Result from Stove Consumption Survey – Raw Data.
From Informalex Website Exchange Only.

Original Query, question from Bruno:

Being from Europe and relying on huts and $cash$ or Camping Gaz stoves with butane cartages, I never really collected enough data on white gas consumption for winter camping. I cannot properly plan my multi day tent trips with white gas stoves; I have either had too much or had too little.

The last time I did a camping trip on the West Coast mountain, I was cooking at +/- 2300 m. It was Spring (end of May) and snow was slushy during the day (and actually also during most of the nights...). We consumed approximately ***200 to 250 ml/ person /*** *day and had lots of left over...*

During my last trip, we were at +/-2200 m and temperature were in the -15 deg C range at night and -5 deg under our tipi tent when cooking and melting snow. Snow was cold powder and compact taken with the shovel. We had 2 MSR whisper light stoves : One brand new, the other not as much, we burned ***425 ml/ d / person*** *and almost all my food was dehydrated. Fortunately we had to come down earlier than expected and I did not run out of gas....My consumption was basically double than during my previous trip.*

Because of so much variability, you could carry a lot of extra weight for nothing or too little. Say group of 8 for 8 days = could range from 13 kg to 27 kg of gas...

I am trying to collect data for planning better my future trip so based on your experience, what are the main consumption factors and what data did you gather during your trips in term of white gas/MSR consumption (assuming that you need to melt the no running water is available); it would be interesting to build up a data base with parameters so that the we can bench mark for planning my next trip (I will definitely share this data with whomever is interested...).

Looking for average consumption per person / day and melting/cooking conditions: Temperature, Altitude, Type of snow, (any others parameter you consider important ?)

Any other tricks to reduce consumption?

Merci !

Replies as they came in

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This is an excellent quest, and you may be able to pull together some good data. I will give you a list of some factors I think are important, but I think what is equally important is technique. Once you have a system that works with your stoves you must adhere to it strictly or your volumes will vary. If you are letting clients run the stoves the volumes could also creep up unless they have good technique.

Consistent technique includes always:
-using the lids
-priming with minimal fuel
-turning off the stove as soon as your water boils
-consistent style of meals (eg rehydrating meat in hot water seems to take forever)
-windscreen application (even inside tents & huts saves fuel)
-number of hot drinks per day
-hot water bottles at night
-systematic adding of new snow to the melting pot

I personally have never run out on winter trips using 250mL/night/person but that could just be good luck.

Good luck with the quest,

==========

I use 125 ml per person per day in an xgk or whisperlite in the winter, 100 ml pppd with a heat exchanger. I have never run out of fuel, but i will admit that I usually carry an extra day. On a 7 day unsupported trip with 3 we carried 2400ml and had almost 600 left over; this relied on about 9l of water from a creek or two though. We probably would have been thankful for the extra were we at high level the whole time but most camps were at around 2300m. This gets you about 2.5 l each ofboiling water and 2 l each of cold water each day from snowmelt. I am quite diligent to keep the pot covered and topped up with snow and the windscreen tight to the pot. The stove is never on when not in use... I've found this fuel is adequate cooking in mid tent and outside. Only water goes in the pot, never food. Tea is made in thermos. Boil in a bag dinner stored in the coat while it cooks and a half liter of soup each night. No extras of tea ;)

Your mileage may vary. Hope this helps.

Added after:

probably worthwhile...

i should mention that those consumption figure are from spring traverse season. for winter ski-in base camps we usually go for 200 ml pppd, but i always seem to have a lot of fuel left in the parking lot.

have a great spring.

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I have always used 250ml per person per day in winter melting snow. i have never run out with this. In summer and with a water source 125 ml per person per day seems plenty as well. I have a whisperlite and a simmerlight, but have also used this with a dragonfly and XGK. Latter have greater fuel consumption. 425 a day seems very excessive. Did you have the correct jet installed. ie : white gas instead of kerosene? If you dont preheat properly and so you flame up a lot or burn orange then that wastes lots of fuel.
i have used this at altitudes between 1500m and 6000m and temps as cold as –30. Obviously wet snow produces more water than powder but with 250 per person per day i have never run out.

Dont be tempted by the Gaz stove with Butane. I am sure you know but it just doesnt work in the cold!

I hope this helps

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I always struggle with the same issue on long trips, usually I take excess as it is easier to pour out too much than to get extra once in the mountains!

I find 250ml/p/day usually works fine. 400+ per day seems really high, maybe check the stoves, make sure the are on insulated surfaces and do not make water hot unless you have to cook with it. Even on all my hi altitude trips in cold conditions (Logan, Denali, etc) I have never used that much.

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For spring ski touring I have been bringing 175 ml / person / day and have never run out. Elevation doesnt seem to make a difference. Cold temps use more fuel but not more than 10% or so.

I add another 500 ml per food cache to help burn the boxes.

This is with MSR Whisperlite and Dragonfly stoves.

I only use breakfasts and dinners that require boiling water to be added, no cooking needed.

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First white gas is the one item i don't mind having to much of during a ski trip. I have never run out and often have 2-4 litres left over after a ski trip.
Secondly, i practice rehydrating my food in the backcountry, so every day at lunch time or in the morning I fill a nalgene bottle with vegetables and add water.
This makes the food more edible, digestible and shortens cooking time. I use a nalgene just for that because it takes on a little food flavour.

I usually plan 250 to 300 ml/pp in the coast range in april and may.

I never use the cold powder snow, I always dig down to the more compacted layers also i'm very careful that when we cook or melt water the guests work together to minimize the stove time.
I one person makes water they have to announce it to the group so everyone can profit. I usually also take a bigger 5-7 litre pot it is more efficient that the small MSR pots.

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I generally allow 1/3 liter/per person/day if you are going to melt all of your water with gas. Build good snow windscreens and insulate the stove bottom (12" X 12" plywood base with 3/8" foam) . Use the foil heat shields all the time.

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It would be good to see the results of your survey. Good for you for taking it on, I hope you get the information you need.

I have done numerous multi-week ski traverses over the years and have reliably used 250ml/person/day as a white gas fuel consumption. We usually have some fuel left over, which we used to assist in burning garbage we couldn't pack out.

Most of my trips have been somewhere in the Coast Mountains ranging from north of Squamish to all the way up into Alaska (the last one a few years ago being out of Anchorage). The trips were usually done at this time of year

(mid-spring) and the campsite elevations, of course, varied. The spring-time, Coastal snow is much denser and easier to melt than mid-winter Rockies snow, that certainly contributed to reducing consumption. I have done some multi-day trips in the Rockies as well, and got away with the 250ml consumption figure.

We were very careful in the way we used the stoves (which were always 1 old Whisperlite and 1 XGK no matter how many were on the trip), never letting them run without a pot of something on them, using windshields wrapped tightly around the pot, simmering them while cooking, etc (yes, I can get a Whisperlite to simmer reliably, not an XGK though). All of our food was cooked, with some dehydrated, and made from scratch, never used freeze-dried (hard to digest), so a good part of the fuel consumption was for cooking. Our food concoctions were made in a single pot for everyone (up to 5 people), which I believe saved a lot of fuel. We also used one stove and pot dedicated to making water, while the other stove and pot was used for cooking. This method made the evenings more efficient, with one person dedicated to filling water bottles (we each carried two 1L bottles), and one doing the cooking.

I have done a lot of summer trips as well including a six-week traverse and used 175ml/person/day. This gave us a bit of excess fuel, but it was easy to burn off.

I hope this info is helpful to you, feel free to ask me any details I may have missed.

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Just a little anecdotal evidence. I never really monitored my fuel that carefully but budgeted around 300ml/pp/pd, possibly a bit more, and felt comfortable with that. Depending on duration and numbers I would add some extra for emergencies and have never really run out. Once the fuel bottles are 3/4 empty or so I combine bottles so I am always using a fuller one. However, I have never managed fuel/cooking for a larger group like you mentioned for longer periods in winter.

A couple of other things that I always try and do... I always start the pot with water in it, and never start the pot with dry snow only. I get the water warm then start adding snow. This may account for why your slushy snow took less fuel if you weren't priming the pot first. As well I try and use a foil wrap around the pot and reflector under the pot as much as possible as well as a lid for increased efficiency. I have carried a thin piece of plywood wrapped in foil to use as a base occasionally to help keep the pot from melting unevenly into the ground as well and this also helps reflect a bit of heat up.

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For Spring ski tours in the Rockies I budget for 200ml/person/day. I usually bring 250ml/person/day as a back-up, but I always seem to have leftover gas. It is spring snow, but not necessarily wet snow. This is being really careful and efficient with the stoves (no unnecessary boiling) and using dehydrated food. The stoves I use are MSR XGK (no longer made) which I found to be way more efficient then the whisper lights.

It helps to use a stove platform with reflective material on the top. Also if I have the opportunity I put a bunch of snow in a black garbage bag in the morning. In the afternoon the snow is partially melted or very moist and this helps with efficiencies when making water.

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My experience with whisperlite is 65 mL/pers/day summer (bring 125) and 150/pers/day spring traverses (bring 250). I have a variety of fuel conserving habits I use and train clients accordingly.

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It sounds like you have just done a pretty good hands-on study. I've found about the same on my trips with changing snow conditions and temps.

In the spring, if you can collect slush with real water in it, or make it by melting snow on dark green garbage bags, about 150-200ml a day is what I've used. Economy of scale is important, say if you cook up a pot for 4 people you can save on the amount of fuel per person.

At high altitude with cold temps and loose dry snow, I've used up about the same as you and more than 425ml.

All of this is of course dependent on how much snow you melt per day for drinks etc. I brew up more now than I used to, so would use more fuel.

I wonder if you could get a consumption figure calculated by the hour rather than the day. ???

Good work on this and good luck with your data base.

==========

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It sounds like you are doing a good job getting the most out of your fuel.
I have used the Whisperlite on a few 1 week to 2 week winter trips, and here are a few things that seem to stretch the fuel.The consumtion per day I will attest to is from trips with temps at night from -5 to -15 C, not brutally cold but "normal". We were skiing in the Selkirks, 1750m to 2800m.

With 2 of us, we were getting 2.5 days per liter, and even a bit more. So, using 1.25 L / day /person. Should be 200 ml/p/day.
This included 2 hot drinks each per morning, a hot breakfast each day, and at least 2 hot drinks each per evening. We filled small Thermos' for the day's travel. We also dehydrated most meals and used quick -cook rice, Cream of Wheat loaded with butter, fruit, nuts, in the morning, and orzo pasta which cooks fast and you don't drain like other pastas. The best and quickest food I ever had on a winter trip-we dried tomatoes, garlic, onions, peppers, tomato paste, etc..
Also, build a light weight platform that just fits the fuel bottle and stove base-use the thinnest plywood or other building material and wrap it in tin foil-this helps a LOT.
The stove isn't tipping all the time and etc..

We were very diligent on our melting, too-always using warmer water to then melt the denser snow blocks, so you don't have to bring it up from snow to water each time.
If you have a bit of solar coming through, use a black garbage sack, fill it with denser snow, and a little solar help will begin to melt it and make it a bit slushy.
Always melting when the stove was running, always a lid on the pot. If the clients do help with the melting, they should be trained up.
MSR also makes a heat exchanger that supposedly really ups the fuel efficiency, but I have never tried one.
I also tuned up my Whisperlite before the trips. I think this info is on-line. Cleaning the fuel tube, plates, jet etc. It ran really well afterwards.
All this may be no news to you but we did get great fuel consumption on both our trips.

Hope this possibly gives you some ideas, Bruno.

Yes, that is 200 ml/person/day. Warm wine sounds nice, but being from the States, we like to tour with 100 proof bourbon. A liter goes a long way.

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I've had similar experience to christoph for consumption. one thing that stood out to me in the variance you experienced bruno is the difference between melting snow that had high water content vs. cold powder snow... not the outside temp difference. and yes, wind is a robber of energy.... the screen is not enough.

one other (lighter and more compact)device is using a soft hood from backpackers pantry but the only limitation is it's for smaller pots similar to to the size heat exchangers will fit. link:

- http://www.backcountrygear.com/backpackers-pantry-outback-oven-10-in.html

and with foods, we dehydrate most of ours for trips and normally when i get to camp i bring the amount of water i need to a boil then put in the food, cover it in my parka or sleeping bag and let it sit.... done. just reheat.

hope that helps...

happy camping,

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my experience on three Denali and four Logan trips as well as numerous

summer trips has been that I need 250 ml of white gas per day and person if I have to melt water, and 125 ml if I don't and have liquid water available. Both numbers are a bit high which I found to be a good thing after having been stuck a few times.

Temperatures seem to play less of a role than wind, or the degree to which you can protect your stove from it. The biggest energy consumption occurs when you convert snow of 0 degrees to water of 0 degrees. Breaking up that crystal bond really sucks up the heat. I have found that an MSR heat exchanger is worthwhile on longer trips. Always covering your pot and starting with a bit of liquid water also helps.

If you were to cook inside your tent, you could probably cut down on the consumption quite a bit. I avoid that if at all possible. Other guides do it and like it.

I have guided several treks with a trekstove, a small device that burns very small pieces of wood. It needs more work, but works really well once you have figured it out.

Hope this is useful.

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When I'm careful I use 65mL/day/person in the summer (but bring 125), and 150-175mL/day/person for spring ski trips (but bring 250). Winter consumption also accounts for one hot water bottle per person per night.

Ten years ago Dave Sarkany and I did a 20-day spring ski traverse near Chilko Lake and used under 80mL/person/day -- but we were fanatical about conservation (since we had little choice), ate terrible/instant food, used a fire or two, and found water a couple of times.

Last spring on a N Selkirks traverse with Conrad Janzen and 6 guests we used one of those heat exchangers that clamps around the pot and I found it improved performance enough to make it worth bringing for longer, e.g. >2 night, trips (since it's heavy you need to save more fuel than it weighs to justify carrying it).

There are a pile of tricks and planning strategies for keeping fuel consumption low. Christoph has indicated a couple. Others include: don't boil longer than absolutely necessary, insulate (e.g. with a sleeping pad, sleeping bag, jacket) and let sit instead; if melting snow use the warmest possible snow (in spring from the surface,

preferably wet); plan your camps so that you're BTL whenever possible; carefully select foods with minimal or zero boiling/simmer times (many dehydrated foods require 30-45 mins of simmer time; avoid these); seek the best possible shelter for your cooking area; build a good wind screen out of snow in addition to using the aluminum wind screens; depressurize the fuel bottle for simmering (close valve - extinguish - don't let it cool down - unscrew - pump once - open valve - relight); fill your water bottles whenever you encounter water; on a hot day at camp put snow in black plastic bags and use this for melting after it's soaked up some sun; plan extravagant meals with long simmer times for resupply nights and keep the other meals spartan; and so on.

I will cook under a tarp, tarp tent or vestibule if conditions warrant but don't cook inside the tent with a liquid gas stove.

Another related tip that these days is pretty much SOP is use plastic pop bottles for fuel storage. I use the smallest MSR fuel bottle (250mL) and refill it from the pop bottles, burning the bottles when they're done or packing them out.

Hope some of this helps,

==========

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Best regards,

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happy camping,

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Thanks to all for your inputs! Very useful information.

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