLjørdalen:quadratPB5           NA         NA      NA       NA
sitePlassen:quadratPB5     -8.551e-01  5.254e-01  -1.628 0.103594
siteGravberget:quadratPB6          NA         NA      NA       NA
siteLjørdalen:quadratPB6           NA         NA      NA       NA
sitePlassen:quadratPB6     -9.624e-01  5.746e-01  -1.675 0.093979 .
siteGravberget:quadratPB7          NA         NA      NA       NA
siteLjørdalen:quadratPB7           NA         NA      NA       NA
sitePlassen:quadratPB7     -1.718e+00  7.628e-01  -2.252 0.024323 *
siteGravberget:quadratPB8          NA         NA      NA       NA
siteLjørdalen:quadratPB8           NA         NA      NA       NA
sitePlassen:quadratPB8     -7.864e-01  5.000e-01  -1.573 0.115784
siteGravberget:quadratPB9          NA         NA      NA       NA
siteLjørdalen:quadratPB9           NA         NA      NA       NA
sitePlassen:quadratPB9             NA         NA      NA       NA
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

    Null deviance: 971.25  on 958  degrees of freedom
Residual deviance: 673.75  on 890  degrees of freedom
```

AIC: 1247.9

Number of Fisher Scoring iterations: 16

Gravberget, 2012

Deviance Residuals:

```
    Min       1Q   Median       3Q      Max  
-1.6473  -0.6844  -0.2934  -0.0001   4.0041  
```

Coefficients:

```
                   Estimate Std. Error z value Pr(>|z|)   
(Intercept)      -9.301e+00  2.867e+00  -3.244  0.00118 **
quadratGA10      -1.641e+01  1.895e+03  -0.009  0.99309   
quadratGA2        1.098e+00  7.030e-01   1.563  0.11816   
quadratGA3       -4.549e-02  8.898e-01  -0.051  0.95922   
quadratGA4        5.862e-01  6.326e-01   0.927  0.35406   
quadratGA5        4.723e-01  1.236e+00   0.382  0.70229   
quadratGA6        7.224e-01  8.360e-01   0.864  0.38756   
quadratGA7       -1.108e+00  1.183e+00  -0.937  0.34893   
quadratGA8       -1.785e+01  1.850e+03  -0.010  0.99230   
quadratGA9       -9.539e-01  1.177e+00  -0.810  0.41780   
quadratGB1       -9.891e-01  1.160e+00  -0.852  0.39394   
quadratGB10       1.602e+00  7.351e-01   2.180  0.02928 * 
quadratGB2       -1.113e+00  8.914e-01  -1.248  0.21190   
quadratGB3       -4.310e-01  7.911e-01  -0.545  0.58588   
quadratGB4        1.332e+00  6.311e-01   2.110  0.03482 * 
quadratGB5       -1.664e+01  2.037e+03  -0.008  0.99348   
quadratGB6        4.572e-01  6.731e-01   0.679  0.49703   
quadratGB7        7.106e-01  7.154e-01   0.993  0.32059   
quadratGB8        6.461e-01  7.023e-01   0.920  0.35758   
quadratGB9        5.024e-01  7.277e-01   0.690  0.48994   
biomass          -9.720e-03  6.249e-03  -1.555  0.11987   
psy               1.098e-02  6.330e-03   1.735  0.08279 . 
vegDwarf shrub    2.785e+00  1.055e+00   2.640  0.00830 **
vegFen           -1.445e+01  1.403e+03  -0.010  0.99178   
vegGrass          2.202e+00  1.208e+00   1.824  0.06822 . 
vegLichen         3.415e+00  1.147e+00   2.978  0.00291 **
vegMoss           1.941e+00  1.178e+00   1.648  0.09936 . 
vegRocks         -1.340e+01  4.665e+03  -0.003  0.99771   
class            -1.973e-01  1.385e-01  -1.425  0.15429   
bilberry          2.175e-02  7.966e-03   2.730  0.00633 **
dominantno trees -1.560e+01  5.728e+03  -0.003  0.99783   
dominantPab       1.263e-01  5.322e-01   0.237  0.81247   
dominantPsy       1.098e+00  5.063e-01   2.169  0.03010 * 
```

```
acc             1.295e+00  4.208e-01   3.078  0.00209 **
accpsy         -3.525e-01  1.991e-01  -1.770  0.07667 .
trees           1.761e-02  6.763e-03   2.604  0.00922 **
altitude        1.296e-02  7.344e-03   1.764  0.07771 .
slope          -8.379e-02  4.489e-02  -1.866  0.06198 .
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

    Null deviance: 369.97  on 319  degrees of freedom
Residual deviance: 215.81  on 282  degrees of freedom
AIC: 412.37

Number of Fisher Scoring iterations: 17
```

Gravberget, 2015

```
Deviance Residuals:
    Min       1Q   Median       3Q      Max
-1.9928  -0.8744  -0.5423   0.2819   2.8724

Coefficients:
                Estimate Std. Error z value Pr(>|z|)
(Intercept)    -2.248046   0.486411  -4.622 3.81e-06 ***
quadratGA10    -1.481255   0.805813  -1.838 0.066031 .
quadratGA2     -0.146590   0.439558  -0.333 0.738760
quadratGA3     -0.732420   0.559829  -1.308 0.190774
quadratGA4     -0.290506   0.409414  -0.710 0.477974
quadratGA5     -0.717376   0.537200  -1.335 0.181747
quadratGA6     -0.193937   0.438984  -0.442 0.658644
quadratGA7     -2.337129   1.055830  -2.214 0.026860 *
quadratGA8     -0.183451   0.402530  -0.456 0.648573
quadratGA9      0.026967   0.413656   0.065 0.948021
quadratGB1      0.082753   0.495224   0.167 0.867290
quadratGB10    -0.643680   0.533628  -1.206 0.227727
quadratGB2     -0.738606   0.480365  -1.538 0.124148
quadratGB3     -0.761471   0.525685  -1.449 0.147469
quadratGB4    -17.072191 824.872845  -0.021 0.983488
quadratGB5     -0.851821   0.578311  -1.473 0.140766
quadratGB6     -1.320012   0.659384  -2.002 0.045297 *
quadratGB7     -0.503390   0.519054  -0.970 0.332135
quadratGB8     -0.587669   0.528146  -1.113 0.265837
quadratGB9     -1.108058   0.652882  -1.697 0.089663 .
biomass         0.001383   0.000384   3.603 0.000315 ***
FSAV            0.005108   0.003582   1.426 0.153817
```

```
vegDwarf shrub   1.189133   0.341269   3.484 0.000493 ***
vegFen           1.440247   1.096480   1.314 0.189008
vegGrass         1.499046   0.480926   3.117 0.001827 **
vegLichen        1.985856   0.436016   4.555 5.25e-06 ***
vegRocks         1.923811   0.825286   2.331 0.019749 *
bilberry         0.016526   0.006961   2.374 0.017598 *
species          0.181846   0.082324   2.209 0.027180 *
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

    Null deviance: 417.05  on 319  degrees of freedom
Residual deviance: 278.11  on 291  degrees of freedom
AIC: 551.58

Number of Fisher Scoring iterations: 15
```

Ljørdalen, 2012

```
Deviance Residuals:
    Min       1Q   Median       3Q      Max
-1.8572  -0.5170  -0.2391  -0.0001   3.8789

Coefficients:
               Estimate Std. Error z value Pr(>|z|)
(Intercept)  -5.820e+02  2.802e+02  -2.078   0.0378 *
quadratLA10  -5.841e+00  2.709e+00  -2.156   0.0311 *
quadratLA11  -2.422e+01  1.990e+03  -0.012   0.9903
quadratLA2   -1.830e+01  2.013e+03  -0.009   0.9927
quadratLA4    2.732e-01  1.350e+00   0.202   0.8396
quadratLA5   -4.049e+00  2.770e+00  -1.462   0.1438
quadratLA6   -2.419e+01  2.136e+03  -0.011   0.9910
quadratLA7   -4.194e+00  2.083e+00  -2.013   0.0441 *
quadratLA8   -5.216e+00  3.149e+00  -1.656   0.0976 .
quadratLA9   -2.674e+01  2.114e+03  -0.013   0.9899
quadratLB1   -2.876e+00  1.791e+00  -1.606   0.1083
quadratLB10  -7.290e+00  3.674e+00  -1.984   0.0472 *
quadratLB2   -3.040e+00  2.210e+00  -1.376   0.1689
quadratLB3   -2.454e+00  1.640e+00  -1.497   0.1345
quadratLB4   -2.287e+01  2.318e+03  -0.010   0.9921
quadratLB5   -9.140e+00  4.393e+00  -2.081   0.0375 *
quadratLB6   -3.715e+00  2.227e+00  -1.668   0.0953 .
quadratLB7   -7.485e+00  3.772e+00  -1.984   0.0472 *
quadratLB8   -4.027e+00  2.739e+00  -1.470   0.1416
quadratLB9   -2.767e+00  2.152e+00  -1.286   0.1986
x             1.525e-03  7.388e-04   2.063   0.0391 *
psy           1.428e-03  6.240e-04   2.288   0.0221 *
```

```
FSAV             2.562e-02  1.316e-02   1.947   0.0515 .
class            3.747e-01  2.051e-01   1.827   0.0677 .
bilberry        -8.195e-02  4.778e-02  -1.715   0.0863 .
dominantno trees  1.069e+00  9.639e+03   0.000   0.9999
dominantPab     -2.835e-01  1.116e+00  -0.254   0.7995
dominantPsy      1.472e+00  1.073e+00   1.372   0.1701
dominantSal     -7.998e-01  9.666e+03   0.000   0.9999
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for poisson family taken to be 1)

    Null deviance: 253.67  on 319  degrees of freedom
Residual deviance: 155.46  on 291  degrees of freedom
AIC: 293.34

Number of Fisher Scoring iterations: 17
```

Plassen, 2012

```
Deviance Residuals:
     Min        1Q    Median        3Q       Max
-1.63744  -0.56410  -0.33045  -0.00008   2.68006

Coefficients:
              Estimate Std. Error z value Pr(>|z|)
(Intercept) -3.886e+01  3.384e+03  -0.011    0.991
quadratPA10 -3.490e+01  7.273e+03  -0.005    0.996
quadratPA2   1.128e+01  2.352e+03   0.005    0.996
quadratPA3  -1.927e+01  4.106e+03  -0.005    0.996
quadratPA4  -4.751e+00  3.624e+03  -0.001    0.999
quadratPA5   9.739e+00  3.469e+03   0.003    0.998
quadratPA6  -2.209e+01  5.514e+03  -0.004    0.997
quadratPA7   3.496e-01  3.158e+03   0.000    1.000
quadratPA8  -4.513e+01  8.476e+03  -0.005    0.996
quadratPA9  -4.334e+01  8.476e+03  -0.005    0.996
quadratPB1   2.820e+01  2.758e+03   0.010    0.992
quadratPB10 -4.887e+01  8.779e+03  -0.006    0.996
quadratPB2   1.464e+01  2.289e+03   0.006    0.995
quadratPB3   1.675e+01  3.891e+03   0.004    0.997
quadratPB4   1.030e+01  2.455e+03   0.004    0.997
quadratPB5   1.969e+00  3.158e+03   0.001    1.000
quadratPB6   3.596e+01  3.384e+03   0.011    0.992
quadratPB7  -3.067e+01  6.679e+03  -0.005    0.996
quadratPB8   1.841e+01  2.267e+03   0.008    0.994
quadratPB9   2.067e+01  2.289e+03   0.009    0.993
```

```
psy          4.224e-03  8.602e-04   4.911 9.06e-07 ***
road         2.418e+01  3.141e+03   0.008    0.994
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for poisson family taken to be 1)

    Null deviance: 244.23  on 318  degrees of freedom
Residual deviance: 158.90  on 297  degrees of freedom
AIC: 291.74

Number of Fisher Scoring iterations: 17
```

Plassen, 2015

```
Deviance Residuals:
     Min        1Q    Median        3Q       Max
-1.49423  -0.58382  -0.36518  -0.00009   2.93927

Coefficients:
                Estimate Std. Error z value Pr(>|z|)
(Intercept)    -2.050e+01  2.041e+03  -0.010  0.99198
quadratPA10     1.737e+01  2.041e+03   0.009  0.99321
quadratPA2      1.643e+01  2.041e+03   0.008  0.99358
quadratPA3      1.642e+01  2.041e+03   0.008  0.99358
quadratPA4      1.771e+01  2.041e+03   0.009  0.99307
quadratPA5      1.573e+01  2.041e+03   0.008  0.99385
quadratPA6      1.705e+01  2.041e+03   0.008  0.99333
quadratPA7      1.869e+01  2.041e+03   0.009  0.99269
quadratPA8      1.711e+01  2.041e+03   0.008  0.99331
quadratPA9      1.060e-01  3.129e+03   0.000  0.99997
quadratPB1      4.110e-02  2.846e+03   0.000  0.99999
quadratPB10     1.855e+01  2.041e+03   0.009  0.99275
quadratPB2      1.707e+01  2.041e+03   0.008  0.99333
quadratPB3      1.825e+01  2.041e+03   0.009  0.99287
quadratPB4      1.620e+01  2.041e+03   0.008  0.99367
quadratPB5      1.760e+01  2.041e+03   0.009  0.99312
quadratPB6      1.747e+01  2.041e+03   0.009  0.99317
quadratPB7      1.696e+01  2.041e+03   0.008  0.99337
quadratPB8      1.776e+01  2.041e+03   0.009  0.99306
quadratPB9      1.874e+01  2.041e+03   0.009  0.99267
biomass        -1.150e-02  5.675e-03  -2.027  0.04263 *
psy             1.129e-02  5.597e-03   2.016  0.04376 *
FSAV            7.101e-03  4.023e-03   1.765  0.07751 .
vegDwarf shrub  1.062e+00  4.972e-01   2.137  0.03264 *
vegFen         -1.814e+01  9.427e+03  -0.002  0.99846
vegGrass        1.578e+00  5.911e-01   2.670  0.00759 **
vegLichen       9.547e-01  5.771e-01   1.654  0.09805 .
```

```
vegRocks       -1.702e+01  2.450e+03  -0.007  0.99446
vegSmall Fern  -1.704e+01  2.631e+03  -0.006  0.99483
trees           6.095e-02  2.476e-02   2.462  0.01382 *
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

    Null deviance: 271.98  on 318  degrees of freedom
Residual deviance: 177.27  on 289  degrees of freedom
AIC: 349.41

Number of Fisher Scoring iterations: 17
```