Cold River Camp
Energy and Resource Consumption Analysis
and recommendations for a sustainable future

by

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Abstract: This report establishes a baseline and details the overall sustainability of Cold River Camp based on the available information. The Methodology section covers the importance of the report and the procedures followed. The Findings section provides a breakdown of the Camp's carbon footprint and other resource use. The Recommendations section outlines several feasible improvements toward greater sustainability.

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I. Introduction

This report contains a resource analysis and recommendations for improved sustainability at Cold River Camp, AMC. The specific purpose of this study was to establish a carbon emissions baseline. Using the information here, Camp leadership can evaluate possible actions that could be taken to reduce the Camp's carbon emissions in the future. If such actions are taken, the baseline reported here can be used to calculate the percentage of carbon dioxide emissions reductions and how that compares to established goals (for example, a generally accepted goal for carbon emissions reductions is 80% by 2050).

As an organization that relies so heavily on outdoor recreation and the health of the environment, conservation – both resource and environmental – are of paramount importance to the well being of the Camp. Serving nearly 600 visitors each year, Cold River Camp has a unique opportunity to improve its environmental stewardship, while educating these visitors about the Camp's effort to preserve the environmental health of the White Mountains.

II. Methodology

This data was collected as part of an improved effort to understand the Camp's carbon footprint and environmental impact. The analysis was conducted beginning on July 5th and ending on July 16th, 2008, with the help of the camp managers and crew. The analysis spanned two groups of visitors over Weeks 2 and 3 of the summer, full-service season. Week 2 had a relatively small group with about 35 guests, and Week 3 was nearly full, hosting about 60 guests. Therefore, it is fair to assume that the analysis is slightly conservative (low) with its results based on the less than full capacity coupled with a potential increase in yearly guest numbers.

The electrical energy audit was conducted using a *Kill A Watt* meter and included observing operating time of electrical devices in the sixteen buildings consuming electricity. The amounts of trash, organic waste, and recycled materials were also measured during this 2008 study period.

The year 2007 served as the baseline for measured consumption, based on utility and other bills. These included 2007 measurements of guest and camp transportation and resource inputs (propane, electricity, kerosene, wood). Because Camp operated in essentially the same manner in 2007 as in 2008, and the number of overall guests were similar during the two years, the combination of data from 2007 and 2008 is assumed to be representative of typical current annual Cold River Camp operations and impacts.

III. Findings

The findings of the analysis will be divided into categories of Inputs, Outputs, Transportation, and Credits. This section will serve as a reference for the recommendations section. Some limitations to each calculation are provided at the end of each resource analyses.

a. Inputs

Propane:

Propane is used to power the back-up generator, the kitchen water heater, the tankless water heater for the dishwasher (Hobart), the dry room heater, and all the bathroom water heaters. Propane tanks range in size from the 500 gallon tank supplying the kitchen, to 120 gallon tanks at the bathrooms. In 2007, Cold River Camp used 1,424.8 fluid gallons of liquid propane supplied by Reliable Oil & Propane of Center Conway.

Propane usage contributed to 8.58% of the carbon dioxide emissions with 8.14 metric tons emitted in 2007. This number was calculated using a multiplier of 12.6 lbs.Co_2/gallon US Department of Energy[1]).

Calculation:
1,424.8 x 12.6 = 17952.48 lbs.Co_2 / 2,205 = 8.14 metric tons

Electricity:

Electricity is consumed in 16 of the buildings in camp and is most heavily used in the Main Lodge, Office, Rec Hall, and by the water pump. The camp uses one electrical meter that is monitored by Public Service of New Hampshire. In 2007 the Camp consumed 17,330 kWh of electricity. A snapshot of the electricity bill, as well as a graph of usage from February 2007 to June 2008, is available in the Appendix (Figures 5 & 7).

An audit of the electricity use at the camp was conducted to provide a detailed breakdown of the sources of the consumption based on the wattage and weekly usage of the various electrical fixtures and appliances. The audit was conducted during the billing period ending August 1st, which, in 2007, accounted for 4,820 kWh of electricity use.

The assumptions used in the audit – such as the length of time various lights and appliances are typically in use – resulted in an estimate of the total electricity consumption for the month of 4,400 kWh (146kWh per day). This is within 500 kWh of the measured consumption in the same month in 2007. Thus, the estimate may be off by as much as 10%. But this discrepancy will only minimally affect the estimated proportions of energy consumed by different appliances and lights around Camp. Naturally, electricity use fluctuates throughout the summer months and is negligible in the off-season, but the consumption at each appliance and building remains proportionately constant as the numbers of crew and guests fluctuates.

Calculating the carbon emitted by electricity consumption is an involved process due to the variety of sources where electricity is generated on any given day. Fortunately, the Department of Energy provides averages of the emissions for each state, based on the state mix of electricity generation sources. At .63lbs, New Hampshire has the second lowest carbon emitted per kilowatt-hour of energy consumed in the nation, behind Vermont (0.03).[2] Using this multiplier and the total measured electricity consumption in 2007 (17,330 kWh), we can calculate the Cold River Camp's carbon emissions from electricity use to be 5.34 metric tons of carbon in 2007.

Calculation:
17,330kWh x .63lbs/kWh = 11,784.4lbs.Co_2 / 2,205 = 5.34 metric tons

A pie chart of the breakdown of electricity use by building is available in the Appendix (Figure 1 & 4).

Kerosene:

Kerosene is consumed exclusively in lamps that are provided for guests to provide light in their cabins. In 2007, the Camp purchased a total of 5 gallons of kerosene. Kerosene emits 21.537 lbs.Co_2/gallon[1], totaling 107.68 lbs.Co_2, or .048 metric tons.

Calculation:
5gal x 21.537 lbs.Co_2/gal = 107.68 lbs.Co_2/ 2,205 = .048 metric tons

Wood:

Wood is often considered an alternative, renewable energy source that, when burned, involves the cycling of biogenic carbon (short-term cycling carbon), not fossil carbon. Thus, carbon accounting policies and markets generally grant credits for the use of wood fuel in place of fossil fuels. However, some rightly argue that burning wood releases carbon that would have been sequestered from the atmosphere for decades. The simple fact is that once carbon dioxide goes into the atmosphere its effects on climate systems are the same, whatever its source. Therefore, under this assumption, wood consumption is not considered carbon neutral, and the use of wood was included as part of the overall picture of the Camp's carbon emissions.

The combustion of wood at Cold River Camp accounts for nearly 22% of carbon emissions at 15.13 metric tons. The camp purchased 5 cords of wood in 2007 to be used in the cabins, the Lodge, and for winter heating in Convent.

The U.S. Department of Energy estimates that burning a short ton of wood or wood waste generates 3,814 pounds of carbon dioxide. For this report, a median cord weight of 3,500 pounds was used. So a cord of wood would be 1.75 tons and thus would generate 6,674 pounds of carbon dioxide per cord.[3] Multiplying this by the five cords consumed each year at the Camp results in 15.13 metric tons of carbon dioxide emissions.

Calculation:
5 cords x 6,674 lbs.Co_2/cord = 33,370 lbs.Co_2 / 2,205 = 15.13 metric tons

Note that this number appears unusually high; therefore, it should be noted that when a cord of wood is measured, it is often by dimensions rather than weight, which allows us to assume that this number can be lower or higher depending on the average size of a "cord" as measured by the supplier.

b. Outputs

Solid Waste:

This report uses "solid waste" as the term for anything that was thrown out in a trash receptacle and subsequently collected in the camp dumpster. In order to collect a rough estimate of the volume of daily trash, bags were weighed twice daily for 5 days using the Camp's antique stand-up scale; therefore, it is worthwhile to note that each weight has an estimated error of +/- 2 lbs due to the imprecise readings on the aging scale.

From July 11th to 15th the average half-day trash weight was 52.25 lbs, with a low of 40 lbs and a high of 72 lbs. By taking the average weight and multiplying by 14 we arrive at a weekly average of 731.5 lbs. The weekly average was then multiplied by the 12 weeks of full camp operation, amounting to a yearly average of 8,773 lbs of trash. The yearly average was then divided by 33 and multiplied by 60 lbs. Co_2 based on the estimation that per 33 lb trash bag, 60 lbs of carbon equivalent is emitted during removal and disposal.[3]

Calculation:
8,773 lbs/year / 33 lbs = 266 bags * 60 lbs.Co_2 = 15,960 lbs.Co_2 / 2,205 = 7.23 metric tons

The cost of trash disposal each year is between $700 and $800. This is the fee charged for emptying the dumpster once each week during the summer season, and as needed during the spring and fall.

Recycling:

Camp guests and crew do a decent job of ensuring that most recyclables are kept out of the trash. Recycling weights were measured on July 16th, exactly one week after the recycling was last removed from Camp. After this week of camp operations the recycling weights were as follows:

Item	Weight (lbs)
#2 Plastic	5
Newspapers	21
Tin	8
#1 Plastic	2
Aluminum Cans	4
Glass	9.5
Cardboard	≈130
Total:	**179.5**

It is important to consider that the week of the recycling measurement had a small group of 36 guests in Camp. The cardboard weight was estimated using the dimensions of the container in which the cardboard is collected, the weight of a test portion, and a rough estimate based on these measurements.

Although the assumptions and calculations are complicated, most carbon accounting systems conclude that recycling reduces carbon equivalent emissions in comparison to disposal in landfills.[1] Thus, Cold River Camp is doing well to have this long-standing recycling program. However, no carbon equivalent emissions credit is included for current recycling, since the purpose of this study is to establish a carbon emissions baseline. Future increases in the rate of recycling will be credited as contributing to reductions in carbon equivalent emissions from Camp operations.

If recycling is assumed to produce only 1/3 of the carbon equivalent emissions of solid waste disposal, then the Camp's recycling program produces about 0.55 metric tons of carbon dioxide emissions from this source (assuming about 1 ton of recycled materials per year and using the solid waste factors discussed above). However, this small amount was not included in the Camp's calculated total carbon emissions.

Food Scraps:

Food scraps are collected and picked up by the Chester Eastman Farm and used to feed pigs. Additional organic waste that would otherwise be rejected by the pig goes into the trash. In order to get a sense of what amount of non-pig food waste was being collected, a bucket was given to the cooks for 24 hours to collect the non-pig scraps. Following this 24-hour collection period, the bucket had gained 17 pounds of compostable food waste.

[1] For example, U. S. EPA's personal carbon emissions calculator assumes that typical household recycling reduces carbon emissions from waste management by about 2/3; see http://www.epa.gov/climatechange/emissions/ind_calculator.html.

It should be noted that the 24-hour period included a dinner where corn on the cob was served. This may have inflated the number by several pounds.

If we assume 15 pounds of non-pig food scraps are produced each day, and the Camp is at the equivalent level of activity for about 100 days each year, there are approximately 1,500 pounds of food scraps that could be diverted from the solid waste stream by, for example, composting.

c. Transportation

Guest Travel to Camp

Guest travel to Cold River Camp in 2007 is responsible for 36% of the camp's carbon footprint at 25.51 metric tons of carbon dioxide. Guest travel by plane accounted for 7.82 metric tons, while guests who drove emitted 17.68 metric tons. Distance traveled was calculated by estimating the mileage and form of transportation of each group traveling to Camp. The guest lists from 2007 were used to estimate each distance (using Google maps), as well as the number of cars based on the size of the group. It was estimated that any trip over 1000 miles was on an airplane, although that may be a conservative (low) estimate.

To calculate plane travel, distances over 1000 miles were combined and divided by 43.3, the miles per gallon for the average passenger.[4] The result was then multiplied by 23.88 lbs/gal[4] of jet fuel to get 13,111 lbs. Because there is some difference of opinion regarding the carbon emissions from typical air travel, a second calculation was used that multiplied the miles traveled by a factor of 0.9 lbs. carbon dioxide, resulting in a much larger total value of 21,395 lbs. The two results of these two calculations were then averaged.

Calculations:
23,773.5 miles / 43.3 miles/gal.jet fuel = 549.04 gal * 23.88 lbs.CO_2/gal = 13,111 lbs.CO_2

23,773.5 miles * 0.9 = 21,395 lbs.CO_2

(21,395 + 13,111)/2 = 17,253.05 lbs.CO_2 / 2,205 = 7.82 metric tons

Distance traveled by automobile was divided by 25 mpg – a figure acquired from the AMC-wide carbon audit – then multiplied by 19.6 lbs/gal[5], the amount of CO_2 emitted from a gallon of gasoline. The result was 17.7 metric tons of carbon dioxide emitted from total car travel to Cold River Camp.

Calculation:
49,736 miles / 25 mpg = 19,89.45 gal * 19.6 lbs.CO_2/gal = 38,993 lbs.CO_2 /2,205 = 17.7

These calculations only account for the travel distances *to* Camp, instead of the mileage traveled round-trip. It is also possible to make the assumption that $\frac{1}{2}$ of the guests travel directly home while the others make additional stops (and, thus, Camp would not be responsible for the carbon emissions produced by those additional stops). If the report accounted for this additional travel, the 17.7 metric tons Co_2 of one-way car trips could be multiplied by 1.5 (additional $\frac{1}{2}$ traveling directly home) to arrive at a value of 26.65 metric tons Co_2. However, it seems unreasonable to place the carbon dioxide emissions directly on Cold River Camp for guests' round trip travel, so this calculation was omitted in the travel section.

Delivery Truck:

The majority of the Camp's food and cleaning supplies come from Sysco of Northern New England via a delivery truck that drives from Portland, Maine twice a week. While the Camp is not the only destination on the truck's route, the driver determined that about 224 miles a week was a good estimate for the travel attributable to Camp deliveries. The truck's diesel engine gets 6 miles per gallon, thus burning approximately 37 gallons of fuel for Camp deliveries per week. This was multiplied by 9 weeks of deliveries and 22.2 lbs.Co_2/gal[5] to determine that the delivery truck contributes 3.38 metric tons to the camp's carbon footprint.

Calculation:
224 miles / 6 mpg = 37.3 gal * 9 weeks * 22.2 lbs.Co_2/gal = 7,453 lbs.Co_2 / 2,205 = 3.38 metric tons

Guest excursion travel:

Mileage traveled by guests to and from Camp during an average week was calculated using the hike leader log from 2007. Distances for 6 weeks were collected, averaged, and multiplied by 9 to determine a yearly average. Trip mileage was multiplied according to the number of cars that were estimated as used, assumed based on trip participant numbers. Based on these assumptions, each year, guests travel an average of 9,781 miles and emit 3.47 metric tons of carbon traveling to and from hiking and canoeing destinations.

Calculation:
9,781 miles / 25 mpg = 391.24 gal * 19.6 lbs.Co_2/gal = 7,668 lbs / 2,205 = 3.47 metric tons

It's difficult to rely on an average for any given month, because of the wide range in the distances traveled in any given week, since some weeks have groups that travel to the

Presidentials and other more distant locations and other weeks don't. Regardless, the numbers provided were based on a best-guess average.

Camp van travel:

Fortunately, the crew has kept a good record of the mileage used in the van for the past two years. From July 21, 2007 to July 12, 2008 the van traveled 2,690 miles. Assuming an efficiency of 15 mpg, the van emits a yearly amount of 1.6 metric tons of carbon dioxide.[5]

Calculation:
2,690 mi / 15 mpg = 179.3 gal * 22.2 lbs.Co_2/gal = 3,514.93 lbs.Co_2 / 2,205 = 1.6 metric tons

Water and Wastewater:

The Camp's wastewater is managed through a variety of septic tanks, a seepage pit, and leach fields. The largest volumes of wastewater are discharged from the kitchen, and the men's, women's, and Greeley bathhouses. Negligible volumes of wastewater come from the Barracks and Tower toilets and sinks.

The kitchen is apparently served by a septic system that was updated in 1983. Design plans by H. Edmund Bergeron Civil Engineers are on file in the Camp office. Wastewater flows northward through two pipes, under the driveway, one of which leads to a 1000 gallon grease trap that existed prior to 1983, but access to which was improved that year. The second pipe leads directly to a 1000-gallon septic tank, which also receives flow from the grease trap. A leach field to the west of the septic tank was considered failed in 1983 and was apparently replaced with two seepage pits. Each pit is seven feet in diameter and eight feet deep, with cement block lined walls on the inside and ½-inch septic stone outside of those walls. A distribution box diverts the kitchen wastewater evenly between the seepage pits, according to the engineering plans.

Septic tanks and leaching fields service the various bathrooms. Additional details can be gleaned from records in the office and contact with those with memories of Camp operations reaching back 30 – 40 years. Because the Camp sits on a sand-and-gravel glacial deposit with excellent percolation, the relatively small amounts wastewaster dispersed into the ground over the period of a year probably have little impact on groundwater and the environment. Because the source of water is close by, the displacement of water caused by the Camp's activities is minimal – the Camp returns its used water to the same micro-watershed and the Camp soils and sub-soils provide good treatment.

Septage (the solids that settle to the bottom of septic tanks) is removed from all Camp septic tanks on an annual basis, usually in the spring, before Camp opens (e.g. June). Chet's Septic Service is the local septage hauler, and, during the spring and other parts of the growing season, they apply septage to farm fields to fertilize grass hay and feed corn or other such crops, in accordance with Maine state regulations. This means that, in most years, Cold River Camp's sewage waste is recycled. Note that it is a good idea to ask that the septage hauler recycle Camp septage to soils and give him or her the flexibility to schedule septage pick-up at Camp for a time that allows for land application.

d. Credits

Cold River Camp manages 85.7 acres of land for camp use; 7-8 acres of this land has been cleared for buildings and other use. Since the remaining forested acreage is left for conservation, it is possible to consider the carbon sequestration to be a credit to the Camp's carbon footprint. However, the AMC's carbon emissions analysis for its professional operations did not include credits for carbon sequestration on other AMC-owned properties. The main reason for this is that these studies are intended to set a baseline based on current activities. Since current activity includes leaving Cold River Camp's woodlots intact, that is part of the baseline, and, therefore, is not considered a credit.

It is worth noting, however, that were the Camp to decide to manage its forests differently, such a change could result in either a credit or a debit in terms of carbon emissions. For example, if more land were cleared, it is likely it would result in reduced carbon sequestration and, thus, would have to be counted as additional carbon emissions attributable to Camp operations. In contrast, if future research definitively showed that particular types or ages of forest absorb carbon more rapidly than the current forest at Camp, then conversion of some of the acreage at Camp to that other forest type might be considered as a reduction in the Camp's carbon footprint.

Because of the complexities and uncertainties of this kind of analysis, the carbon emissions impacts of the land owned by Cold River Camp was not included in any of the numerical calculations in this report.

e. Cold River Camp's Carbon Footprint

The breakdown for the Camp's carbon emissions is presented in the Appendix (Figures 3 & 6).

IV. Recommendations

a. Electricity Conservation

Lighting:

One of the most compelling results from the energy audit was the amount of energy consumed by traditional 60 watt incandescent bulbs. While the camp has made the effort to transition to compact fluorescent (CF) bulbs as incandescent bulbs expire, the net energy savings would be far greater with one punctuated switch. By comparison, newer compact fluorescent bulbs consume 15 watts; one-fourth the amount of an incandescent bulb.

Thanks to the energy audit, it is possible to calculate the immediate energy savings after completing the switch to all CF bulbs: roughly 15%, from 4400 kwh/month to 3725 kwh/month at peak consumption. CF bulbs use less power and have a longer rated life, but generally have a higher purchase price. CF bulbs contain mercury, which complicates the disposal process, but doesn't diminish the benefit of the energy savings.

Throughout the camp there are many lights that remain on throughout the night that might benefit from LED replacements. LED (Light Emitting Diode) lights cost significantly more than incandescent and CF bulbs, but last much longer while consuming as little as 3 watts. Significant energy savings could be realized by using LED bulbs in overnight fixtures that see the most use.

Alternative Energy:

Cold River Camp appears to have ripe opportunity to gain energy independence – at least in part – by professionally installing a net-metered solar array. Due to the seasonal operation of the Camp, the energy generated by the sun in the summer may be able to serve a good portion of normal camp operations, while the excess energy created in the other three seasons could be sold back to the "grid" for credits toward the Camp's energy bill (net-metering is supported in New Hampshire). A professional assessment of the potential solar resource would provide valuable details as to the feasibility of such a project. Consideration should be given to both roof-mounted and/or ground-mounted systems. Consideration should also include hot water heating systems, which are generally considered most cost-effective. Any such project should only be pursued based on professional analysis and design.

Other alternative energy might be available in the form of a run-of-the-river hydroelectric system, although the viability of this and other alternative energy sources, such as wind, are probably considerably less than solar.

b. Waste Reduction

Consumables:

The camp purchases a considerable amount of single use napkins and other paper products from Sysco that can be eliminated or transitioned to post-consumer recycled materials. Napkins for breakfast and dinner could be changed to cloth napkins, and plates used for the bi-weekly cookouts could be fully biodegradable (providing a benefit only if composting were implemented). These measures would reduce trash weight and eventually reduce the amount of money spent on paper products and trash disposal. In the event that consumable paper products remain, it would be best to ensure that only post-consumer recycled products are purchased.

Compost:

A simple barrel compost would be a great tool to reduce trash weight and ensure a steady supply of fertilizer. The majority of the organic waste is already sustainably managed by the "Chez Pig," but the additional material would be easily composted. As mentioned in the results section, one 24-hour period yields approximately 15 lbs of non-pig waste, totaling about 1,500 pounds per season. Any compost system would need to be designed to accommodate this volume.

Recycling:

Recycling at Camp is already quite accessible and frequently used. Occasionally it appears that people tend to throw out recyclables in the waste basket when there is no option of recycling in the cabins. Recycling baskets in the cabins would be a great measure to ensure 100% recycling at the Camp. An alternate or interim plan could be for guests to put out their recycling on the front step of their cabins for collection every few days by the crew.

By further reducing use of disposable products, increasing recycling, and introducing composting, it may be possible to significantly reduce the number of dumpster loads disposed of each year, which would reduce trash costs and carbon emissions.

Environmentally Sensitive Cleaning Supplies:

Other AMC facilities are already making the effort to use "green" cleaning supplies from companies like Hillyard, Shaklee, and Seventh Generation. Hillyard offers post consumer toilet paper, center pull towels, regular paper towels, and assorted cleaning chemicals. Seventh Generation offers eco dish soap and hand soap that can be purchased through Associated Buyers. Camp management is in touch with representatives of these product lines and have begun assessing the viability of switching to certain products in the near future.

c. Crew & Guest Involvement

Green Team Leader:

What may have already become apparent is the requisite amount of organization and motivation required by the Camp to ensure it is heading down a sustainable path. While it is primarily up to the individual to make environmentally conscious decisions, it's important to designate one of the crew members to ensure that the whole Camp is operating with the same goals of resource and environmental conservation in mind. Therefore, it may be worthwhile to provide incentive for a crew member – ideally someone who feels passionately about sustainability – to ensure that the Camp is operating efficiently. Providing weekly updates to the crew and guests is a great way for everyone to feel active and involved in the Camp's progress and hopefully internalize the benefits of living a sustainable lifestyle. This "Green Team Leader" would oversee the health of the compost, the recycling program, proper disposal of waste, product consumption, and be responsible for communications with guest and crew.

Guest Education:

The foremost goal of the Camp is to ensure that the guests are happy and involved in the Camp's offerings and programs. However, Camp guests also feel considerable ownership and are interested in the long-term viability and sustainability of the Camp. Therefore, the Camp's environmental efforts could be a part of the Camp's mission statement and communicated regularly to the guests. Feedback from the guests is an important tool to gauge the success of any actions taken toward increasing the sustainability of operations.

Trip Carpooling:

Travel to and from camp during the week accounts for a significant amount of the camp's carbon footprint. Camp hike leaders and managers should make an effort to ensure that carpooling plays an active role in guest travel; although, no one should be forced or guilted into something they don't want to do.

Carbon Offsets:

A great way to immediately reduce the camp's carbon footprint is to purchase carbon offsets from a certified offset company. One major source of the Camp's carbon emissions for which there is no significant viable solution in the near term, is travel to and from camp. Increasingly, businesses are providing the option of purchasing a carbon offset in addition to the goods or services they are providing. It wouldn't require much additional effort for the Camp to make an arrangement with a certified carbon offset company to provide guests the opportunity to purchase a carbon offset for their trip to and from camp. This could be an optional line item on the standard Camp invoice. However, it would be critical to research thoroughly the carbon offset business, ensure its program is verified by a reliable third-party watch-dog, and to annually review the arrangement and the integrity of the program.

d. New Hampshire Sustainable Lodging and Restaurant Program

Cold River Camp joined this program (NHSLRP – see http://www.nhslrp.org/) in the spring of 2008 and immediately achieved the second level of certification, "Environmental Partner." A good short-term goal for the Camp would be to reach the third and highest level, "Environmental Champion," which is attained by having an independent third-party evaluation of its operations to ensure compliance with NHSLRP standards. Many of the recommendations in this report will, of course, advance the Camp's standing in the NHSLRP.

Many other AMC facilities, such as the Highland Center, are already certified at the highest "Environmental Champion" level. Besides being "the right thing to do," the certification as a "green" operation is playing an increasing role in consumer choices, according to NHSLRP and others. While most Camp guests return for other reasons, many note on their evaluation forms and in conversations that environmental matters are important to them. Achieving higher levels of sustainability in its operations will only make the Camp a more desirable destination in the eyes of many current, long-time guests as well as new and potential guests.

V. Conclusion

Cold River Camp has an excellent opportunity to achieve a sustainable future in the coming years. The Camp faces the unique challenge of weighing the benefit of generations of traditions with encouraging the development of new eco-friendly alternatives. Fortunately, the most effective changes that have yet to be made would probably create minimal if any changes in the guest experience, if carefully integrated into current systems, much to the appreciation of seasoned guests. While Cold River Camp is an Appalachian Mountain Club facility, it became quite clear to me that the organization exudes a certain personality that is uniquely its own. With that in mind, it's important to achieve a balance of new ideas that closely align with the traditional mindset and functionality of the Camp.

In the end we all share the same atmosphere, rely on the same complex ecosystems, and equally share the burden as the only species capable of consciously modifying the earth's climate and environment. So, while change in the environment is natural, we need to curb the human activities that are threatening human societies and all things wild, both plants and animals. If development is to provide real benefits in a sustainable way without wreaking havoc on the environment, the communities that rely on the planet's natural assets will need to learn to tread softly on the earth.

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Appendix

Fig 1: Electricity Consumption by Building

Building	Wh/day	kWh/day	kWh/month
House Keeping	12	0.012	0.36
Convent	1286	1.286	38.58
Vatican City	1348	1.348	40.44
Mano	592	0.592	17.76
Ice House	1125	1.125	33.75
Kay's Cabin	629	0.63	18.9
Raynor's Roost	1260	1.26	37.8
Main Lodge	20440	20.4	613.2
Tower	720	0.7	21.6
Barracks	1960	1.96	58.8
Staff bath	1400	1.4	42
Women's Bath	2400	2.4	72
Men's Bath + Laundry	750	0.75	22.5
Water Pump	4720	4.72	141.6
Greeley Bath	1380	1.38	41.4
Rec Hall + Apt	8880.8	8.9	266.4
Library	900.4	0.9	27.01
Office Building	3185.3	3.2	95.6
Kitchen	93647.9	93.6	2809.4
Totals:	146636	146.6	4399

Fig. 2 : Electricity Consumption W/CF Bulbs

Building	Wh/day	kWh/day	kWh/month
House Keeping	3	0.003	0.09
Convent	866	0.866	25.98
Vatican City	1348	1.348	40.44
Mano	219	0.219	6.57
Ice House	990	0.99	29.7
Kay's Cabin	629	0.628	18.86
Raynor's Roost	315	0.315	9.45
Main Lodge	11620	11.62	348.6
Tower	180	0.18	5.4
Barracks	1338	1.338	40.14
Staff bath	545	0.545	16.35
Women's Bath	1095	1.095	32.85
Men's Bath + Laundry	435	0.435	13.05
Water Pump	4720	4.72	141.6
Greeley Bath	345	0.345	10.35
Rec Hall + Apt	8580	8.58	257.4
Library	602	0.602	18.05
Office Building	2690	2.69	80.7
Kitchen	87638	87.6	2629.1
Totals:	124158	124.1	3724.7

Fig 3: Carbon Dioxide Emissions by Source

		Units Consumed Per Year	Metric Tons of CO_2
Transportation (mi)	Air Travel	23778.5	7.82
	Car Travel	49736.33	17.68
	Delivery Truck	2016	3.38
	Van Travel	2690	1.59
	Trip Travel	9781.2	3.48
Inputs	Propane (gal)	1424.8	8.14
	Electricity (kwh)	17330	5.34
	Kerosene (gal)	5	0.05
	Wood (cords)	5	15.13
Outputs	Waste (lbs)	8778	7.24
Credits	Preservation Land Use	N/A	N/A

Emissions	69.87
Offsets	N/A
Total:	69.87

Fig 4: Electricity Consumption Pie Chart

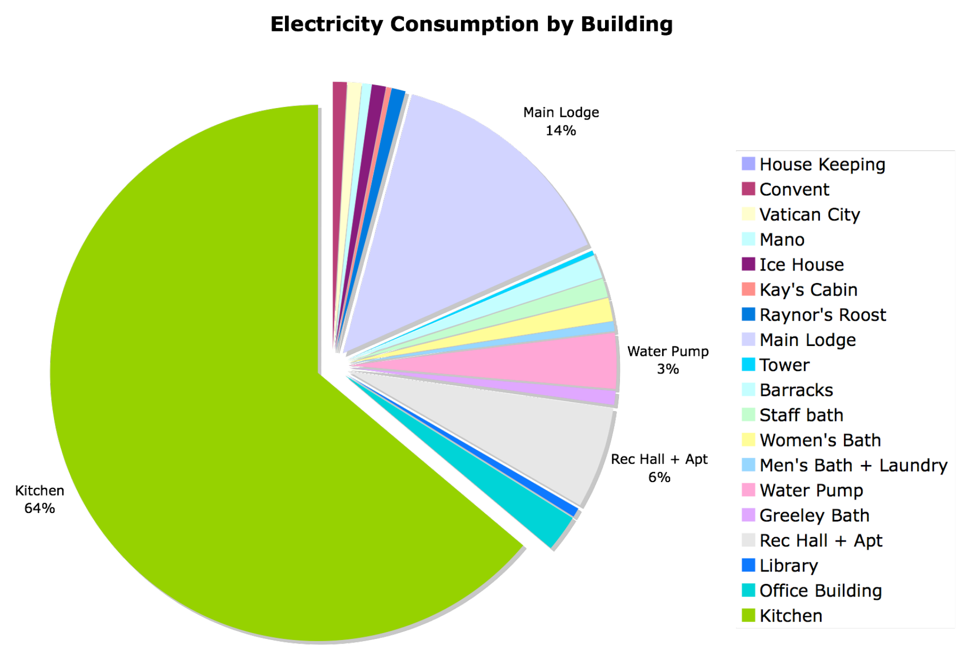

Fig 5: Electricity Consumption by Month 2/07 – 7/08

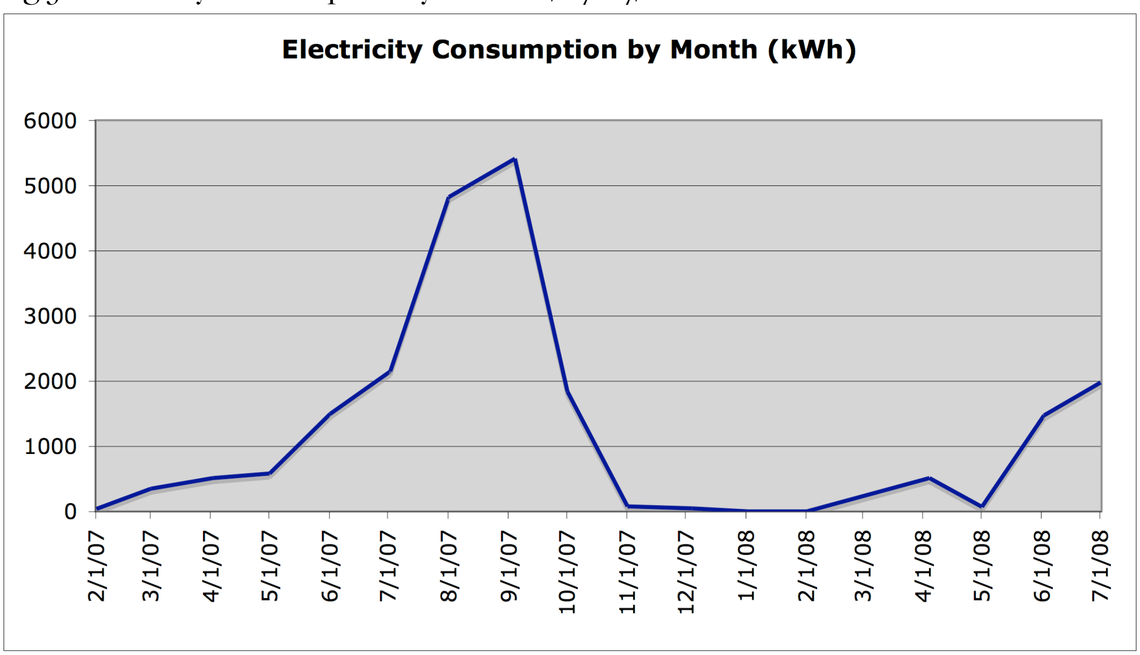

Fig 6: Carbon Pie Chart by Source (lbs.CO_2)

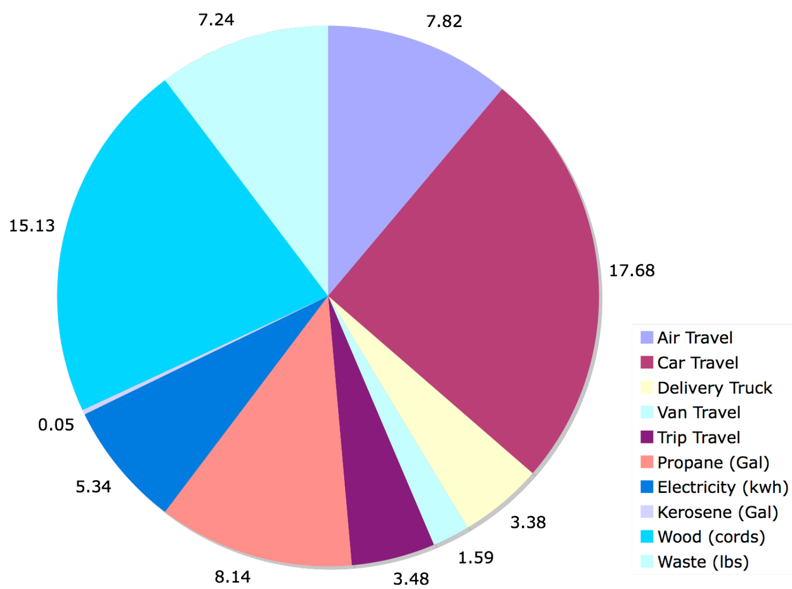

Fig 7: Energy Snapshot

Billing Account: [illegible]

Service Account: RATE G GENERAL SVC 1 PHS

Service Location: 0 MAIN RD
CHATHAM NH 03813

View Usage Data | View Usage Graph | Email Data To Me

Read Date (Click to View Bill)	Billed Demand (kWh)	Usage (kWh)	Number of Days	Usage Per Day	Charge	Read Type	Average Temp (°F)
07/01/2008	14.00	1980	29	68.28	$349.43	01	63.7
06/02/2008	13.10	1470	32	45.94	$268.40	00	50.6
05/01/2008	1.40	70	27	2.59	$21.01	00	43
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
02/01/2008	0.00	0	30	0.00	$10.08	77	18.2
01/02/2008	0.00	0	29	0.00	$10.08	77	19.4
12/04/2007	1.00	50	33	1.52	$17.58	00	28.5
11/01/2007	1.50	80	31	2.58	$22.11	00	49.6
10/01/2007	14.70	1840	27	68.15	$317.02	00	57.4
09/04/2007	16.10	5410	34	159.12	$687.24	00	62.6
08/01/2007	15.80	4820	30	160.67	$625.43	00	65.4
07/02/2007	14.00	2150	31	69.35	$341.76	00	60.5
06/01/2007	13.40	1500	31	48.39	$260.00	00	52.4
05/01/2007	2.60	580	29	20.00	$95.93	00	38.6
04/02/2007	3.40	510	32	15.94	$87.78	00	26.6
03/01/2007	1.80	350	28	12.50	$63.29	00	11.5
02/01/2007	1.00	40	30	1.33	$15.08	00	15.3

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