

## Calorie Intake for Kayaking Trips Constance Mier, Pd.D.

*How much food do I need to bring on my trip?*

This article can apply to those who are competing in long-distance kayak or canoe races, and also for kayak/canoe wilderness trips (from leisurely overnights to very long distances). If you haven't already, go to the article "How many calories do I burn while kayaking?" and calculate your daily energy expenditure (total calories burned in one day). Even if you are not aware of your calories burned, you'll find some useful information in this article that will help you choose the best foods for your trip.

Energy balance is a state when calorie burning is equal to calorie intake. When in balance, there is no appreciable change in body fat stores. Tip that scale in one direction or the other and the result is a change in fat stores. For instance, say you are in energy balance now and decide to add a 1-oz bag of potato chips to your diet each day. That one bag increases your daily calorie intake by 150 calories, placing you in positive energy balance. Theoretically, if you continue with this positive state, you'll gain body fat. And in fact, you can estimate that in about 3 weeks, you will gain 1 pound of fat (1 lb of fat = 3500 calories, approximately). The same applies when going in the opposite direction, negative energy balance. Decrease your intake by 150 calories per day, and you will lose a pound of fat in 3 weeks. Of course, this is only an estimate and a change in energy balance elicits all kinds of responses and defenses from the body. This is an interesting topic as it relates to obesity and the chronic diseases associated with it.

How important is it to match your calorie intake and calorie expenditure during a trip or race? As I mentioned in the other article, it is more likely that you will be in negative energy balance during your trip or race, no matter how hard you try to avoid it. In fact, you'll probably be consuming more calories during these trips than you would otherwise. Given the amount of calories one can burn by continuously paddling for hours each day, it would be a daunting goal to replace all those calories. Simply put, your digestive system may not have the capacity to allow you to do that! Knowing that you will likely be in calorie deficit, choosing the right quality of foods becomes even more critical.

*Is negative energy balance a bad thing?*

Before we discuss food quality and choices, I'd like to spend some time discussing some consequences of chronic negative energy balance, particularly as it applies to athletes or very active individuals. Consider a person who engages in physical exertion for several hours a day for several days in a row while consuming little food and getting little sleep. Some endurance events can be described in such a way. Perhaps the best representation of this type of event comes out of the military. Much of what we know about chronic negative energy balance during extreme and prolonged physical stress comes from military research.

For example, Castellani et al (Med Sci Sports Exerc, 2006) studied US Marines during a field-training exercise called "The Crucible". This involved 54 hours of simulated sustained combat operations requiring intense physical and mental strain lasting 20 hrs each day. During this period, men and women were subjected to sleep deprivation, restricted rations, and both environmental & emotional stresses. Energy expenditure was over 6000 calories per day for men and over 4500 calories per day for women. When calorie expenditure was related to body mass, differences between men and women disappeared. At the same time, calorie intake was very low for both men and women, approximately 1500 and 1200 calories per day, respectively. That computes to a calorie deficit of 4500 and 3300 calories for men and women, respectively. As a consequence, body mass loss for men and women was 3.1 kg (6.8 lb) and 1.6 kg (3.5 lb), respectively. The investigators were also interested in looking at the body's ability to regulate its temperature and they found no evidence of hypothermia in the men or women. Thus, 2 ½ days of severe negative energy balance and sleep deprivation had no negative consequences on the body's ability

to maintain a normal temperature, but it did result in a 3-4% loss of body mass (much of which was probably water).

More extreme studies have been performed and many of these come out of Norway. Norwegian military academy cadets have been studied during a 5- or 7-day field exercise. Almost all of these studies included only men but I did find a more recent study that included both men and women (Hoyt et al, Am. J Clin. Nutr, 2006). The field exercise in this study was characterized by sleep and food deprivation and sustained physical activity. The total daily energy expended was 6300 calories and 5200 calories for men and women, respectively. 70% of the energy expended was through physical activity. The Norwegian military academy was not as generous with their rations as the US Marine Corp; the total intake amounted to no more than 500 calories per day. During this period, men lost 7.5 kg (16.5 lb) and women lost 5.95 kg (13.1 lb) of body mass, approximately 10% of their weight. Half of what was lost was fat-free (mostly water).

It seems obvious that one will lose weight during negative energy balance, but the question remains, are their negative consequences on performance or health? The Norwegian military studies have focused primarily on hormone levels and certain performance indices such as muscle strength. Basically, testosterone is suppressed and certain stress hormones such as cortisol are increased. What negative consequences these changes have are not altogether clear, but the fact that physical performance such as muscle strength and endurance capacity and mental performance are decreased indicates that there are some negative effects. Additionally, intense bouts of exercise can result in suppressed immune function and increase one's susceptibility to respiratory infections. If one engages in intense activity day in and day out, this could result in chronically suppressed immune function and lead to overtraining. I'll discuss more on the phenomenon known as overtraining in another article. One must keep in mind however, that these military studies have imposed very extreme negative energy balance mainly through food deprivation. To the contrary, during a 3-week cycling race, athletes will consume well over 6000 calories each day; not nearly the calorie deficit the military imposed on its research participants.

### *Should I avoid negative energy balance?*

Complete avoidance of negative energy balance should not be the primary goal when preparing for a racing event or long distance trips. Let me give you one more example. Two highly-fit men, both 25 years of age, completed a south-to-north ski trek across Greenland in 86 days. The total distance was approximately 1800 miles (about 21 miles per day on average). Each man pulled a sled initially containing 150 kg (330 lb) of energy-dense foods (about 6000 calorie each day), on average 9 hours per day. The heaviest man lost the most weight (8.6 kg or 18.9 lb), almost 9% of his initial body weight. The lighter guy only lost 1.1 kg or 2.4 lb, just over 1% of his initial body weight. Obviously, the bigger guy was in greater negative energy balance. He also lost more fat weight and fat-free mass. Did either man suffer any loss in physical performance? While they did not lose aerobic capacity, they did lose some anaerobic power. The bigger guy lost strength as well. Because these two men were highly motivated and well above average in fitness from the start, the loss in performance did not have negative consequences on their ability to complete the trek (well under the goal of 100 days). They did not experience the same degree of calorie deficit as the military recruits described earlier. Thus, one can conclude that adequate calorie intake during a long distance kayak/canoe race or trip does not necessarily equate to perfect energy balance.

Because pack weight and volume is an important consideration when packing a kayak or canoe, close attention to the quality of foods one brings on a trip is necessary. You may think that packing 3000-4000 calories for each day is way over your space allotment, but consider the fact that backpackers can carry 5-7 days worth of food in a 30-lb or less backpack. A backpacker will try to pack less than 1.5 to 2 lb of food for each day. If you figure 1.5 lb per day on a 6-day trip, that's 9 lb of food. If you went to the grocery store and bought 7 days worth of groceries you'd be hauling more than 9 lb to the car (the gallon of milk weighs about 8 lb). So what are the backpackers doing? They pack high calorie density foods, and this is largely accomplished through the dehydration of foods. Not only does this reduce weight, it

reduces volume. The bottom line is you don't have to compromise nutrition when packing for a trip or race.

*What's all the fuss about calorie and nutrient densities?*

When we talk about calorie density we are talking about fat, carbohydrate and protein, the energy nutrients. Calorie density is the ratio of calories to volume or mass of a nutrient or food. Here is the calorie density for each energy nutrient:

Fat	9 calories/gram
Carbohydrate	4 calories/gram
Protein	4 calories/gram

*Please note: in nutrition, the metric system is used. More often than not, solid foods are quantified in grams and liquids in milliliters. It's often useful to be able to convert grams to teaspoons or cups and milliliters to ounces, or vice versa. Here are a few useful conversions:*

*Weight*

<i>1 ounce =</i>	<i>28.3 grams (g)</i>
<i>1 pound =</i>	<i>16 ounces (oz)</i>
<i>1 stone =</i>	<i>14 pounds (lb)</i>
<i>1 kilogram =</i>	<i>2.2 lb (or 1000 g)</i>

*Volume*

<i>1 ounce =</i>	<i>29.6 milliliters (ml)</i>
<i>1 liter =</i>	<i>33.8 oz (or 1000 ml, or 1.06 quarts)</i>
<i>1 quart =</i>	<i>32 ounces</i>
<i>1 gallon =</i>	<i>128 oz (or 3.8 liters)</i>
<i>1 gallon =</i>	<i>8 pints (or 4 quarts, or 16 cups)</i>
<i>1 cup =</i>	<i>16 Tbl (or 48 tsp, or 8 oz)</i>

*\*With respect to water, weight equals volume (1 kilogram of water is equal to 1 liter, or 1 gallon of water is equal to 8 lb)*

Fat has twice the calorie density as protein or carbohydrate. Can you see why fatty foods provide more calories? Knowing the calorie density for each energy nutrient, we can compare food items. Most everything we eat contains at least 2 energy nutrients and most foods contain a relatively high percent of water (water provides no calories). For instance, while 1 cup skim milk weighs approximately 250 grams, it contains only 25 grams of protein, carbohydrate and fat (the weight of vitamins and minerals is negligible). The remainder of the weight, 225 grams, is water, which makes up 90% of the total weight. If you were to look at calorie density based on total weight of the milk, you would get a value of 100 calories for that cup of milk or 0.4 calories per gram. Compare that value to the numbers you see above for protein, carbohydrate or fat. It's considerably lower because the calorie density of water is zero.

You can easily determine calorie density for a food item by simply looking at a food label and then dividing total calories by the serving size weight. For instance, on a box of bran flakes you'll find that one serving weighs 29 grams (about 1 ounce) and contains 113 calories (this is from 1 gram of fat, 23 grams of carbohydrate and 3 grams of protein). Add to the bran flakes a ½ cup of skim milk (125 grams in weight and 50 calories). The calories for bran flakes and skim milk are now 163 in total. Therefore, the calorie density of bran flakes plus skim milk is 163calories/154 grams, or 1.06 cal/g.

Another way to assess the quality of a food or diet is *nutrient density*. Nutrient density is the ratio of a particular nutrient (it could be a vitamin, mineral or energy nutrient) to its total calories. For instance, the McDonalds biscuit with bacon, egg and cheese breakfast 440 calories. But how well does it provide the essential nutrient *calcium*, compared to the bowl of bran flakes and skim milk, which only offers 163 calories? If you consider absolute values you get an equal amount of calcium from both, approximately 200 mg of calcium. From this you might conclude the two breakfasts have equal value when it comes to calcium. But remember, you have to consume 440 calories to get that calcium at McDonalds, while you consume only 163 calories with your cereal breakfast. Compared to bran flakes with skim milk, the McDonalds biscuit with bacon, egg and cheese is a lower quality food when it comes to calcium. In fact, the bran flakes breakfast provides almost 3 times more calcium per calorie than the McDonald's breakfast!

### *Does calorie density matter?*

There are several things to consider when preparing for a trip, not the least of which is the volume and durability of the food you pack in your boat. Although not as restricted as a backpack, kayak storage space is limited. Because of this, calorie density is an important factor when deciding on what foods to bring. Those experienced in long distance wilderness tripping will tell you that a good rule to live by is to try to carry 1.5 to 1.75 lb of food for each day (keep it under 2 lb). Backpackers will try their hardest to reduce that number without compromising calories. That's where the calorie density of foods becomes most critical.

A couple years ago I began building a database of the food items we take on our trips. Over a couple seasons of kayak camping, I created a list of foods that currently includes 100 food items ranging from olive oil to several types of energy bars, to several versions of breakfast cereals, to various soups and pasta dinners. Nutritional information was gathered from the food label of each food item. Every time we tried a new food item, I added it to the database. For each food item, I included the following information: weight of item, total calories, grams of protein, carbohydrate and fat, grams of fiber and mg of sodium. After inputting these data, I set up calculations in new columns to calculate the following for each food item: percent calories from protein, carbohydrate and fat, and calorie density. I've separated the database into several tables and they are included below.

There are some glaring omissions from the database, three things in particular. First, only one meat item, beef jerky, is included. The reason being is that I am a vegetarian. However, I do eat fish, so you'll find several fish items like tuna steak, sardines, smoked salmon and salmon jerky. Another omission is chocolate (with the exception of a trail mix that contains M&Ms). The reason for this is that we are in south Florida and even in the dead of winter, chocolate melts (we do pack hot chocolate mix for after dinner). The third type of food you won't find here is the pre-packaged camp meals from companies such as Natural High, Mountain House, or Backpacker's Pantry, to name a few. It isn't because I don't like or recommend them (some are very tasty), I just don't need them for my Everglades trips. For me, these meals are not as convenient for purchasing and they are a bit pricey. They are not sold in a typical grocery store and unless I am content on a few items stocked in the local camping store, I won't find a nice variety to choose from unless I order on-line. The bottom line is, I can find comparable meals at the regular grocery stores that are just as easy to make, as tasty or better, cheaper and as high in calories and nutrients.

One more thing to mention about the database, I don't include any homemade food. I have on occasion brought certain items that need refrigeration and therefore would be eaten the first or second day of the trip; these include tomatoes, onions, cheese, veggie burgers, spaghetti sauce with ground Boca Burger, homemade lentil soup, or homemade refried beans. None of these is included in the database, however. Additionally, I do not dehydrate foods, I don't own a dehydrator.

So what does that leave us to eat? Plenty! If you peruse the database, you'll find that I've included several breakfast items like dry milk, dry cereal, oatmeal, and carnation instant breakfast. For snacks or lunch, I've included several Clif bars, Larabars, granola-type bars, bagels, pita bread, tortillas, peanut

butter, honey, and tuna lunchables. For evening dining you'll find several versions of pasta meals, tuna and salmon steaks, dehydrated veggies, breads and crackers, soups, and a few other dinner items. And for the dessert end of the evening dining I have biscotti, ginger snaps, almond cookies, chocolate tarts and cocoa mix. There is nothing extravagant here.

What information can you get from this database? Let's talk about calorie density first. Calorie density (I provide it as calories per ounce of food) from the database list ranges from 224 to 13. On the high end is olive oil; it is after all, pure fat. On the lowest end is soy milk, which is about 80% water. As a rule, when camping I strive for an average calorie density around 100 or higher, this means 100 calories or more per ounce. For instance, if I am carrying 5 lb of food, that should provide over 8000 calories in total. For me, that gets me easily through 4 days and 3 nights because I typically consume just over 2500 calories per full day.

Before you go out and stock up on high calorie density food items, a word of caution. Remember, the calorie density of fat is twice that of carbohydrate or protein. And also keep in mind that olive oil has 224 calories per ounce. So if calorie density was the only consideration when choosing food items, you'd only have to bring a bottle of olive oil (choose a plastic container, it weighs less)! Therefore, you cannot look at calorie density only; you must also pay attention to what percent of calories are coming from fat, carbohydrate and protein (not to mention vitamins and minerals, and possibly fiber content).

Let's take a look at calorie density of these food items and how it relates to the energy nutrients. Take a look at the graphs below. The first graph (figure 1) shows you how calorie density and percent of fat calories relate to one another. Each dot on the graph represents a food item. As you can see, there is a strong positive correlation (illustrated by the bold black line) meaning, the higher the calorie density, the higher the percent of calories coming from fat. What we really want to pay close attention to are the food items that range between 100 and 130 (within the red vertical lines), that's where half the food items from the database reside. If you look at the food items having calorie densities close to 100, they all have about 20% or less of calories coming from fat. If you look at the food items closer to 130, their fat content is 25% or higher with some food items reaching about 60%. The black line gives you an idea of the average percent of calories from fat at a given calorie density. Notice also on the graph a couple of food items that I have selectively pointed out, these seem to fall out of the norm and deserve some attention. I'll talk about sardines and the fantastic Jumpin' Black Bean soup a bit later.

This next graph (figure 2) shows you how calorie density relates to the percent of carbohydrate calories. Opposite of the previous graph, this one shows a negative relationship between carbohydrate calories and calorie density, meaning, the higher the calorie density, the lower will be the calories from carbohydrate. As a general rule, the higher the fat content, the lower the carbohydrate content. For instance, almost all the food items scattered around a calorie density value of 100 have carbohydrate contents ranging from 60 to 100% calories. These are also the food items with 20% or less fat calories.

The third graph (figure 3) shows you how calorie density relates to protein calories. Notice that the relationship between protein calories and calorie density is not as defined (the black is less steep) as the previous relationships, but it does tend to go in the same direction as carbohydrate calories. Technically, protein provides relatively few calories during exercise, but it is an important nutrient, most important during recovery and more recent evidence indicating it may play a larger role during exercise.

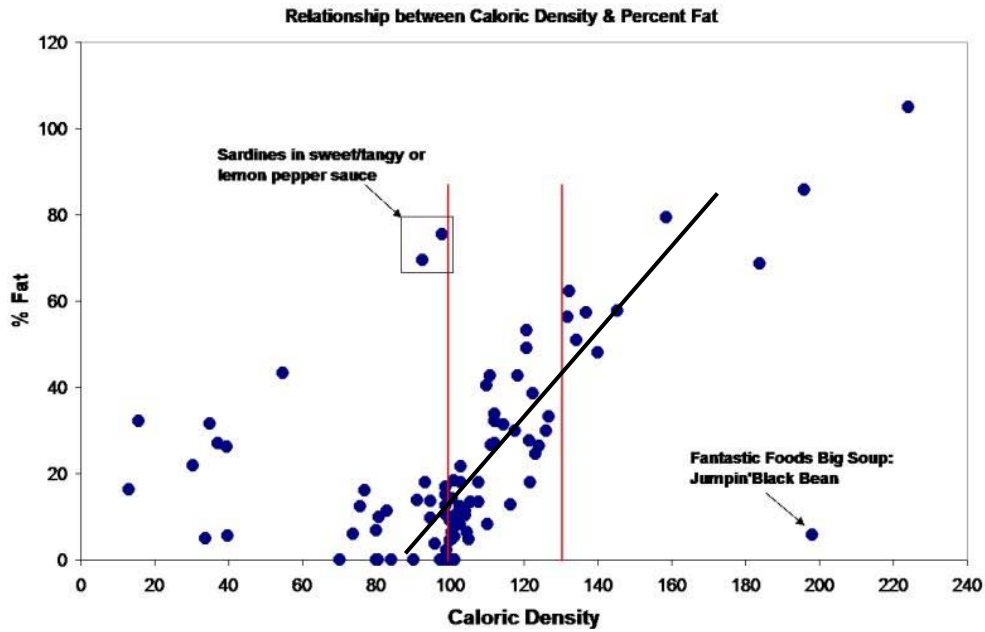


Figure 1. The relationship between calorie density and percent of calories coming from fat.

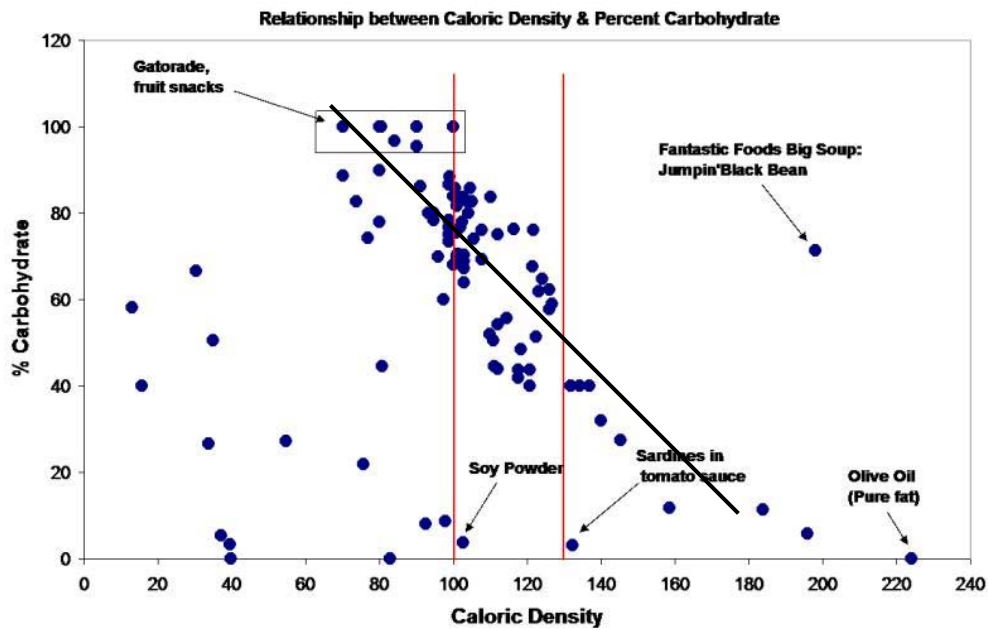


Figure 2. The relationship between calorie density and percent of calories coming from carbohydrate.

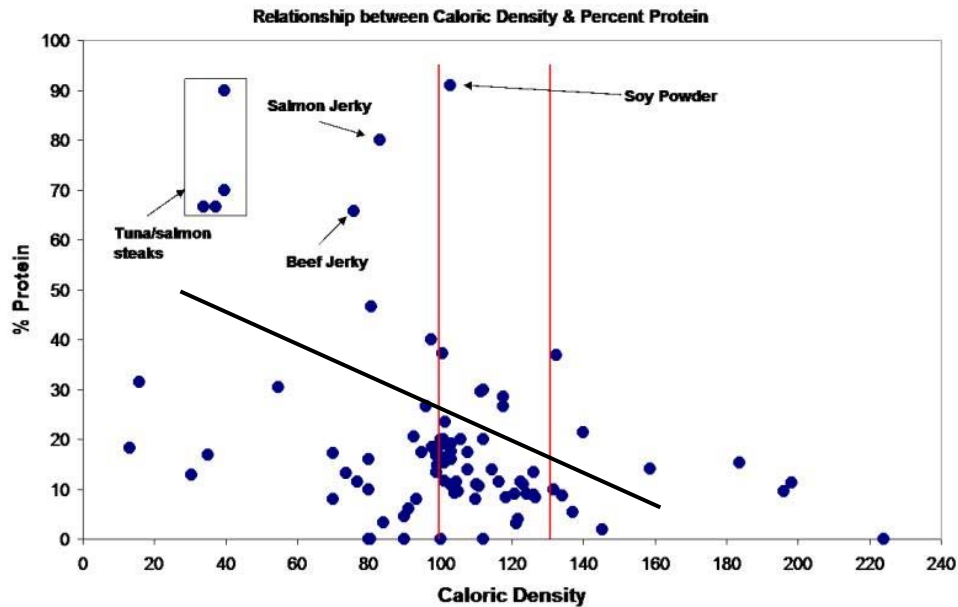


Figure 3. The relationship between calorie density and percent of calories coming from protein.

To make better sense of all this, I categorized the list of food items according to calorie density to come up with the following (those in red comprise food items having calorie densities ranging from 100 to 130):

Category	Calorie density range	Number of food items
Extreme high	$\geq 130$	11
Very high	120-129.9	10
High	110-119.9	11
Moderate High	100-109.9	30
Moderate	90-99.9	17
Low	$< 90$	21

I consider any food item with a calorie density of 100 calories or more per ounce to be high. I consider a food item that provides 60% calories or higher from carbohydrate to be a high-carbohydrate source. Items with fat calories 30% or less are low-fat items and anything greater than 40% is high-fat. Protein calories 12% or higher are good sources, and greater than 20% I consider to be high-protein foods. These are not scientifically categorized; rather, this is my personal take on these nutrients. I'll discuss these nutrients in more detail in another article. To summarize:

High carbohydrate	$\geq 60\%$
High fat	$\geq 40\%$
Low fat	$\leq 30\%$
High protein	$\geq 20\%$
Good source of protein	12-19%

The first table below shows those food items that fall into the extreme-high category. On average, these foods have a very high fat content (62%) and are not so high in protein or carbohydrates (10% and 40%, respectively). Remember the story above about the 2 guys who trekked across Greenland? The average fat calorie content of their foods was 60%. Now you can imagine what they were eating. In this category, three of the high fat foods are nuts or nut butter. If you include high fat foods in your camping diet, these nuts are the way to go. Along these lines, olive oil or canola oil are your best choices for cooking oils. I prefer olive oil (extra virgin) because it has some vitamin E and is very high in omega fats, as are your nuts. Go for the good fats, and these food items will provide them for you. I prefer peanuts in the form of peanut butter because I eat it with bread and peanuts are a better source of protein and lowest in fat compared to walnuts and almonds. All are good, but I would rate them in this order: peanuts, almonds, walnuts.

Sardines are also excellent sources of omega fats. As far as sardines are concerned, my database includes 3 versions all of which contain the bones (source of calcium); tomato sauce, sweet & tangy sauce, and lemon pepper sauce. They are all relatively high in fat, the tomato sauce version being the lowest in that regard and ironically, the highest in calorie density. I suspect it is because the other 2 versions contain more water weight, thus lowering their calorie densities. What also makes the tomato sauce version the best choice of the 3 is it is highest in protein, coming in at a whopping 36.9% of calories, compared to 18.4% and 20.6% for the other two versions. I find that sardines with crackers are a good snack right after a paddle, while I am getting my camp set up. It's a very high protein food item, great for recovery.

One item in this category deserves special attention and that is the Fantastic Big Soup Jumpin' Black Bean. This is an example of a quality food item in dehydrated form. As a meal, it has just about everything you need nutritionally speaking, and it provides almost 200 calories per ounce! It is a fairly decent source of protein (11% or 13 grams in total) as well and it's loaded with the necessary carbohydrate to get you ready for the next day's paddle. Low on fat, you could add some oil or nuts to this meal, or heat up a tortilla in the oil and serve it with your soup. The nuts will add some protein as well. This type of soup is a clear illustration of how great dehydrated foods are for backpackers and kayakers. But remember, you have to add back the water when you cook, which may or may not be an issue when packing for a trip.

Two "energy" bars make it on this list, the Pecan Pie and Cashew Cookie versions of the Larabars. Beware; these are NOT energy bars, as much as they are just darn good to eat. They provide you lots of calories, but over half of those calories are fat, mostly from the nuts, so it's not altogether bad fat. They may make a very good dessert after your black bean soup. Don't expect to get your quick energy or protein from these energy bars though, just consider them an occasional treat. Same goes with the Planters trail mix and banana chips, both high in fat and not great sources of protein or carbohydrate. Last, the dry milk is a supplement that goes with coffee or Carnation Instant Breakfast. It's a great source of protein but high in fat. Substitute with non-fat milk and you get your protein without all the fat.

#### Extreme High calorie density foods

Food Item	Weight (g)	Units	Calories	Fat (g)	CHO (g)	Pro (g)	Calorie density	% Fat	% Protein	% CHO
Olive oil	15	1 tbl	120	14	0	0	224.0	105.0	0.0	0.0
<b>Fantastic Big Soup Jumpin' Black Bean</b>	<b>65</b>	<b>1 cont</b>	<b>460</b>	<b>3</b>	<b>82</b>	<b>13</b>	<b>198.2</b>	<b>5.9</b>	<b>11.3</b>	<b>71.3</b>
Raw walnuts	30	16 nuts	210	20	3	5	196.0	85.7	9.5	5.7
<b>Peanut butter</b>	<b>32</b>	<b>2 tb</b>	<b>210</b>	<b>16</b>	<b>6</b>	<b>8</b>	<b>183.8</b>	<b>68.6</b>	<b>15.2</b>	<b>11.4</b>
Raw almonds	30	16 nuts	170	15	5	6	158.7	79.4	14.1	11.8
Banana chips unsweetened	42	1 hand	218	14	15	1	145.3	57.8	1.8	27.5
Nido dry milk	30	1/3 cp	150	8	12	8	140.0	48.0	21.3	32.0
Larabar Pecan Pie	45	1 bar	220	14	22	3	136.9	57.3	5.5	40.0
Larabar Cashew Cookie	48	1 bar	230	13	23	5	134.2	50.9	8.7	40.0

<b>Sardines in tomato sauce</b>	<b>55</b>	<b>1 cont</b>	<b>260</b>	<b>18</b>	<b>2</b>	<b>24</b>	<b>132.4</b>	<b>62.3</b>	<b>36.9</b>	<b>3.1</b>
Planters Trail mix, nut & chocolate	170	1 pck	800	50	80	20	131.8	56.3	10.0	40.0
<b>Average</b>			<b>277</b>	<b>17</b>	<b>23</b>	<b>8</b>	<b>161.9</b>	<b>61.6</b>	<b>12.2</b>	<b>25.7</b>

The next category is the ‘Very high’ calorie density category (see next table below). I think this is my favorite category, it’s mostly “fun” foods and nutritionally speaking, they’re not bad. These are not your high protein or high carbohydrate foods items, although one item, Kashi TLC roasted almond crunch, does give you 13% calories (6 grams) from protein and almost 60% calories (26 grams) from carbohydrate. Compared to the ‘Extreme high’ list, these foods are lower in fat. Two Larabars make this list and both with around 50% fat calories raise the average. All the other food items provide you a normal portion of fat, around 30%. As far as carbohydrate goes, 5 of the food items provide over 60% calories, making them excellent sources of carbohydrate. The Kashi TLC bar and Oreo thin crisps are great for quick energy during the paddle, but if you want more protein, go for the Kashi bar. The ginger snaps, biscotti or Almondina cookies are all excellent dessert choices, each providing lots of carbohydrate, low fat content and not too stingy with the protein. There are two nice meal additions on this list: the flatbread and the cup-a-soup. I enjoy the soup just before dinner and the flatbread is a bonus treat with dinner. I was surprised to see these absolutely delicious crackers having low fat and very high calorie density. They are a great supplement with a dinner. They do tend to break up with packing but if you leave enough air in a baggy, they do fine.

#### Very high calorie density food.

Food Item	Weight (g)	Units	Calories	Fat (g)	CHO (g)	Pro (g)	Calorie density	% Fat	% Protein	% CHO
Nature valley roasted almond granola bar	42	2 bars	190	7	28	4	126.7	33.2	8.4	58.9
<b>Nonni's Biscotti Originali</b>	<b>20</b>	<b>1</b>	<b>90</b>	<b>3</b>	<b>14</b>	<b>2</b>	<b>126.0</b>	<b>30.0</b>	<b>8.9</b>	<b>62.2</b>
<b>Kashi TLC roasted almond crunch</b>	<b>40</b>	<b>1 bar</b>	<b>180</b>	<b>6</b>	<b>26</b>	<b>6</b>	<b>126.0</b>	<b>30.0</b>	<b>13.3</b>	<b>57.8</b>
Almondina The Original cookie	30	4 cook	133	4	22	3	124.1	26.4	9.0	64.7
<b>Margaret's Artisan Flatbread</b>	<b>25</b>	<b>1 pc</b>	<b>110</b>	<b>3</b>	<b>17</b>	<b>3</b>	<b>123.2</b>	<b>24.5</b>	<b>10.9</b>	<b>61.8</b>
Lipton cup a soup broccoli & cheese	16	1 env	70	3	9	2	122.5	38.6	11.4	51.4
Oreo thin crisps 100 calorie packs	23	1 pck	100	2	19	1	121.7	18.0	4.0	76.0
Mi-del Ginger snaps	30	10 cook	130	4	22	1	121.3	27.7	3.1	67.7
Larabar Ginger snap	51	1 bar	220	13	22	5	120.8	53.2	9.1	40.0
Larabar Chocolate Coconut Chew	51	1 bar	220	12	24	5	120.8	49.1	9.1	43.6
<b>Average</b>			<b>211</b>	<b>11</b>	<b>24</b>	<b>6</b>	<b>126.3</b>	<b>39.8</b>	<b>10.6</b>	<b>50.5</b>

The next category is the ‘High’ calorie density category. With the exception of two items, Bisquick pancake mix and Nestle’s hot cocoa mix, these food items are not high sources of carbohydrate. But, on average, they are relatively high in protein and low in fat. Again, two Larabars make this list, both with high fat content and relatively low in protein or carbohydrate. Nice treats, but not quick energy bars by any means.

There are two food items that really stick out, the Bisquick pancake mix and the Barilla tortelloni. The pancake mix is an excellent source of carbohydrate and does well in terms of total protein. If you share 1 package with another person, you each get 10 grams of protein, not bad for pancakes. Add some peanut butter or nuts with those and you’ll get even more protein, an excellent precursor meal to paddling. We rarely bring the pancake mix however, because it requires cooking (unless you make them the night before).

For dinner, the tortellini is an excellent choice, giving you good amount of carbohydrate (despite falling below 60%) and protein. Add the Artisan Flatbread crackers, some dehydrated veggies and nuts (or smoked salmon or tuna steak) with the pasta, and biscotti for dessert and you’re ready to haul the next

day. As a protein supplement, the Clif Builder Bar is great (not as tasty as the regular Clif bars), providing you 20 grams of protein. The Balance Trail mix bars are not excellent carbohydrate sources, but they are very generous with the protein. They seem to satisfy my energy needs during a paddle, but I also like to have real quick energy sources on hand as well (like Gatorade).

The next category is the ‘moderate high’ category, bringing in the longest list of food (see table below). This is a great list with a variety of foods; here you’ll find most foods to be high sources of carbohydrate and very good to high sources of protein. And with the exception of one item, they are all low-fat foods. The exception is the one Larabar that makes this list. It has the highest percent of fat calories with 40.5% and next to lowest carbohydrate at 52%. And it’s stingy with the protein, as are all the Larabars.

You’ll find one item with nothing but carbohydrate, and that is Gatorade. It is what it is, an excellent source of carbohydrate and electrolytes while paddling. It is my energy drink of choice. I place a 1 ½ quart bladder (Camelback) behind my seat (or under my seat in the canoe) and have the bite valve readily available at all times. I mix my own Gatorade and pretty much use the recommended amount (which is 60 grams of carbohydrate per liter). So for 1 ½ quarts, I mix approximately 1 ½ scoops with my water, equivalent to just over 350 calories.

Speaking of quick energy sources, you’ll find almost all the Clif bars in this category. They are great for carbohydrates as well as protein. The bonus is they taste very good and come in such a variety that most anyone will find at least 2 that are pleasing. The bars also come fortified with several vitamins and minerals. I try to bring a variety of these bars along so I don’t tire of one flavor.

Some breakfast foods are on this list including Carnation Instant Breakfast, Cheerios, plain oatmeal and the instant version that has added sugar. None of these is a great source or protein, but others are; the Back to Nature energy start and Kashi Go Lean cereals, ranging from 9 to 13 grams protein per serving. That’s not bad for breakfast cereals. Add milk and nuts to these cereals and you have a lot of protein and carbohydrates to get you going.

There are some very good dinners on this list that provide lots of carbohydrates as well as protein. Top of the list is Annie’s curly fettucine, Far East Couscous and Dr. Mc Dougall’s black bean and lime or Minetrone & pasta soups, all very good to high sources of protein. Add some nuts and/or dehydrated veggies, Kavli crispbread on the side and you have an excellent meal. The smoked salmon or tuna steak are also great with couscous or fettucine.

### High calorie density foods

Food Item	Weight (g)	Units	Calories	Fat (g)	CHO (g)	Pro (g)	Calorie density	% Fat	% Protein	% CHO
Larabar Apple Pie	45	1 bar	190	9	23	4	118.2	42.6	8.4	48.4
Balance Trail mix bar cinnamon oats & honey	50	1 bar	210	7	23	15	117.6	30.0	28.6	43.8
Balance Trail mix bar fruit and nuts	50	1 bar	210	7	23	15	117.6	30.0	28.6	43.8
Balance Trail mix chocolate chip	50	1 bar	210	7	22	14	117.6	30.0	26.7	41.9
<b>Bisquick Shake n' Pour Blueberry pancake mix</b>	<b>177</b>	<b>1 pck</b>	<b>735</b>	<b>11</b>	<b>140</b>	<b>21</b>	<b>116.3</b>	<b>12.9</b>	<b>11.4</b>	<b>76.2</b>
<b>Barilla tortelloni ricotta &amp; spinach</b>	<b>225</b>	<b>1 pck</b>	<b>920</b>	<b>32</b>	<b>128</b>	<b>32</b>	<b>114.5</b>	<b>31.3</b>	<b>13.9</b>	<b>55.7</b>
Nestle Rich chocolate hot cocoa mix	20	1 env	80	3	15	0	112.0	33.8	0.0	75.0
Balance Outdoor Honey Almond	50	1 bar	200	6	22	15	112.0	27.0	30.0	44.0
Kashi TLC honey almond flax	35	1 bar	140	5	19	7	112.0	32.1	20.0	54.3
<b>Clif Builders Bar cookies n cream</b>	<b>68</b>	<b>1bar</b>	<b>270</b>	<b>8</b>	<b>30</b>	<b>20</b>	<b>111.2</b>	<b>26.7</b>	<b>29.6</b>	<b>44.4</b>
Larabar Cherry Pie	48	1 bar	190	9	24	5	110.8	42.6	10.5	50.5
<b>Average</b>			<b>305</b>	<b>9</b>	<b>43</b>	<b>13</b>	<b>114.5</b>	<b>30.8</b>	<b>18.9</b>	<b>52.5</b>

The next category is the moderate category (see table below), although not high in calorie density, this is an important category. You can count on these food items to be very low in fat and very high in carbohydrate (with the exception of the sardines). Protein content is very good to high among all the food items with the exception of 4 items. Those items, Kavli crispbread, chocolate tarts, dehydrated

strawberries & bananas, and fruit leather are great sources of carbohydrate and quick energy. The crispbread is a nice addition to a dinner and the chocolate tart is a very nice dessert.

You'll find several more Clif bars in this category, each an excellent source of carbohydrate and protein. For dinner, there are a few excellent dinners, Near East Couscous, Kraft mac & cheese and Dr. McDougalls split pea soup; all three excellent sources of carbohydrate and protein. Adding the dry milk and tuna to the macaroni and cheese or nuts to the couscous or soup is a protein bonus. A surprise item on this list is the Melba toast, which provides a decent amount of protein. Eat about 9 of these with dinner and you get 6 grams of protein, not to mention about 40 grams of carbohydrate.

### Moderate high calorie density foods

Food Item	Weight (g)	Units	Calories	Fat (g)	CHO (g)	Pro (g)	Calorie density	% Fat	% Protein	% CHO
Pretzels sourdough thin	28	12 pret	110	1	23	3	110.0	8.2	10.9	83.6
Larabar Cocoa Mole	51	1 bar	200	9	26	4	109.8	40.5	8.0	52.0
<b>Kavli Hearty Thick crispbread</b>	<b>18</b>	<b>2 pieces</b>	<b>70</b>	<b>1</b>	<b>15</b>	<b>2</b>	<b>108.9</b>	<b>6.4</b>	<b>11.4</b>	<b>85.7</b>
Oatmeal dry	39	1/4 cup	150	3	26	7	107.7	18.0	17.3	69.3
Pasta Roni World Flavors Butter Herb Italiano	156	1 pck	600	9	114	21	107.7	13.5	14.0	76.0
Back to nature energy start cereal	53	3/4 cp	200	3	37	10	105.7	13.5	20.0	74.0
Lipton cajun sides red beans & rice	200	1 pck	750	4	155	18	105.0	4.8	9.6	82.7
Heart to Heart Apple cinnamon instant oatmeal	43	1 pck	160	2	33	4	104.2	11.3	10.0	82.5
Publix Apple & Cinnamon Instant oatmeal	35	1 pck	130	2	26	3	104.0	10.4	9.2	80.0
Clif bar chocolate almond fudge	68	1 bar	250	5	44	10	102.9	18.0	16.0	70.4
Clif bar crunch peanut butter	68	1 bar	250	6	40	12	102.9	21.6	19.2	64.0
Clif bar crunch chocolate chip peanut crunch	68	1 bar	250	6	43	11	102.9	21.6	17.6	68.8
Clif bar crunch peanut toffee buzz	68	1 bar	250	6	42	11	102.9	21.6	17.6	67.2
Clif bar banana nut bread	68	1 bar	250	6	43	10	102.9	21.6	16.0	68.8
Cheerios cereal	30	1 cup	110	2	23	3	102.7	12.3	10.9	83.6
Soy powder Super Blue Pro-96	30	1 pck	110	1	1	25	102.7	8.2	90.9	3.6
<b>Near East Couscous Roasted Garlic &amp; olive oil</b>	<b>164</b>	<b>1 pck</b>	<b>600</b>	<b>6</b>	<b>117</b>	<b>24</b>	<b>102.4</b>	<b>9.0</b>	<b>16.0</b>	<b>78.0</b>
<b>Annie's curly fettucine white cheddar w/ broccoli</b>	<b>206</b>	<b>1 box</b>	<b>750</b>	<b>9</b>	<b>144</b>	<b>30</b>	<b>101.9</b>	<b>10.8</b>	<b>16.0</b>	<b>76.8</b>
<b>Dr McDougall Black bean and lime</b>	<b>94</b>	<b>1 cont</b>	<b>340</b>	<b>2</b>	<b>60</b>	<b>20</b>	<b>101.3</b>	<b>5.3</b>	<b>23.5</b>	<b>70.6</b>
Nestles Carnation Instant Breakfast	36	1 pck	130	0	27	5	101.1	0.0	15.4	83.1
Lipton Asian sides teriyaki noodles	133	1 pck	480	4	98	14	101.1	7.5	11.7	81.7
Clif bar oatmeal raisin walnut	68	1 bar	245	5	43	10	100.9	18.4	16.3	70.2
Clif bar black cherry almond	68	1 bar	245	5	43	10	100.9	18.4	16.3	70.2
<b>Dr McDougall Minestrone &amp; pasta</b>	<b>50</b>	<b>1 cont</b>	<b>180</b>	<b>1</b>	<b>34</b>	<b>9</b>	<b>100.8</b>	<b>5.0</b>	<b>20.0</b>	<b>75.6</b>
<b>Kashi Go Lean cereal</b>	<b>39</b>	<b>3/4 cp</b>	<b>140</b>	<b>1</b>	<b>30</b>	<b>13</b>	<b>100.5</b>	<b>6.4</b>	<b>37.1</b>	<b>85.7</b>
Kashi Go Lean Crunch cereal	53	1 cp	190	3	36	9	100.4	14.2	18.9	75.8
Just Veggies dehydrated carrot, corn, pepper, tomatoe	112	1 cont	400	4	84	16	100.0	9.0	16.0	84.0
<b>Gatorade lemon-lime</b>	<b>14</b>	<b>1/4 sco</b>	<b>50</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>100.0</b>	<b>0.0</b>	<b>0.0</b>	<b>104.0</b>
Dr McDougall Pad Thai noodle soup	56	1 cont	200	1	42	8	100.0	4.5	16.0	84.0
Dr McDougall Tortilla Soup	56	1 cont	200	2	34	10	100.0	9.0	20.0	68.0
<b>Average</b>			<b>266</b>	<b>4</b>	<b>50</b>	<b>11</b>	<b>103.1</b>	<b>12.3</b>	<b>18.1</b>	<b>74.0</b>

### Moderate calorie density foods

Food Item	Weight (g)	Units	Calories	Fat (g)	CHO (g)	Pro (g)	Calorie density	% Fat	% Protein	% CHO
Near East Couscous Mediterranean curry	161	1 pck	570	2	126	21	99.1	2.4	14.7	88.4
Clif bar cookies n cream	68	1 bar	240	4	47	10	98.8	15.0	16.7	78.3
Clif bar chocolate brownie	68	1 bar	240	5	45	10	98.8	16.9	16.7	75.0
Clif bar carrot cake	68	1 bar	240	4	46	10	98.8	15.0	16.7	76.7
<b>Melba toast whole grain</b>	<b>17</b>	<b>3 pc</b>	<b>60</b>	<b>0</b>	<b>13</b>	<b>2</b>	<b>98.8</b>	<b>0.0</b>	<b>13.3</b>	<b>86.7</b>
<b>Kraft macaroni and cheese</b>	<b>170</b>	<b>1</b>	<b>600</b>	<b>7</b>	<b>110</b>	<b>25</b>	<b>98.8</b>	<b>10.5</b>	<b>16.7</b>	<b>73.3</b>

		pck								
Back to nature oat & soy crisp cereal	51	3/4 cp	180	3	33	8	98.8	12.5	17.8	73.3
Sardine fillets sweet & tangy sauce	106	1 cont	370	31	8	17	97.7	75.4	18.4	8.6
Instant nonfat dry milk	23	1/3 cp	80	0	12	8	97.4	0.0	40.0	60.0
<b>Dr McDougall Split Pea Soup</b>	<b>70</b>	<b>1 cont</b>	<b>240</b>	<b>1</b>	<b>42</b>	<b>16</b>	<b>96.0</b>	<b>3.8</b>	<b>26.7</b>	<b>70.0</b>
Clif bar crunch cranberry apply cherry	68	1 bar	230	3	45	10	94.7	9.8	17.4	78.3
Cliff bar lemon poppy seed	68	1 bar	230	4	46	10	94.7	13.7	17.4	80.0
Kavli Crispy Garlic crispbread (1 pck = 30 pc)	150	1 pck	500	10	100	10	93.3	18.0	8.0	80.0
Sardine fillets lemon pepper sauce	106	1cont	350	27	7	18	92.5	69.4	20.6	8.0
<b>Health Valley Chocolate Tarts</b>	<b>40</b>	<b>1bar</b>	<b>130</b>	<b>2</b>	<b>28</b>	<b>2</b>	<b>91.0</b>	<b>13.8</b>	<b>6.2</b>	<b>86.2</b>
Just strawberries n bananas, dehydrated	56	1 cont	180	0	43	2	90.0	0.0	4.4	95.6
Stretch Island Fruit Leather Chunky cherry	14	1	45	0	11	0	90.0	0.0	0.0	100.0
<b>Average</b>			<b>264</b>	<b>6</b>	<b>45</b>	<b>11</b>	<b>95.8</b>	<b>16.2</b>	<b>16.0</b>	<b>71.7</b>

The final list is the low calorie density list (see table below), ranging from 13 to 84 calories per ounce. There is a variety of food items here, many of which I don't leave home without. It is here that you will find your very high sources of protein and very low fat food items. Most are excellent sources of carbohydrate as well. In fact, 4 items provide nothing but carbohydrate, Kalahari Fruit Trekker, dates, honey, and dried papaya. Each of these is a quick energy source. I use the honey with my peanut butter and bagel (or tortilla, or pita bread) for lunch. Your highest sources of protein are the jerkys (salmon or beef), tuna steaks and salmon steaks. The tuna and salmon steaks are excellent with pasta or couscous and do not need to be cooked, simply add them to the cooked pasta or couscous. The salmon or beef jerky is a nice snack during paddling. I sometimes get a craving for the salmon jerkey, perhaps it's the salt. Another excellent source of protein is the Fantastic Taco filling, with tortilla and some veggies and cheese, it's a great dinner. I enjoy the Idahoan mashed potatoes with the tuna or salmon (or a fresh catch) and add olive oil and dehydrated veggies to make a high carbohydrate and protein meal.

You'll also notice 3 bread items on this list, tortillas, bagels and pita bread. Each is pretty good for protein, the pita bread being the most generous in that regard. They hold up quite well with packing too. The last two items on the list are exceptionally low in calorie density, the soy milk and the red pepper soup. These items are primarily water, which is why they weigh so much for their calories. I like the soy milk better than the dry milk mixed with water and it's a good source of calcium and protein as well. The soup is a bonus and surprisingly, provides a decent amount of protein. We enjoy this soup with our dinner, but usually only bring one box per trip.

I can't leave this category without dismissing a couple items. While perusing the prepackaged shelf meals at Wild Oats one day I came across the Tasty Bite meals. I love Indian food and the idea of having spinach dal for dinner while camping was too good to resist. My excitement turned to disappointment after one un-tasty bite. Save your money, they are tasteless and very low in calorie density to boot. You get a lot of calories, but it weighs you down. And they're not that impressive in terms of protein or carbohydrate.

### Low calorie density foods

Food Item	Weight (g)	Units	Calories	Fat (g)	CHO (g)	Pro (g)	Calorie density	% Fat	% Protein	% CHO
Kalahari Fruit Trekker Banana	40	1 bar	120	0	29	1	84.0	0.0	3.3	96.7
<b>Salmon Jerky</b>	<b>108</b>	<b>1 pck</b>	<b>320</b>	<b>4</b>	<b>8</b>	<b>64</b>	<b>83.0</b>	<b>11.3</b>	<b>80.0</b>	<b>10.0</b>
<b>Fantastic Taco filling</b>	<b>125</b>	<b>1 box</b>	<b>360</b>	<b>4</b>	<b>40</b>	<b>42</b>	<b>80.6</b>	<b>10.0</b>	<b>46.7</b>	<b>44.4</b>
Dates	8	1	23	0	6	0	80.5	0.0	0.0	100.0
<b>Honey</b>	<b>21</b>	<b>1 tbl</b>	<b>60</b>	<b>0</b>	<b>15</b>	<b>0</b>	<b>80.0</b>	<b>0.0</b>	<b>0.0</b>	<b>100.0</b>
DiGiorno Linguine	70	1/4 pck	200	2	39	8	80.0	6.8	16.0	78.0
Idahoan mashed potatoes	56	1 pck	160	0	36	4	80.0	0.0	10.0	90.0
Mission whole wheat tortillas	51	1	140	3	26	4	76.9	16.1	11.4	74.3

Beef Jerky	108	1 pck	292	4	16	48	75.7	12.3	65.8	21.9
Lender's Cinnamon raisin swirl bagel	57	1 pc	150	1	31	5	73.7	6.0	13.3	82.7
<b>Toufayan Bakeries whole wheat pita</b>	<b>56</b>	<b>1</b>	<b>140</b>	<b>0</b>	<b>31</b>	<b>6</b>	<b>70.0</b>	<b>0.0</b>	<b>17.1</b>	<b>88.6</b>
Papaya dried unsweetened	40	2 piec	100	0	24	1	70.0	0.0	4.0	96.0
Starkist lunch to go Albacore	128	1 kit	250	12	17	19	54.7	43.2	30.4	27.2
<b>Bumble Bee Albacore tuna steak</b>	<b>113</b>	<b>1 pouch</b>	<b>160</b>	<b>1</b>	<b>0</b>	<b>36</b>	<b>39.6</b>	<b>5.6</b>	<b>90.0</b>	<b>0.0</b>
Chicken of the sea smoked alaskan pacific salmon	85	1 pouch	120	4	1	21	39.5	26.3	70.0	3.3
Bumble Bee Pink salmon steak, lemon & dill	113	1 pouch	150	5	2	25	37.2	27.0	66.7	5.3
Tasty Bite Peas paneer & basmatic rice	342	1 pck	427	15	54	18	35.0	31.6	16.9	50.6
Chicken of the sea Ahi tuna steak	149	1 pouch	180	1	12	30	33.8	5.0	66.7	26.7
Tasty Bite Spinach dal & basmati rice	342	1pck	372	9	62	12	30.5	21.8	12.9	66.7
Organic Edensoy Original soymilk	250	1 box	140	5	14	11	15.7	32.1	31.4	40.0
Pacific roasted red pepper & tomato soup	473	1 box	220	4	32	10	13.0	16.4	18.2	58.2
<b>Average</b>			<b>194</b>	<b>3</b>	<b>24</b>	<b>17</b>	<b>58.7</b>	<b>12.9</b>	<b>31.9</b>	<b>55.3</b>

To summarize, here's a short list of the all-star foods:

Fantastic Big Soup Jumpin' Black Bean soup – very high calorie density, lots of calories in one serving, lots of protein and carbohydrate, goes well with tortillas, bread or crackers, you can add veggies to it and its great tasting.

Gatorade – I never leave home without it. It offers three important nutrients all rolled into one: water, sodium and carbohydrate. And several varieties are available to suit your taste.

Peanut butter – tried and true, this high protein food goes well with so many things, bread, crackers, honey, fruit, and pancakes to name a few. It provides good fats and some carbohydrate as well.

Kashi Go Lean cereal – for a dry breakfast cereal, it's loaded with protein and a great source of carbohydrate. It's a bit dry and plain tasting, but you can add dehydrated fruit or honey for taste.

Margaret's Artisan Flatbread – it just tastes so dang good, especially with pasta. It's low in fat and provides some protein as well.

Clif bars – pick one, any one. For the highest protein yield, go with the peanut butter crunch version. They offer lots of carbohydrate, vitamins and minerals.

Salmon jerky – try it, just try it. It's a great protein source, and also provides lots of sodium.

Barilla tortelloni – very generous with protein and excellent tasting. With the Artisan flatbread, a little olive oil and garlic, you can't go wrong.

And for dessert,

Nonni's Biscotti – it even has some protein to offer and provides the highest calorie density compared to other dessert choices.

### *Is there a perfect energy food?*

One last thing I will talk about and that is energy bars, energy gels and sport drinks. I've included some in my database including Clif bars, Balance Trail Mix bars, Kashi TLC bars and Gatorade. But there are several others not included in my database that I'll give some mention to. First, simple soft drinks like Coca Cola and Pepsi, are energy drinks (not the diet version, which do not contain calories). They provide lots of carbohydrate calories. Then you have your more serious energy drinks that are loaded with carbohydrate, caffeine and other assorted herbs and spices. There are so many different brands out there it would be a waste of time to go through all of them. In short, I'm talking about Red Bull, Rockstar, Full Throttle, etc. For quick energy, there is nothing wrong with these drinks. Be aware of the caffeine if it is not part of your regular diet. When looking at all these drinks, save some money and buy the regular soft drinks. The added "exotic" ingredients in some of these energy drinks are useless and questionable.

There are several energy gels out on the market now, the first out was GU. These are a nice alternative to the chewy energy bars that sometimes take a lot of energy just to digest. Clif has a version called Clif Shot, and along with GU seem to be popular among athletes. They come in 1-oz packets of 25 g of carbohydrate (100 calories) and some contain a little caffeine. You can see that the calorie density of the sport gels is about 100 calories per ounce, placing it in the moderate to moderate-high category.

There are several sport drinks/gels that provide a relatively high amount of protein, along with the carbohydrate. Some of these are touted as recovery drinks. There are several versions of these drinks out there on the market, but I'll mention two popular ones among endurance athletes; Accelerade and Endurox. Accelerade is much like Gatorade, except it contains protein. Accelerade also comes in a gel version called Accel Gel. Compared to Gatorade, Accelerade provides the same amount of carbohydrate and a little more sodium. And it provides approximately 14 grams of protein per liter (or quart). The drink is formulated with a patented 4:1 ratio of carbohydrate to protein. I'll discuss this in more detail in another article, but for now I will say that more evidence indicates that a combination of carbohydrate and protein is better for performance and muscle recovery than carbohydrate alone. What's interesting is that the research is indicating improved performance with a carbohydrate and protein combination consumed DURING exercise.

Endurox is marketed as the ultimate recovery drink and also uses the patented 4:1 ratio for carbohydrate and protein. There is good evidence that the combination of these two energy nutrients is better for muscle recovery, including protein and glycogen synthesis, than carbohydrate alone when consumed during the first few hours following exercise. There is nothing, I repeat, nothing magic about the 4:1 ratio. Be assured that Endurox is giving you a generous helping of carbohydrate and protein and the combination probably has more to do with taste than any physiological response. Is it worth purchasing? From what I found from various on-line stores, one serving will cost about \$1.80 to \$2.00. That's a 12-oz fluid mixture that contains 53 grams of carbohydrate (almost 3 times the concentration of Gatorade) and 14 grams of protein. This is a very concentrated drink, thus absorption will be slower than a more diluted solution like Gatorade. But, if you're resting and recovering, the rate of absorption may not be an issue. It really comes down to taste and convenience (or maybe cost) because you can get the same combination of carbohydrate and protein from a Turkey breast wrap and a peanut butter cookie from Subway (but it will cost you more than the Endurox drink).

Another diet supplement that is often used during ultra-endurance events is Ensure. Ensure is actually a wonderful drink, giving you 250 calories per 8-oz bottle. The calories consist of 6 g fat (22% calories), 40g carbohydrate (64%) and 9 g protein (14%), making it a good protein, excellent carbohydrate and low fat choice. It also contains potassium, an important electrolyte. If you're not into milk protein, this is not the drink for you, but it does come in a variety of flavors and actually tastes good.

### *Aren't the pre-packaged camp meals high in calorie density?*

Yes they are for the most part, but the calorie density varies greatly. You may think that dehydrated foods would have the highest calorie density, but when you look at them more closely you'll find they range in calorie density from low to extreme high. I found some falling below 80 calories per ounce and some as high as 150 calories per ounce. Most that I researched fell within the 80-90 calorie per ounce range and those were the 2-serving packages. I looked more closely by choosing two brands that offer single person entrees; Enertia and Mountain House. I looked at 12 Enertia entrees (some were breakfast entrees) and 6 Mountain House entrees. You can go to the Campmor website and search for 'Food' as the category; you'll find these and their nutritional information quite handily.

The Enertia entrees fared quite well, ranging from 98 to 156 calories per ounce. The average calorie density for the 12 Enertia entrees was 110 calories/oz. The total calories ranged from 320 to 540. The 156 calorie/oz entrée was the Sierra Scramble, which was primarily fat (58%). It does offer a high source of protein at 30%, but compromises the carbohydrate. With the exception of two items (the Sierra

Scramble and the Mountain Morning Oatmeal), the entrees offer 60% or more carbohydrate, but the higher the carbohydrate (one reaching 90%), the lower the protein (lower than 10%). If I were to choose the top 2 Enertia meals (irrespective of taste) based on this information and wanting 400 calories or more for dinner, I would choose Max Patch Mac & Cheese, and Moosilauke Goulash.

If you really want to get the most for calories for weight, the average calorie density among the Mountain House entrees was 128 calories/oz, ranging from 108 to 136 calories/oz. Despite their very high calorie density, these entrees are relatively low in fat (below 30% calories), with the exception of one item, Lasagna and Meat which had the highest calorie density and highest percent calories from fat (37%). They all offered very good to high amounts of protein (12% or higher), the lowest being the only non-meat entrée, Pasta Primavera. Total calories ranged from 280 to 510.

As far as pre-packaged meals are concerned, other than a few exceptions, these are relatively high calorie foods, light in weight and good to excellent sources of carbohydrate and protein. For someone who does not want to cook or put too much thought into creating a meal, these are the way to go. But, I have yet to find a pre-packaged meal that surpasses the Fantastic Foods Jumpin' Black Bean soup at a whopping 200 calories per ounce!

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