



AALBORG UNIVERSITY
DENMARK

Aalborg Universitet

Second home mobility, climate impacts and travel modes

Can sustainability obstacles be overcome?

Næss, Petter; Xue, Jin; Stefansdottir, Harpa; Steffansen, Rasmus; Richardson, Tim

Published in:
Journal of Transport Geography

DOI (link to publication from Publisher):
[10.1016/j.jtrangeo.2019.102468](https://doi.org/10.1016/j.jtrangeo.2019.102468)

Creative Commons License
CC BY-NC-ND 4.0

Publication date:
2019

Document Version
Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

Citation for published version (APA):
Næss, P., Xue, J., Stefansdottir, H., Steffansen, R., & Richardson, T. (2019). Second home mobility, climate impacts and travel modes: Can sustainability obstacles be overcome? *Journal of Transport Geography*, 79, Article 102468. <https://doi.org/10.1016/j.jtrangeo.2019.102468>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.



Second home mobility, climate impacts and travel modes: Can sustainability obstacles be overcome?

Petter Næss^{a,*}, Jin Xue^a, Harpa Stefansdottir^a, Rasmus Steffansen^b, Tim Richardson^a

^a Department of Urban and Regional Planning, Norwegian University of Life Sciences, Ås, Norway

^b Department of Planning, Aalborg University, Aalborg, Denmark

ARTICLE INFO

Keywords:

Second home
Mobility
Climate impact
Travel mode
Qualitative research
Mixed-methods

ABSTRACT

Based on a mixed-methods study of Norwegian second home users, this paper addresses travel distances, modes and carbon dioxide emissions from second home mobility, with a particular focus on reasons for choosing relevant modes of transportation to second home areas and while staying there. The questionnaire data show that the climate impacts are particularly high for trips to second homes located abroad, but due to their higher number, mobility when visiting domestic Norwegian second homes is also a sizeable source of CO₂ emissions. Qualitative interviews with 18 participants illustrate important reasons why the car is often considered the default mode of travel when going to Norwegian second homes. These findings provide foundations for proposing land use and transport policies to reduce the climate impact of second home mobility.

1. Introduction

It is often considered an 'obvious fact' that the second-home lifestyle is closely associated with car travel. However, few studies have scrutinized second home-related travel and the reasons second home users have for their ways of traveling. The purpose of this paper is to provide a nuanced picture of travel modes linked to second home¹ mobility, comprising of both trips between primary and second homes and local travel within the second home areas. Particularly, we investigate the reasons for using the respective modes of transportation for such trips, based mainly on qualitative interview data from a Norwegian study, supplemented with some of its survey results. By doing this, we also aim to advance the research field of second home mobility and contribute to wider debates about how it could possibly be made more climate friendly.

Travel linked to the use of second homes represents a non-trivial contribution to the climate impact of the users of such dwellings. Around 40% of Norwegian households have regular access to second homes that they either own themselves or have access to through families, friends, and other relations. According to Farstad and Dybedahl (2011), 70% of Norwegians' second homes were located more than 1 hour driving distance from the user's primary home address, and 28% more than 3 hours driving distance away. Although the number of

annual trips to and from second homes is much lower than, for example, workforce participants' commuting trips, the CO₂ emissions from these trips is still considerable primarily due to the long distances covered when visiting second homes and the reliance on auto- and aeromobility as the major means of transport (Aall, 2011a,b, 2014; Adamiak et al., 2015). This is especially the case for second homes located abroad, which are often accessed by long-distance flights. As shown in Section 3, per capita CO₂ emission from the second home mobility of Greater Oslo residents with access to second homes abroad is about one quarter of the mean total CO₂ emission per Norwegian, and is four times as high as the corresponding per capita figure for those using only domestic second homes.

For visits to domestic second homes by residents of the Nordic countries, the private car is the predominant travel mode (Aall, 2014; Hiltunen, 2004; Danmarks Statistik, 2010). Still, many visitors to second homes use other means of transportation, and some trips to second homes include a combination of different travel modes. Shifts to less environmentally harmful means of transport are part of the solution to reducing the climate impact of second home mobility. A vital precondition for attaining this is a deeper understanding of why second home users have preferences for and choose a certain travel mode, either car, train, bus or airplane.

Although second homes in the Nordic countries have been a subject

* Corresponding author at: Department of Urban and Regional Planning, Norwegian University of Life Sciences, P.O. Box 5003 NMBU, N-1432 Ås, Norway.

E-mail address: petter.nass@nmbu.no (P. Næss).

¹ By second homes, we refer to stationary dwellings for recreational purposes other than the dwelling registered in the national census as a person's official home address, to which the person or household in question has regular access (Farstad and Almås, 2008), and regardless of whether the dwelling is located in Norway or abroad.

of research within different disciplinary traditions, studies on second home mobility are not abundant, particularly in connection with climate change. The topic of second home mobility has been mainly approached from four perspectives. The first presents second home mobility patterns at national or regional scales such as travel distances, travel modes, frequency of visits, etc. (e.g. Farstad and Dybedahl, 2011; Hiltunen, 2004; Hiltunen and Rehunen, 2014; Kauppila, 2010). This type of study is often based on surveys and is mostly quantitative and descriptive. The second perspective examines cultural meanings associated with second home mobility (Pitkänen, 2008; Ellingsen and Hidle, 2013; Overvåg, 2011; Lipkina, 2013). The third analyzes the political conception of second home mobility with particular attention to how this type of mobility represents division or connection between rural and urban spatial entities (Hall and Müller, 2004; McIntyre et al., 2006; Hidle et al., 2010; Rinne et al., 2014). The last type of research on second home mobility is devoted to its environmental impacts through estimating energy consumption in connection with visits to second homes (Aall, 2011a,b, 2014; Hille et al., 2007; Hiltunen, 2008). None of the studies has attempted to dig into the travel modes chosen and their underlying reasons. Such understanding is important in order to formulate policy measures to mitigate the climate impacts of second home use. Moreover, no study has so far, to our knowledge, taken into account visitors' travel *within* the second home area when staying there. This dimension has even been intentionally excluded in some studies (e.g. Hille et al., 2007). This paper will fill in these research gaps and for the first time present a detailed account of the reasons for travel mode choices related to second home use.

In the next Section 2, we present the data and methods of the study. Section 3 offers an overview of travel modes among Greater Oslo survey respondents and interviewees for their trips *between* primary and second homes. Based on qualitative interview data, Section 4 sheds light on the more detailed practices of second home mobility and the reasons for such practices. In Section 5, underlying rationales influencing second home mobility are elicited. Section 6 discusses whether and how second home mobility can become more climate friendly. A few concluding remarks finalize the paper (Section 7).

2. Data and methods

The empirical material on which this paper is based stems from a questionnaire survey among inhabitants of Greater Oslo, and eighteen qualitative interviews with persons having access to second homes. In addition to Greater Oslo residents, the interviewees included some second home users living in the city of Trondheim.

The survey respondents were recruited among inhabitants living within 45 postal zones in Greater Oslo. These zones were chosen in order to ensure variation in terms of housing types, neighborhood densities, centrality (distance from the city center of Oslo) and district-scale income levels. In total, we sent 10,000 invitation letters to the web-based questionnaire survey to addressees randomly selected among the residential addresses within the selected postal zones. We received 717 completed responses, yielding a response rate of 7.2%. While rather low, such a response rate is not uncommon in social science studies nowadays, especially for extensive and complex questionnaires such as the one used in the present study. Since the questions focused on the use of second homes, persons who did not use or have access to any such dwellings were less prone to answer. This is reflected in the high share of persons with access to second homes among the respondents (67%), which is considerably above the national average of about 40%. The survey data used in this paper include only the respondents who have access to one or more second homes.

As can be seen in Table 1, respondents have on average higher education and income and are on average older than the general population in the two counties in which they live. In particular, this applies to those respondents who have access to second homes, who also belong to on average larger households with a higher occurrence of

children than those without such access. The difference between respondents with and without access to second homes in income, education level and household size corresponds to findings in another study of the Oslo metropolitan area (Næss, 2016). Since the present paper focuses only on the owner/user group, we consider this group as fairly representative of the population of second home owners/users among Greater Oslo residents.²

Apart from questions about ownership and access to second homes, the questionnaire included questions about, among others, motivations for going there, duration and frequency of stays, the address, type, size and standard of primary as well as second homes, modes of traveling between primary and second homes, and how far from the primary dwelling each second home was located. The questionnaire survey did not include questions about the respondents' travel during their stay at the second homes.

We also asked if the respondents were willing to participate in a follow-up qualitative interview. After a preliminary analysis of the survey data, we decided to focus on second homes that are mainly for recreational use, since this is the dominant type in the survey. Among the 244 respondents that stated their willingness, nine who had access to second homes located at various places in Southern Norway were selected as interviewees. Subsequently, nine additional interviewees were selected among owners/users of second homes located in the municipalities of Oppdal, Trysil and Kragerø. The interviewees of Oppdal (a mountain municipality) all lived in Trondheim, whereas the additional interviewees with second homes in Kragerø (a coastal municipality) and Trysil (a mountain municipality) all lived in Greater Oslo, like the interviewees who were recruited through the questionnaire did.

To an even higher degree than the survey respondents with access to second homes, the interviewees have a high education level, high income and belong to large households with above-average number of children 7–17 years of age (see Table 1). This difference between interviewees and survey respondents with access to second home may be due to the fact that all interviewees owned at least 1 second home, except three who had access through close relatives, whereas the respondents included a larger share of persons who had access to the second homes of relatives or friends but did not own one themselves. All interviewees had a Norwegian ethnic background. Persons with an immigrant background, who often have access to second homes in their own or their parents' country of origin (Duval, 2004), were thus not represented among the interviewees. Appendix A shows key demographic and socioeconomic characteristics of the interviewees as well as the location and ownership status of their second homes. Several interviewees had access to more than one second home. Fig. 1 shows the locations of the second homes owned by or accessible for the interviewees.³

The interviews lasted for 60 to 90 min and were semi-structured, addressing several pre-identified topics. Apart from the mobility aspect, each interview covered a number of other themes discussed in separate papers. Each interview was conducted in an open manner, where the interviewees were first given the opportunity to speak freely for some minutes about their visits to second homes. Six interviews were conducted in Norwegian and the remaining twelve in English language,

² At a national scale in 2013, income and education levels were considerably higher among buyers of second homes than among the general population, and among second home buyers from Oslo, two thirds had education at bachelor level or higher (Steinnes, 2016). Similarly, among second home owners and renters in two mountain municipalities in the county of Telemark, 64% had completed a university or university college education (Nordbø, 2008).

³ One of the second homes owned by one of the interviewees was located at the southern coast of Turkey and is not shown on the map. At three locations (Oppdal, Kragerø and Trysil), the number of interviewee second homes within a concentrated area was too high to enable each such dwelling to be represented by a separate pin on the map.

Table 1
 Characteristics of the survey respondents (all aged 19 or more) and interviewees, compared to the population of the counties of Oslo and Akershus.

	Respondents of the survey (N = 717) (Values for those with and without second home access, respectively, in parenthesis)	Interviewees (N = 18)	Inhabitants of the counties Oslo and Akershus (including the Greater Oslo area)
Percent with access to one or more second homes	67	100	Approx. 40
Average number of persons per household	2.49 (2.75/1.96)	2.83	1.94
Average number of children aged 0–6 years per household	0.25 (0.29/0.16)	0.22	0.15
Average number of children aged 7–17 years per household	0.36 (0.43/0.22)	0.78	0.13
Average age among respondents (all aged 18 or more)	55 (54/56)	51.0	46 (aged 16 or more)
Gender (percent female)	51 (49/52)	44	50
Percent of workforce participants among respondents	66 (70/59)	83	81
Average annual household income (1000 NOK)	928 (999/790)	1056	812
Percent with education at master level or higher	54 (58/47)	78	16 (aged 16 or more)

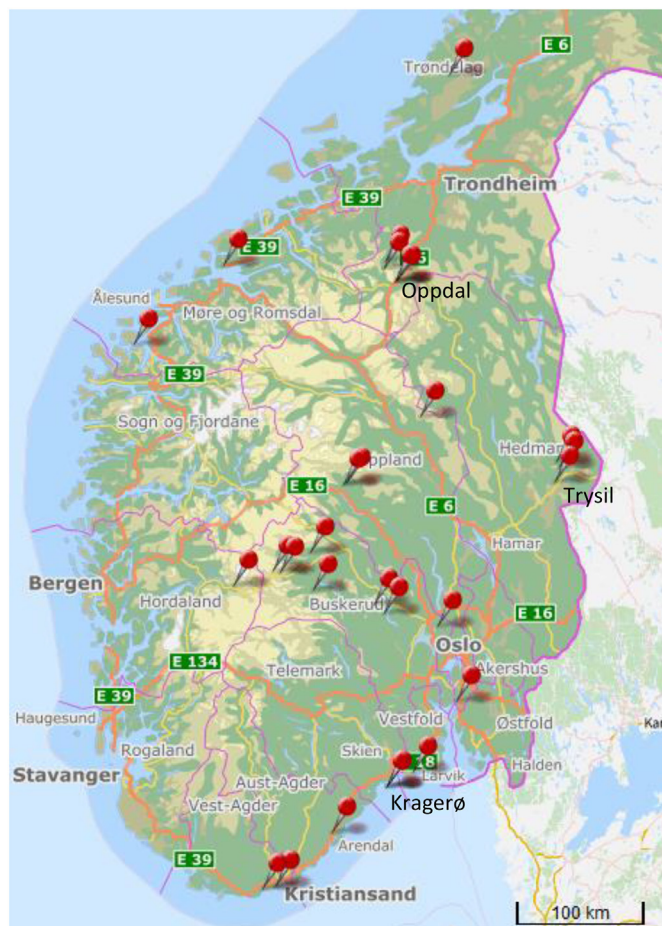


Fig. 1. Locations of the second homes owned by or accessible for the interviewees.

reflecting that some of the interview team members were not native Norwegian speakers. For most of the interviews, two interviewers participated. The interviews were all audio-recorded and subsequently transcribed, verbatim. An important tool in the subsequent analysis of interview data was an interpretation scheme developed in studies on residential location and travel conducted earlier by some of the project team members (Næss, 2013; Næss et al., 2018; Næss, 2018) and adapted to the present study. The interpretation scheme requested the

interpreters to state what each interview could tell about each of the research sub-questions. Each interview was interpreted by one member of the research team while another research team member who had read the same transcript acted as a quality-checker. By having two interviewers for most of the interviewees, we could also learn from each other, adjust our perspectives and better align our understandings. Synthesizing across the 18 interviews was conducted separately for different question groups formed from the original research questions of the interpretation scheme.

3. Survey results

Travel distances and travel modes for respondent’ trips to and from second homes differ considerably, depending on whether the second home is located in Norway or abroad. Whereas second homes in Norway are on average located 249 km from the respondents’ primary dwellings, the average distance is 1878 km to their second homes abroad. Airplane is the main travel mode for more than half of the latter visits. Among the second homes abroad, 62% are located outside Scandinavia. In the presentation of survey results below, we have chosen to distinguish between trips to/from second homes located in Norway and abroad.

3.1. Travel distances

Table 2 shows how travel distances between respondents’ primary dwelling and second homes differ, depending on whether the second homes are located in Norway or abroad. Both for the respondents’ most visited second home and for any other second homes less frequently visited by the respondent, travel distances are, as one might expect, much longer to the second homes located abroad. We also see a clear tendency that the second homes most frequently visited are located closer to the primary dwelling than those visited more rarely. Such ‘distance decay’ (Maddison et al., 1996) applies to the domestic Norwegian second homes as well as to those abroad and is in line with findings in other studies of second home mobility (e.g. Hiltunen and Rehunen, 2014; Farstad and Dybedahl, 2011).

3.2. Travel modes

Car, airplane, train and bus are by far the dominating travel modes among the respondents, used as the main⁴ mode for 97.8% of the trips

⁴ If the trip involves more than one travel mode, the main mode refers to the

Table 2

Distances between respondents' primary dwellings and second homes located in Norway and abroad. Quartiles and mean values. The N values refer to second homes in Norway and abroad, respectively.

Second home no. (First = most frequently visited, third = least frequently visited)	In Norway				Abroad			
	Percent of respondents whose second home is within the given distance (km)			Mean distance to the second home (km)	Percent of respondents whose second home is within the given distance (km)			Mean distance to the second home (km)
	25% (lower quartile)	50% (median)	75% (upper quartile)		25% (lower quartile)	50% (median)	75% (upper quartile)	
First (N = 377; 43)	93	160	240	229	180	325	2000	1020
Second plus third (N = 163; 31)	121	209	309	297	1459	2385	3674	3069

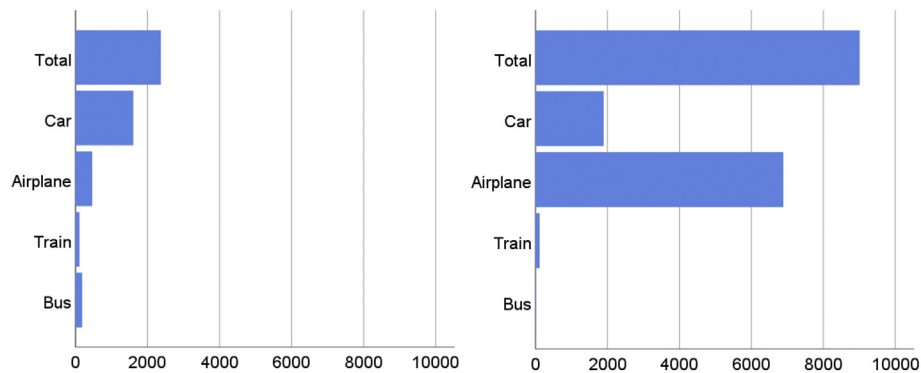


Fig. 2. Mean travel distances for trips with car, airplane, train and bus as the main travel mode to and from respondents' second homes during the last 12 months among second home users without (left, N = 350) and with (right, N = 72) access to at least 1 second home abroad.

to second homes located in Norway and 98.8% of the trips to second homes outside Norway. For trips to second homes in Norway, other motorized forms of transportation (coastal liner, ferry, private boat used for recreation, taxi, snow scooter and others) are the main travel modes for 0.9% of the trips and non-motorized modes for 1.3%. The trips by modes other than car, airplane, train and bus are generally much shorter than those with the main travel modes and therefore account for a tiny percentage of the distances traveled. In the figures below, we will therefore concentrate on the four main modes used for travel to and from second homes.

Fig. 2 shows average distances traveled to/from second homes using car, airplane, train and bus as the main travel mode among second homes users with access only to second homes located in Norway (to the left), and second home users who have access to at least 1 second home abroad (to the right). Car is the most important mode in terms of distance traveled for trips to and from second homes located in Norway, while airplane has a dominant position for trips to second homes abroad. Private cars also cover a considerable distance among the latter trips; this applies mainly to second homes located in Sweden and to some extent also Denmark. Conversely, airplane accounts for nearly 30% of the distance traveled to second homes in Norway visited by the respondents. In terms of travel distance, train and bus account for very small proportions when visiting second homes in Norway as well as abroad.

3.3. Carbon dioxide emissions

Fig. 3 shows, in a way corresponding to Fig. 2, the CO₂ emissions per capita⁵ resulting from respondents' trips to and from second homes

(footnote continued)

travel mode used for the longest part of the journey.

⁵ Per capita emissions are calculated among the persons who actually travel to/from each second home, i.e. the users. We have used CO₂ emission factors for car driving from Miljøkommune.no (2018), for air travel from Aamaas et al.

in Norway and abroad using car, airplane, train and bus as the main travel mode. Respondents visiting second homes outside Norway and using airplane as the main travel mode generate very substantial CO₂ emissions, with an average of nearly 1650 kg per capita over the 12-month period, compared to < 250 kg for car travel. The per capita CO₂ emissions for respondents' travel by airplane and car to and from second homes abroad amounts to one fourth of the per capita CO₂ emissions among Norwegians for all purposes, excluding oil and gas production. For visits to second homes in Norway, the car is still the dominant greenhouse gas emitter with nearly twice as large CO₂ emissions per respondent (240 kg) as for airplane (123 kg). The latter emissions are accounted for by only 4% of the trips to second homes located in Norway.

Train and bus travel make up very small amounts and virtually negligible shares of the CO₂ emissions from trips to/from second homes abroad as well as in Norway.

In a climate perspective, the steadily increasing number of Norwegians regularly visiting second homes abroad is worrying. According to Statistics Norway (2017), the number of second homes owned by Norwegians but located abroad was more than eight times as high in 2015 as in 2001. Although persons with access to at least 1 second home abroad make up only one sixth of the second home users, their total CO₂ emissions from trips to/from second homes are

(footnote continued)

(2013) and for bus and train from VTT (2016). Only direct emissions are included, thus omitting the indirect CO₂ emissions resulting from the production and maintenance of vehicles, planes and transport infrastructure. For car, emissions are estimated to be 0.151 kg per vehicle kilometer. Based on this, emissions per person kilometer by car have been calculated from the respondents' statements about the number of persons traveling together for the trips to the specific non-primary dwellings. For airplane, emissions per person kilometer are estimated to be 0.27 kg, which is the average value for trips below (0.30 kg) and above 800 km (0.24 km) given by Aamaas et al. (2013). For bus and train, we have used emission factors of 0.03 and 0.02 kg per person km, in line with the figures given by VTT (2016).

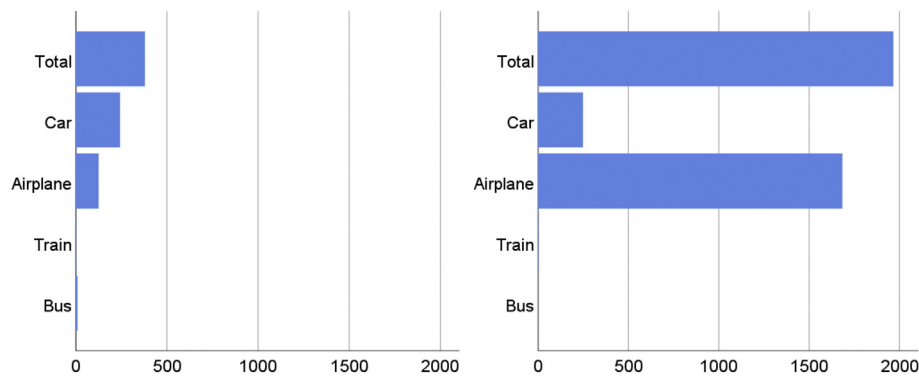


Fig. 3. Mean CO₂ emissions from trips with car, airplane, train and bus as the main travel mode to and from respondents' second homes during the last 12 months among second home users without (left, N = 350) and with (right, N = 71) access to at least one second home abroad.

slightly higher than the corresponding total emissions of the five sixth of the second home users who do not have access to second homes abroad.⁶ Discouraging further growth in Norwegians' second home ownership in distant countries would thus be highly relevant to reduce greenhouse gas emissions from second home mobility (see Section 6).

However, due to their high number (460,000 in 2017), journeys to and from second homes within Norwegian national borders also make up a challenge in a climate perspective. Since our study of second home mobility is part of a project whose main focus is on spatial planning and vacation homes in a Norwegian context, our qualitative interviews focused mainly on the use of second homes in Norway (although one interviewee also had a second home abroad). In the remainder of the paper, we will thus focus on mobility in connection with visits to second homes located in Norway, drawing mainly on the qualitative interview material. Investigating the motivations and rationales underlying travel to second homes in distant foreign countries is an important topic for future research not addressed in the present study. However, before leaving the survey data, we will take a brief look at the accessibility of the respondents' Norwegian second homes by bus or train.

3.4. Transit accessibility of Norwegian second homes

Table 3 shows how large percentages of the Norwegian second homes to which the respondents have access are located within 0.5 km, 1 km and 2 km from the closest transit stop, respectively.

Overall, 73% of the Norwegian second homes visited by the respondents are located > 2 km from the closest transit stop, and only 8% can reach such a stop within 500 m distance. The proportions of second homes located close to or at a moderate distance from a transit stop are somewhat lower for the least frequently visited ones, but even for those visited most often, a large majority is located far from the closest stop. A closer look at the data shows that transit accessibility is particularly poor for second homes in mountain areas, whereas the proportions that can be reached within a moderate distance from the closest transit stop are somewhat higher in coastal areas.

The location of most second homes far away from the closest transit stop can obviously make it cumbersome for visitors to choose more environmentally friendly travel modes than the private car. In the next section, we will explore the reasons and motivations given by participants in the qualitative interviews for their choices of travel modes in connection with visits to second homes.

⁶ Due to the so-called radiation forcing effect, the total climate impact of aviation may be as high as 1.9 times the CO₂ only effect. Taking this into consideration, mobility to second homes abroad may account for nearly two thirds of the climate impact of the respondents' second home mobility.

Table 3

Proportions of respondents' second homes in Norway located within 0.5 km, 1 km and 2 km distance from the closest transit stop. For respondents with access to more than 1 second home, the 'first', 'second' and 'third' refers to the rank of the second homes in terms of frequency of visits.

Second home no.	First (N = 337)	Second (N = 99)	Third (N = 38)	Total (N = 474)
Percent within:				
0.5 km	8.3	9.1	5.3	8.2
1 km	14.8	15.2	10.5	14.5
2 km	28.2	27.3	13.2	26.8

4. Results from the qualitative interviews⁷

The qualitative interviews can shed light on the more detailed practices of second home mobility, as well as the reasons and rationales (i.e. motives, considerations and justifications) underlying such practices. In this section, we will first focus on trips between the primary dwelling and the second home, and subsequently on internal trips within the second home areas.

4.1. Trips between primary dwellings and second homes

Among the eighteen interviewees, fifteen use private cars as their main mode of travel between primary dwellings and second homes, while three normally go by transit, two of which by train and one by bus. These interviewees combine transit with taxi, rented car or travel as passengers with friends or relatives for a smaller part of the journey (closest to the second home). One interviewee has one of his second homes in Turkey and travels by airplane to an airport near the second home.

Some of the car travelers have occasionally used transit but do not normally do so. One interviewee who now uses the car intends to shift to transit in the future.

4.1.1. Reasons for going by car

The reason the interviewees most frequently refer to for traveling between primary dwellings and second homes by car is the need to bring with them baggage and/or other items that would be cumbersome or impossible to transport if traveling by other modes. The following quote is illustrative:

I didn't use it [the bus from Oslo to Trysil], but my wife has used it a few times, and it's been working fine for her. It's just that when we

⁷ The interviewee names mentioned are all pseudonyms.

go there, or at least nowadays, we have a three-year old, we tend to have a lot more things with us.

Quentin, 34 years.

The items that the interviewees bring with them include foodstuffs, equipment for sports and outdoor life, clothes and laundry. One interviewee also says that they need to take garbage from the second home to a container at some distance. A couple of interviewees mention that they were refurbishing or extending their second homes and needed to bring materials with them.

For many of the interviewees, the transit connections to the second home are poor, but some of those interviewees would still have traveled by car if the transit connections had been better. Some interviewees who can travel to their second homes relatively easily by transit also prefer to travel by car anyway. For example, one interviewee can travel by bus from Oslo to a bus stop only 150 m from the second home but always travels by car, primarily because it is cumbersome for the family to bring all the food and equipment with them on the bus. However, for about half of those interviewees who normally travel to their second home by car, poor transit connections are mentioned as one of the reasons for their choice of travel mode. For many interviewees, going to the second home by other modes than car would require transfers between several transit lines (with related waiting times) and the use of taxi (if available) for the last part of the journey. For example, the bus stop closest to one of the second homes of one interviewee is 10 km from the cabin and there are no taxis. Another interviewee tells that the bus stop is located far away from and at an altitude 500 m lower than the second home and that it would not be tempting to take a bus for a short stay.

Four interviewees say that they travel to the second home by car (also) because they need to drive from the second home to various activities within the second home area (see the next sub-section).

For most interviewees, traveling to the second home by modes other than car would be more time-consuming. This is mentioned explicitly by only four interviewees but is probably an underlying concern also for those who refer to poor transit accessibility to the second home as a reason for traveling by car.

Only three interviewees explicitly mention flexibility as a reason for traveling to second homes by car, but a wish for flexibility is plausibly also an underlying reason when interviewees state that they travel to their second home by car because they want to drive to facilities within the second home area (see Section 4). The illustrations given by interviewees about their wish for flexibility are all related to travel within the second home area and not to the journey between primary dwelling and second home per se.

Convenience as a reason for traveling between primary dwellings and second homes by car is related to the concern about bringing items to/from the second homes as well as to perceiving transit connections as poor. Two interviewees explicitly mention convenience as a reason for traveling by car, and it is implicitly indicated by another interviewee. The wife of one of these interviewees used to take the bus sometimes before, but now the bus no longer stops just outside the neighborhood where their cabin is located.

A few interviewees say that it is economically more favorable to travel by car to their second homes than going by transit. This is especially the case when many people go together to the second home, as one of them stated.

A couple of interviewees also indicate that they have a long-standing habit of car driving and a predilection for using this travel mode. Both these interviewees belong to households that have for long periods had two or more motor vehicles (cars and motorcycle), and for one interviewee, driving seems to be so self-evident that the reasons for choosing this travel mode go without saying.

Finally, one interviewee likes the freedom provided by the car and mentions this feeling of freedom as one of the reasons for traveling by car to the second home.

4.1.2. Reasons for going by transit

All the three interviewees who use transit as their main travel mode for trips between primary dwellings and second homes mention environmental considerations as one of the reasons for this choice of travel mode. In addition, another interviewee, who now travels by car but intends to shift to transit, mentions environmental concerns as one of the reasons for making this shift.

The interviewees who talk about transit as a convenient and easy travel mode all refer to train travel. One of them says that life is much easier on a train than when driving, since in the latter case you cannot rest. She mentions their experiences of being stuck in traffic jam as an example of what she can avoid taking the train. On the other hand, she thinks bus travel is not very convenient, especially on winding roads, which makes them car sick. Another interviewee emphasizes the convenience of train travel and mentions that her kids like to take the train whereas they feel restless in a car. One important condition for her judgment of train travel as convenient is that they have a duplicate set of basic categories of equipment at their second home and thus do not need to bring all stuff with them (bed linen, towels, skis, clothes, etc.), so the baggage is small, which makes it easier to go by train.

None of the three interviewees who travel to second homes by transit owns a private car, which is obviously an important reason for their travel modes for these trips. They all live at quite central locations in Oslo, and two of them explicitly say that their non-ownership of cars is because they do not need to travel by car at their primary dwellings, as illustrated by this quote:

It's important for us to live here [at the primary dwelling] without a car, and of course we could have borrowed a car going there, but life is much easier on a train, yeah. It's three and a half hours with rest, and when you drive a car there is no rest. ... we take the bus here, from Sagene down to Oslo Central Station, that's the first part, 10 min. And then it's 3.5 h on the train, and then we walk just to the store, buy all the stuff, put it in a taxi and then we are up there.

Berit, 41 years.

All three non-car-owning interviewees mention environmental awareness as an important reason for not having a car, and one of them, who does not even have a driver's license, says that her non-possession of driver's license is an environmental choice. Non-ownership of car as a reason for traveling by transit is thus closely related to the above-mentioned environmental reason for choosing transit as travel mode when traveling between primary dwellings and second homes.

Only one of the transit-traveling interviewees explicitly mentions good transit connections as a reason for their travel mode choice. Another interviewee says that the transit connection to one of her second homes has worsened and is more of a challenge, since the travel time has increased from 1 to 2 h. This interviewee, who does not possess a driver's license or a car (cf. above), is a car passenger with her mother when she visits her other, more distant second home, except when she travels alone. Then she travels by bus despite the long travel time of 12–13 h.

For those interviewees who do not own a car and do not have the opportunity to travel as car passenger with other visitors to the second home, the alternative to transit travel is to rent or borrow a car. Compared to renting a car, travel by transit will then be cheaper, as stated by one interviewee.

One of the interviewees who often travels by transit between the primary dwelling and second homes sometimes does borrow a car (from her parents or parents-in-law) when traveling to their two least transit-accessible cabins. The reason for this is the relatively poor transit access to these cabins, where the train journeys must be combined with relatively long taxi trips at the end or they must make an agreement with local people to drive them.

4.1.2.1. Taxi, car, boat and ferry as supplementary travel modes. Three interviewees who travel by transit for most of the journey between their

primary dwellings and second homes normally combine the transit trip with other travel modes (taxi or car passenger) for the part of the journey between the closest transit stop and the second home. Although not stated explicitly, the reason for the use of these means of transport is obviously that the distance between the transit stop and the second home is longer than acceptable non-motorized travel distance. This can in its turn be related to poor transit connections on the last part of the trip from primary dwelling to second home.

Three interviewees have their second homes on a small island and take a taxi boat or ferry from the closest pier on the mainland after having traveled most of the distance from the primary dwelling by car. Their reason for combining car travel with another travel mode is thus topographical. Another interviewee uses a car ferry as a shortcut across the Oslo fjord on his car trips between primary dwelling and second home, which can partly be attributed to topographical reasons. In addition, he likes the relaxation during the ferry trip.

4.2. Travel modes within second home areas

Among the eighteen interviewees, fifteen use private cars when traveling within second home areas, i.e. all interviewees except three whose cabins are on a small island. A slight majority of the car users combine driving with other travel modes within their second home areas, depending on trip destinations, purposes and other circumstances. However, nearly half of the car-using interviewees travel only by this mode when traveling to activities within their second home areas (recreational walking, skiing and biking starting directly from the second home not included).

Apart from driving, the interviewees make use of the following travel modes to reach activity locations within their second home areas: Walking (six interviewees), taxi boat or ferry (three interviewees), private boat (two interviewees), skiing (two interviewees), ski lift (two interviewees), and snow scooter, bike, bus, and rented or borrowed car (one interviewee each).

4.2.1. Reasons for going by car

To some extent, the use of cars for travel within the local areas of second homes seems to be the default option. Rather than giving explicit reasons for using this travel mode, the interviewees' explanations of their travel mode choices tend to focus on their reasons for using any modes other than the car. For example, none of the interviewees explicitly mentions poor transit connections as a reason for traveling within second home areas by car, although poor possibilities for using transit to local destinations is a widespread feature in many second home areas, particularly in the mountains.

The reason mentioned by most interviewees for driving to destinations within the second home area is that the trip distance is long. This includes trips to get supplies during the stay as well as trips to facilities for sports, outdoor recreation and other leisure activities. The length of the trip of course depends on what facilities and activity opportunities exist near the second home (such as grocery stores, alpine skiing facilities, etc.). However, some interviewees who can reach opportunities for a given kind of activity without needing to travel by car still sometimes drive to carry out this activity type at farther locations for the sake of variety. Similarly, some interviewees state that weather conditions determine the distances to activity locations. For example, one interviewee says that weather and snow conditions influence whether they go directly from the cabin to skiing trips or hiking tours. They prefer to go directly. If the weather is bad around the cabin, they go to other places and then use the car.

Another relatively frequent reason for driving to destinations within the second home area is that the interviewees bring children with them to the activities in question. One of these interviewees puts it this way:

... last winter we started to ski all together when he was 4 years old then, my son, and then we need to take a car because it's too much

like flat skiing, and it's too long to take him here, so then we take the car and we drive up here, and then we do all the skiing all around the mountain.

Rolf, 42 years.

This reason is related to the above-mentioned trip distance reason, since the need to drive kids reflects that the distance to the activity is considered too long for the children to go on foot, ski or by bike even if the destination would be within acceptable non-motorized travel distance for a grown-up person.

This interviewee also mentions altitude difference between the second home and the trip destination as a reason for traveling by car. Both this criterion and the trip distance criterion reflects an underlying reason of avoiding too much physical efforts. The distance criterion plausibly in most cases also reflects concerns about time consumption.

Three interviewees point to flexibility as a reason for choosing to travel by car. One of them says that he prefers driving because he likes to be flexible and to be able to visit the local shop and acquaintances. Another interviewee states that traveling by transit would require that they would have to plan their shopping very carefully. A third interviewee points to the possibility of visiting various places for outdoor recreation activities when staying at his second home in the mountains:

... during the stay .. I drive a little bit to go fishing or maybe go, to go alpine skiing I have to drive 10 minutes so, it's the freedom when I'm up there to have a car to get around to different places, because if I didn't then I had to use very much the same path in and out of the cabin all the time just going skiing and all.

Christian, 55 years.

When staying at his other second home (at the coastline), this interviewee says that it is more flexible to visit his family by car. Otherwise, his family would have to visit him at the cabin.

Two interviewees say that they use the car because of unsafe biking conditions for trips where they could otherwise have cycled. One of them tells:

... around my parents' house ... we just use the bikes, and we can visit a lot of people, but the farm and my grandfather they are 20 km up in the valley. And sometimes we can take a bike, but with children, it's a really narrow road, and everybody is driving really really fast ... it's a lot less safe than biking in town, so then you just, everybody needs a car there.

Berit, 41 years.

The same interviewee also points at social contact as a reason for choosing to travel by car. Since she is at the second home with her family, they use her relatives' car to get around for some trips. Social contact is still probably not the only reason here, since this interviewee does not have a car or driver's license and therefore depends on someone else to drive her and her kids to destinations that cannot be reached by non-motorized modes or transit.

4.2.2. Reasons for going by transit

Except for the interviewees who stay at second homes on a small island without any bridge or tunnel to the mainland, transit plays a very modest role for the interviewees' travel within their second home areas. For those with island second homes, the situation is very different, since there is no grocery store on the island where their second homes are located (Jomfruland). Boat transport is therefore the only opportunity to reach stores and other facilities not present on the island.

Two of the interviewees whose second home is located on an island own private boats and alternate between using these boats and public boat services. One of them states that strong wind/bad weather at sea can make him take the public boat rather than his own. The private boat is quite small, and he uses the public boat when traveling together with friends/relatives, probably because of the limited size of the private boat.

4.2.3. Reasons for going by non-motorized modes

Short distances to destinations is the most common reason given for choosing non-motorized modes. Two interviewees mention this as a main reason for reaching activities on foot as well as on ski. In addition, another interviewee states short distance as a reason for walking to shops and yet another one for skiing to activity locations.

Three interviewees mention the legislation against driving under the influence of alcohol as a reason for walking to and from destinations in the second home area instead of traveling by car. When visiting friends living in cabins in the surrounding areas, one interviewee and his wife sometimes walk so that they can have a glass of wine there. Indirectly, this concern also influences the travel modes of another interviewee as one of the reasons for choosing a location of the second home as close as possible to the alpine skiing facility. This interviewee says that they wanted to be able to have some wine on Friday nights without having to wait until the next afternoon to drive to the lifts. Similarly, yet another interviewee says that the location of their cabin not far from the alpine skiing hill is nice also because if you don't need a car you can take a beer after alpine skiing.

Two interviewees whose mountain cabins are located at some distance from the closest road, have to walk or go skiing one or two kilometers each direction between the car parking and the cabin. (One of them sometimes uses snow scooter instead of walking during winter time, see below.) Walking can also in some cases be shorter and more convenient than driving since the latter may include long detours along the road network. This is the case for one interviewee's visits to some of their friends who live in cabins just up the hill from their own, easier accessible on foot than if they were to walk to the parking place and then drive.

Finally, one interviewee states that he walks to local destination on the island where his second home is located because there is a ban against driving on island (except when arriving at and leaving the second home, which is allowed against a high fee). None of the two other interviewees with second homes on the same island mentions walking as a local travel mode, but they obviously have to walk at least the distances between their cabins and the piers for public and/or private boats.

4.2.4. Reasons for traveling by other modes

For some of their hiking/skiing trips, two interviewees take the ski lift from the valley bottom to the top of the mountain where they start the skiing or hiking activity. The obvious reason for this is to overcome altitude difference. This concern can in its turn be traced back to a wish to avoid too much physical efforts and probably also time-saving, which enables the interviewees to visit more distant and varied hiking and skiing areas than possible if they were to start the trips directly from the cabin. Variety-seeking may therefore also be an underlying reason for using the ski lift in connection with hiking and cross-country skiing.

One interviewee sometimes uses snow scooter between the parking lot and the cabin, which is located 1 km away. She does this particularly when she brings food to the cabin after having visited the grocery store. The reason for using the snow scooter for these trips instead of skiing thus seems to be to avoid having to carry heavy shopping commodities.

Two interviewees sometimes use private boats for travel within the second home areas. These boats are largely used for trips where being on the sea is the recreational activity pursued (including things such as water skiing, fishing and bathing during the trip), but they are also used for instrumental travel purposes. A main reason for using the private boat is that it is fast.

5. Underlying rationales influencing second home mobility

In research on the impacts of the built environment on travel, investigating residents' underlying rationales for activity participation, location of activities and travel modes has proved fruitful (Næss et al., 2018). The rationales for activity participation and location of activities

have important impacts on distances traveled as well as travel modes choice. The difference between *underlying rationales*, and the *reasons* examined in the previous section, lies in that the reasons were stated explicitly by the interviewees whereas the rationales are abstract constructs of underlying backgrounds, motivations and justifications, inferred by us as researchers based on the interviewees' narratives. We believe that this approach can also be relevant for understanding the phenomenon of second home mobility.

5.1. Rationales for being a second home user

In the context of second home mobility, the activity participation in question is being a second home user, which includes the visits to second homes as well as the participation in various activities while staying in the second home area. A theme common for almost all the interviewees' narratives is that second home visits are related to the Norwegian cultural perception of the good life, or more specifically a good *Norwegian* life. Another theme is about relaxation, to get a break, and to escape the urban areas. The latter often refers to the life in the urban areas, encompassing both lack of nature and stressful/hectic work-life, and maybe even the urban buzz/social life. Outdoor recreation – both traditional *friluftsliv* and more sports-oriented activities like alpine skiing, are also important motivations, with underlying rationales of nature connectedness, landscape esthetics and a wish for physical exercise. Other interviewees emphasize the second home as a meeting place for family and relatives. The above motivations are all in line with what has been emphasized in Norwegian and international literature on the second home phenomenon (Kaltenborn and Clout, 1998; Hall and Müller, 2004). The rationales for being a second home user have, as shown below, important bearings on the preferred location of the interviewees' second homes as well as their ways of traveling to these places.

Asked about how they perceived the environmental impacts of their use of second homes, a few interviewees said that they believed such impacts to be mainly positive. The interviewee Rolf considered that he became more environmentally aware when getting out into nature, which he believed outweighed his travel. However, it is evident from the interview that this is hardly a main motivation for his second home use but rather a side effect of his already established second-home lifestyle.

5.2. Rationales for choosing second home location

The rationale of importance to most interviewees when choosing the location of second homes is recreation quality. 'Good physical and natural conditions for recreational activities' and 'all-year usefulness' are two different quality dimensions addressed by the interviewees. Under the rationale 'good physical and natural conditions for recreational activities', the majority of interviewees emphasize good conditions for mountain-based activities, particularly skiing. Several interviewees state the importance of being high up in the mountains either near or above tree line. For example, asked about how much time it would take to travel from their primary dwelling in Oslo to their second home in the mountains, the interviewee Anders responded:

... We drive for three hours approximately. And of course, some friends of us have bought second homes a bit closer, but, you see, maybe I am a bit biased, but I gladly drive for another hour to reach 1050 m above the sea level, rather than parking in a garage one hour closer. Because this would be, in a way, half the experience; it would be forest, and maybe lots of people.

Anders, 52 years.

A short distance to the tree line can reduce the physical efforts required to reach activity destinations for both cross-country and alpine skiing. In addition, landscape esthetics is an important rationale for some interviewees. All these interviewees have a passion for mountains,

including the views, mountain-based activities and in general the experience in the mountains.

For some interviewees, proximity to families, relatives and friends is also relevant to the choice of second home location, reflecting a rationale of social contact. This rationale is often coupled with a rationale of place attachment, for example because the location is a childhood area or due to long ownership in the family. For second homes near the coast, social contact and place attachment are the rationales encountered most often among the interviewees. One reason for this might be the cost of coastal second homes, particularly near Oslo, which makes inheritance important. The inherited second homes in these areas then naturally become places for social/family relations.

For the interviewees with second homes in mountain areas, the choice of location is very much related to experiencing nature and outdoor recreation (which seem to be very much two sides of the same coin). Rationales of recreation quality, related to the physical conditions of the second home area and its outdoor activity opportunities, thus appear as the most prominent ones among the interviewees with second homes in mountain areas. However, the rationales of social contact (notably proximity to family members) and place attachment occur among users of mountain second homes as well. For example, the interviewee Liv chose the cabin in Oppdal because she has childhood relation to the place and the cabin is close to family and relatives, and it is therefore used as a point for family gatherings.

In our earlier research on rationales for activity location in an urban context, interviewees have made a tradeoff between the two main rationales of choosing the best facility and limiting the friction of distance (Næss et al., 2018; Næss, 2013). All the rationales mentioned above are about aspects perceived to be parts of the quality of a second home, and could thus be considered as sub-rationales of the 'best facility' rationale. This still does not mean that the distance from the primary dwelling does not matter. The interviewees have some threshold for how long time they are willing to spend traveling to reach their second homes. The acceptable travel time varies, but it is generally much longer than for daily-life destinations such as workplaces, stores or cinemas. This is hardly surprising, since the topographical qualities sought often do not exist in the city regions where the interviewees live, and because each stay at a second home usually has a much longer duration than a stay at an urban facility, thus justifying more time spent on travel to and from. Moreover, for some of the interviewees, the location of the second home was not an intentional choice, as they had either inherited the second home, were partial owners of a family second home or only had access to a second home owned by someone else (usually a relative). For each interviewee there still evidently exists some maximum acceptable travel distance, which varies depending on a number of conditions. Among other things, the fact that the largest continuous mountain areas of southern Norway can be reached within a driving distance of some 3 h from the largest city regions (and in Mid and North Norway even closer) probably makes up a disincentive against choosing second home locations much farther away than that from the primary home.

5.3. Rationales for travel mode choice

Given the rationales for being a second home user and the rationales for choosing a preferred second home location, travel distances to second homes tend to be long (which is also evident from the quantitative material presented in Section 3). A rationale of timesaving plays an important role for the interviewees' choices of travel modes between their primary and second homes. If travel time to the second home is long, journeys between primary and secondary home will consume a high proportion of the time budget, for example the available days off from work during a weekend. The time allocated to travel may then replace other, desired activities at the second home.

Several interviewees explicitly mentioned convenience as a reason for their travel mode choice, and even more interviewees pointed at this

rationale indirectly through statements concerning flexibility, bringing baggage, quality of transit connections, bringing children, weather conditions and altitude difference as reasons for their travel mode choice. Both the need to bring baggage on the trip and altitude difference make certain modes of travel physically exhaustive; these concerns are thus related to a sub-rationale of avoiding too much physical effort.

Social contact as a reason for travel mode choice (the family traveling together in the car) is mentioned by only one interviewee but is in line with a rationale encountered for daily-life travel, and is also pointed to in an earlier study of second home mobility (Ellingsen and Hidle, 2013). This rationale is linked to one of the above-mentioned rationales for being a second home user, as the second home as a meeting place for family and relatives could arguably be extended to include the context of traveling as a family together by car to and from the second home.

Environmental concerns make up an important rationale for a few interviewees who travel to and from their second homes by transit despite this taking considerably longer time. These interviewees do not have a car at their disposal, so one might argue that their travel mode choice is due to necessity rather than environmental awareness. However, for the interviewees in question, their non-ownership of cars appears to be a self-imposed constraint motivated by environmental concerns and could thus be regarded, in these cases, as a derivative of an environmental rationale. On the other hand, one interviewee argues that his and his wife's trips to their second home are environmentally friendly because they bought a hybrid car. However, this is hardly their reason for using car instead of transit for these trips, but rather a way of trying to make their already chosen travel mode less environmentally harmful.

6. How can we make second home mobility more climate friendly?

To the extent that second home mobility has at all been addressed in second home research as a problem in terms of climate impacts, the focus has mainly been on travel between the primary dwelling and the second home. However, as some of the interviewees explained, they drive between primary dwelling and second home because they need car for traveling when staying in the second home area. This may prevent some people from taking transit to and from their second homes even if transit service is easily accessible. Likewise, if people travel by car to their second home, it is more tempting to choose car for local activities within the second home area. The existence of this interrelationship suggests that external and internal transport concerning second home mobility should be managed in a coordinated way if we wish to promote more sustainable second home mobility.

According to Banister (2008), sustainable mobility can be promoted pursuing four different strategies: 1) reducing the need for making trips; 2) shifting travel modes towards more environmentally friendly forms; 3) reducing trip lengths, and 4) by encouraging greater efficiency in the transport system.

An example of the first of these strategies could be to reduce the number of second home users, for example through a shift from privately owned second homes towards more collective solutions such as the cabins of the Norwegian Trekking Association. Although visits to such cabins also involve travel, the users of the Trekking Association facilities probably do not travel as often to the areas of such cabins as they would do for visits to a privately owned second home.

For users of second homes, Banister's three remaining strategies could in principle all be employed.

In particular, a great sustainability gain could be achieved if the growth in Norwegians' second home ownership in distant countries could be halted and reversed, for example by putting high taxes on property ownership abroad and high fees on international flights. Such reduction could either take place, in line with Banister's strategy 3, by replacing foreign with domestic second home ownership (which would

imply a need for construction of additional second homes in Norway), or by reducing foreign second home ownership without any compensatory additional second home construction in Norway (cf. Banister's strategy 1). Obviously, such policies would reduce the opportunities of experiencing the different climatic, natural and cultural contexts of the foreign countries where Norwegians have acquired second homes.

For second homes in Norway, the possibilities of reducing travel distances are limited by the spatial distribution of the geographical/climatic conditions sought for by second home owners. Mountain areas attractive for winter activities are located at some distance from Oslo and other larger cities, and the number of second homes in coastal areas near the largest population concentrations (particularly the Oslo region) is already so high that further development of second homes in these areas would reduce public access to shorelines and often conflict with nature conservation concerns as well.

A shift to electric cars could remove the direct emissions from car travel to second home areas (although considerable indirect emissions would still remain). Such a strategy would necessitate not only a massive replacement of fossil-fueled vehicles with electric ones, but also extensive provision of loading opportunities along the roads leading to the second home areas as well as within each area. Moreover, growth in second home mobility based on private electric cars would arguably contribute to a path dependency that would counteract a desirable general shift towards environmentally more favorable travel modes (Driscoll et al., 2012). This can also lead to increased encroachments on natural areas. Some of the interviewees mentioned missing road connection on the last stretch before the destination as a reason for combining car travel with another travel mode for the final part. If car is the preferred and planned-for mode, this can in its turn make up a pressure for road building to second homes presently unconnected with the road network.

Another way of increasing the environmental efficiency of car travel is to increase the capacity utilization of each car. However, the prospects for pursuing this strategy for second home mobility appear meagre, both because the cars are often already filled with family members (and their baggage) and because of the very private nature of second home visits, where the trip itself is a setting for togetherness among the family members and, when relevant, their relatives/friends.

Regardless of any achievement that might be obtained in terms of reduced travel distances and higher vehicle efficiency of each car trip, we therefore believe that a change towards more environmental travel modes must play an important role if trips to Norwegian second homes are to become environmentally more sustainable.

For travel to/from second home areas, the importance attached to time-saving is very understandable from a time-geographical perspective (Hägerstrand, 1970). By traveling by car, higher travel speed can be obtained, leaving more time left for activities in the second home area.

For travel within the second home areas, concerns about bringing children, flexibility and altitude differences come to the fore, and some also mention safety and weather conditions. However, what is really striking is the large number of interviewees referring to trip distance as a circumstance influencing their travel mode choice. This reason is mentioned particularly for situations where the options are whether to use non-motorized or motorized transportation.

On the other hand, our material shows that some interviewees are motivated by environmental awareness and are willing to make some efforts to reach their second homes by other modes than the car. If some of the practical difficulties could be removed and alternative modes be better facilitated, a higher number of second home users could probably be nudged into traveling by modes other than car to and within their second home areas.

In order to enable more second home users to take transit to their second homes, providing frequent, flexible and easily accessible transit service is important. Certain land use conditions are necessary in order to facilitate high quality transit service. A national land use strategy

designating a few second home areas for future development could facilitate the provision of infrastructure for transit such as railways for regional trains and roads for buses. Moreover, shuttle services for trips between primary dwellings and major second home areas could be established. Such shuttle services would be particularly useful on Friday and Sunday afternoons and during the most common vacation periods.

As regards the internal transport related to second home mobility, reducing the trip distances between the second home and different destinations including the nearest train station or major bus stop, grocery stores, and various spots for leisure activities will encourage the choice of non-motorized travel modes. 'On demand' shuttle bus services can be established between the closest transit stop and relevant second home areas and between second homes and grocery stores and major activity destinations. 'On demand' here means that the driving route of the shuttle bus would pass the second homes of the actual passengers of each particular trip. Regular food deliveries organized by the local grocery stores is another idea. Such shuttle and delivery services would probably only be possible if second homes are developed densely in clusters and the services and leisure activity destinations are also concentrated in certain areas, cf. above. In low-density second home areas, better taxi provision could be helpful. A possible way to finance such shuttle bus and taxi services could be to establish (increased) toll fees on the local roads leading to the second homes and earmark some of the revenues to run the conveyance systems at subsidized fares.

While the above-mentioned improvements might facilitate a shift from car to transit among those second home users who are motivated for changing their travel mode, many users would probably still prefer to drive. Although a majority of the interviewees admit that travel related to the use of second homes has negative impacts on the climate, there is a general sense that the impact from travel to second homes in Norway on the climate as well as on the environment in general is modest. It is very common that the interviewees downplay their own impact.

In order to induce a stronger shift to more climate-friendly travel when visiting second homes, 'carrot' instruments would likely need to be combined with 'stick', for example new or higher tolls on the main highways connecting the largest cities with the most important second home areas. In addition, more general policies targeted for the transport sector beyond the leisure travel alone could facilitate this shift (Høyer, 2000), including tougher measures such as higher fees to reduce car ownership.

Enhancing environmental awareness among the general public can be another contributing factor to sustainable second home mobility. In Norway, statements about the cultural values of cabin life (Kaltenborn and Clout, 1998) dominate the discourse on second home development. In comparison, not so deep reflections have been made on the environmental impacts imposed by the second home lifestyle. The environmental dimension could be more debated in public to enhance the awareness of second home users of how their lifestyle choice potentially affects the environment.

Despite that the above proposed land use and transport policies may facilitate a shift towards choosing environmentally friendly travel modes among second home users, there are certain distinguished features of the second home lifestyle that can limit the adoption and outcomes of these measures. Firstly, second home users in Norway are often motivated by the desire to experience wild nature, to escape from urban life and to enjoy tranquility and serenity provided by the cabin life (Kaltenborn and Clout, 1998). To obtain these experiences may speak against a high-density and concentrated development of second homes. As several of our interviewees articulated, a dense development of second home areas can alleviate some of the environmental loads, but this is not the ideal cabin life for themselves and they do not want to see neighbors through their windows. Secondly, several interviewees indicated a wish for variation of experiences and leisure activities, which means their activity destinations would change and spread over the surroundings of the second home. This can be a hindering factor for

providing shuttle bus service between second home area and activity destinations, particularly among second home users for whom the second home is primarily a base for performing a variety of outdoor and sports activities rather than a site for place attachment (Stefansdottir et al., 2019). Thirdly, the usual need of second home users to bring large luggage on the trip to second homes makes it hard for transit to compete with private car. All these hindering factors derived from the distinct features of the second home lifestyle may increase the challenges and difficulties in shifting users' choice of travel modes towards transit.

7. Concluding remarks

Travel to, from and within second home areas generates considerable carbon footprints by those involved. Distances between primary dwellings and second homes are often long, since a main motivation for having second homes is to stay in a geographical environment different from that at the primary dwelling and to be able to access places and activity opportunities that are too far away for an ordinary day-trip from the primary dwelling. Most Norwegian second homes are also located in areas poorly accessible by ordinary public transportation. Private cars play a more dominant role for visits to second homes than for most other travel purposes (Hjorthol et al., 2014). Our interviews with users of second homes illustrate important reasons why the car is often considered the default mode of travel when going to second homes. The identification of these reasons provides foundations for proposing and implementing relevant land use and transport policies to make second home mobility less environmentally harmful. So far, no governments at national, regional and local levels in Norway (and hardly in a wider European context either) have undertaken measures to facilitate a shift in travel modes among second home users. The proposed policies can be a springboard to inspire more initiatives. However, it should be noted that these attempts might not be as effective as expected largely due to the distinct features of the second home lifestyle.

Some interviewees stated that they considered it impossible to use their second homes without having a car at their disposal. Although none said explicitly that their use of second home had made them acquire cars they would otherwise not have acquired, one interviewee (Nils) pointed at the second home as the main reason for the household's car ownership. Another interviewee (Liv) stated that she rarely uses the car when staying at her primary home, where she cycles or walks to daily destinations. A few other interviewees told that they

have SUVs or 4-wheel drive cars instead of ordinary cars because of their trips to their second homes. These findings are consistent with interviews in another study we have recently completed, where we also found some examples of interviewees owning cars mainly because of their second home ownership (Næss, 2016; Cao et al., 2019). Unpublished survey data from this latter study (which included respondents with as well as without access to second homes) also show higher likelihood of having at least one car in the household the higher is the number of visits to second homes, also when controlling for household composition, income, education and other relevant socio-demographic variables as well as for the location and neighborhood density of the primary dwelling. Being a second home user thus has ramifications on car driving practice far beyond the visits to second homes, since a car, once acquired, tends to be used for trips for a number of purposes and to destinations that would otherwise be reached by other modes.

International research on second home mobility has not yet addressed the type of questions dealt with in this paper at a similar level of detail. Our research calls for a rethinking or retuning of the discourse on sustainable tourism as well as the wider discourse on sustainable mobility. The environmental impacts of the high and increasing volumes of leisure mobility have long been a blind spot in the discourse on sustainable tourism (see, e.g. Lu and Nepal, 2009; Moscardo and Murphy, 2014), although addressed by researchers already a couple of decades ago (Høyer, 2000). This neglect also applies to research on second homes and the environment. Given its long traveling distances and the obstacles to changing travel modes of second home mobility towards environmentally more favorable modes, one could question whether the modern Norwegian second home phenomenon is at all compatible with environmental sustainability (Steffansen, 2017). The CO₂-intensive travel that the use of second homes often involves at least represents a serious sustainability challenge. It is time for a new kind of policy debate on the unsustainable mobility of second homes.

Funding

This work was supported by the Research Council of Norway [grant number 235642].

Acknowledgment

We wish to thank JTRG's two anonymous reviewers for very helpful comments on earlier versions of the paper.

Appendix A. Demographic, socioeconomic and spatial characteristics of the interviewees

ID no.	Alias	Age	Gender	Number of adult household members	Number of household members below 18 years	City of primary residence	Location(s) of second home(s), and ownership status	Education level	Household income (1000 NOK)
1	Anders	52	Male	3	2	Oslo	Dagali (owned)	Uni ≥ 4 years	≥ 1200
2	Berit	41	Female	1	2	Oslo	Ål (owned); Åfjord (access)	Uni ≥ 4 years	800 to 999
3	Christian	55	Male	1	0	Oslo	Heggenes (owned); Søgne (access)	Uni ≥ 4 years	600 to 799
4	Dagny	39	Female	1	1	Oslo	Rovde (access)	Uni ≥ 4 years	400 to 599
5	Else	54	Female	2	0	Oslo	Søgne (owned); Hønefoss (owned); Vøringfoss (owned)	Uni ≥ 4 years	≥ 1200
6	Frida	53	Female	2	2	Oslo	Haugastøl (owned); Arendal (owned but rented out)	Uni ≥ 4 years	600 to 799
7	Gunnar	71	Male	2	0	Oslo	Norefjell (owned); Turkey (owned)	Uni ≤ 3 years	1000 to 1199
8	Haldis	40	Female	2	2	Oslo	Son (access); Stavern (access); Venabygdsgfjellet (access)	Uni ≥ 4 years	1000 to 1199
9	Inga	68	Female	2	0	Oslo	Jomfruland (owned)	Uni ≥ 4 years	N.A.
10	Jan	58	Male	2	0	Oslo	Jomfuland (owned); Eggedal (owned)	Uni ≥ 4 years	N.A.
11	Kari	50	Female	1	0	Oslo	Jomfuland (owned); Haugastøl (owned)	Skilled worker/craftswoman	N.A.

12	Liv	53	Female	1	1	Trondheim	Oppdal (owned); Molde (owned)	Skilled worker/craftswoman	N.A.
13	Morten	40s	Male	2	2	Trondheim	Oppdal (owned)	Uni ≥ 4 years	N.A.
14	Nils	40s or 50s	Male	2	2	Trondheim	Oppdal (owned)	Uni ≤ 3 years	N.A.
15	Ola	64	Male	2	0	Trondheim	Oppdal (owned)	Uni ≥ 4 years	N.A.
16	Per	53	Male	2	3	Oslo	Trysil (owned)	Uni ≥ 4 years	N.A., but "good"
17	Quentin	34	Male	2	1	Oslo	Trysil (access)	Uni ≥ 4 years	N.A.
18	Rolf	42	Male	2	2	Oslo	Trysil (owned)	Uni ≥ 4 years	≥ 1200

References

- Aall, C., 2011a. Energy use and leisure consumption in Norway: an analysis and reduction strategy. *J. Sustain. Tour.* 19 (6), 729–745.
- Aall, C., 2011b. Hyttebruk og Miljø: en arena for nøysomhet eller overforbruk? In: Gansmo, H.J., Berker, T., Jørgensen, F.A. (Eds.), *Norske hytter i endring - Om bærekraft og behag*. Trondheim: Tapir akademisk forlag.
- Aall, C., 2014. Sustainable tourism in practice: promoting or perverting the quest for a sustainable development? *Sustainability* 6, 2562–2583. <https://doi.org/10.3390/su6052562>.
- Aamaas, B., Borken-Kleefeld, J., Peters, G., 2013. The climate impact of travel behavior: a German case study with illustrative mitigation options. *Environ. Sci. Pol.* 33, 273–282.
- Adamiak, C., Vepsäläinen, M., Strandell, A., Hiltunen, M.J., Pitkänen, K.C., Hall, M., Rinne, J., Hannonen, O., Paloniemi, R., Åkerlund, U., 2015. Second Home Tourism in Finland – Perceptions of Citizens and Municipalities on the State and Development of Second Home Tourism. (Reports of the Finnish Environment Institute 22en/2015).
- Banister, D., 2008. The sustainable mobility paradigm. *Transp. Policy* 15, 73–80.
- Cao, J., Næss, P., Wolday, F., 2019. Examining the effects of the built environment on auto ownership in two Norwegian urban regions. *Transp. Res. D* 67, 464–474.
- Driscoll, P., Theodorsdottir, A.H., Richardson, T., Mguni, P., 2012. Is the future of mobility electric? Learning from contested storylines of sustainable mobility in Iceland. *Eur. Plan. Stud.* 20 (4), 627–639.
- Duval, D.T., 2004. Mobile migrants: Travel to second homes. In: Hall, C.M., Müller, D.K. (Eds.), *Tourism, Mobility and Second Homes: Between Elite Landscape and Common Ground*. Channel View Publications, Cleveland/Buffalo/Toronto, pp. 87–96.
- Ellingsen, W.G., Hidle, K., 2013. Performing home in mobility: second homes in Norway. *Tour. Geogr.* 15 (2), 250–267.
- Farstad, M., Rye, J.F., Almås, R., 2008. *Fritidsboligfenomenet i Norge*. Trondheim: Norsk senter for bygdeforskning.
- Farstad, M., Dybedahl, P., 2011. *Nasjonal fritidsboligundersøkelse 2008*. Tourimpact report no. 4, TØI report 1155/2011. Institute of Transport Economics, Oslo.
- Hägerstrand, T., 1970. What about people in regional science. *Papers Reg. Sci. Assoc.* 24, 7–21.
- Hall, C.M., Müller, D.K. (Eds.), 2004. *Tourism, Mobility and Second Homes: Between Elite Landscape and Common Ground*. Channel View, Clevedon.
- Hidle, K., Ellingsen, W., Cruickshank, J., 2010. Political conceptions of second home mobility. *Sociol. Rural.* 50 (2), 139–155.
- Hille, J., Aall, C., Klepp, I.G., 2007. Miljøbelastninger fra norsk fritidsforbruk – en kartlegging. (Vestlandsforskning report 1/07).
- Hiltunen, M.J., 2004. Second housing in Finland – Perspectives on mobility. In: Paper Presented at the 13th Nordic Symposium in Tourism and Hospitality, Aalborg, November 2004.
- Hiltunen, M.J., 2008. Environmental impacts of rural second home tourism – case Lake District in Finland. *Scand. J. Hosp. Tour.* 7 (3), 243–265.
- Hiltunen, M., Rehunen, A., 2014. Second home mobility in Finland: patterns, practices and relations of leisure oriented mobile lifestyle. *Fennia* 192 (1), 1–22.
- Hjorthol, R., Engebretsen, Ø., Uteng, T.P., 2014. *Den nasjonale reisevaneundersøkelsen 2013/2014 – nøkkelrapport*. TØI rapport 1383/2014. Institute of Transport Economics, Oslo.
- Høyer, K.G., 2000. Sustainable tourism or sustainable mobility? The Norwegian case. *J. Sustain. Tour.* 8 (2), 147–160.
- Kaltenborn, B.P., Clout, H.D., 1998. The alternate home – motives of recreation home use. *Norsk Geografisk Tidsskrift - Norw. J. Geograph.* 52 (3), 121–134.
- Kauppila, P., 2010. Resorts, second home owners and distance: a case study in northern Finland. *Fennia* 188 (2), 163–178.
- Lipkina, O., 2013. Motives for Russian second home ownership in Finland. *Scand. J. Hosp. Tour.* 13 (4), 299–316. <https://doi.org/10.1080/15022250.2013.863039>.
- Lu, J., Nepal, S.K., 2009. Sustainable tourism research: an analysis of papers published in the journal of sustainable tourism. *J. Sustain. Tour.* 17 (1), 5–16.
- Maddison, D., Pearce, D.W., Johansson, O., Calthrop, E., 1996. *The True Costs of Road Transport*. Earthscan Publications, London.
- McIntyre, N., Williams, D.R., McHugh, K.E. (Eds.), 2006. *Multiple dwelling and tourism: Negotiating place, home and identity*. Wallingford. CABI.
- Moscardo, G., Murphy, L., 2014. There is no such thing as sustainable tourism: re-conceptualizing tourism as a tool for sustainability. *Sustainability* 6, 2538–2561. <https://doi.org/10.3390/su6052538>.
- Næss, P., 2013. Residential location, transport rationales and daily-life travel behavior: the case of Hangzhou metropolitan area, China. *Prog. Plan.* 79 (1), 1–50.
- Næss, P., 2016. Urban planning: Residential location and compensatory behaviour in three Scandinavian cities. In: Santarius, T., Walnum, H.J., Aall, C. (Eds.), *Rethinking Climate and Energy Policies New Perspectives on the Rebound Phenomenon*. Springer, Switzerland, pp. 181–207.
- Næss, P., 2018. Validating explanatory qualitative research: Enhancing the interpretation of interviews in urban planning and transportation research. *Applied Mobilities*. <https://doi.org/10.1080/23800127.2018.1464814>. published online June 2018 at.
- Næss, P., Peters, S., Stefansdottir, H., Strand, A., 2018. Causality, not just correlation: residential location, transport rationales and travel behavior across metropolitan contexts. *J. Transp. Geogr.* 69, 181–195.
- Nordbø, I., 2008. Hyttefolk = nyttefolk? Resultater fra en spørreundersøkelse blant hyttefolk i Tinn kommune og Øyefjell, Vinje kommune høsten 2007. Rjukan: Fjellregionsarbeidet i Telemark.
- Overvåg, K., 2011. Second homes: migration or circulation? *Norsk Geografisk Tidsskrift - Norw. J. Geograph.* 65 (3), 154–164.
- Pitkänen, K., 2008. Second-home landscape: the meaning(s) of landscape for second-home tourism in Finnish Lakeland. *Tour. Geogr.* 10 (2), 169–192.
- Rinne, J., Kietäväinen, A., Tuulentie, S., Paloniemi, R., 2014. Governing second homes: a study of policy coherence of four policy areas in Finland. *Tour. Rev. Int.* 18 (3), 223–236. <https://doi.org/10.3727/154427214X14101901317318>.
- Statistics Norway, 2017. Dette er Norge 2017 – Tall som forteller. Statistics Norway, Oslo/Kongsvinger.
- Statistik, Danmarks, 2010. *Ferie- og forretningsreiser 2009*. Statistiske efterretninger 2010:9. Copenhagen: Statistics Denmark.
- Stefansdottir, H., Xue, J., Steffansen, R., Næss, P., Richardson, T., 2019. The Impact of Climate Change on Potential Use of Vacation Home Areas. (Paper under review).
- Steffansen, R., 2017. *The Norwegian Second Home Phenomenon: A Critical Perspective*. PhD thesis. Norwegian University of Life Sciences, Ås.
- Steinnes, T.A., 2016. *Mange drømmer om hytte – kven gjer draum til royndom?* Oslo/Kongsvinger: Statistics Norway. Accessed January 2016 from. <https://www.ssb.no/bygg-bolig-og-eiendom/artikler-og-publikasjoner/mange-droymer-om-hytte-kven-gjer-draum-til-royndom>.
- VTI, 2016. LIPASTO – a calculation system for traffic exhaust emissions and energy consumption in Finland. VTT Technical Research Centre of Finland 2016. <http://lipasto.vtt.fi>.