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# A Survey to Understand the Attitudes towards Biodiesel in Southwestern Idaho

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**Keywords.** Biodiesel, petroleum diesel, Idaho Department of Water Resources, survey

# A Survey to Understand the Attitudes towards Biodiesel in Southwestern Idaho

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**Abstract**
The ultimate goal of the Idaho B20 Biodiesel Program sponsored by the Idaho Department of Water Resources (IDWR) is to make B20 available to the public at large in Idaho, thus creating a demand for a biodiesel production facility in the region. Therefore, a survey is desired to be administered to public and private biodiesel and petroleum diesel purchasers to obtain an understanding of the attitudes towards biodiesel. The survey found that nearly half of all those surveyed had never heard of biodiesel, and many people, 56%, didn't know it was available in the area. High percentages showed agreement with statements that biodiesel can reduce dependence on foreign oil, that it is cleaner for the environment, and biodiesel is better since it uses renewable resources, 72%, 63%, and 91%, respectively. Although some respondents disagreed with the idea that it is worth paying extra for biodiesel, 26%, it was still found that most people, 53%, were willing to pay from one to ten cents per gallon extra. All of these findings from the survey confirm that a more aggressive advertising campaign must be started to promote the awareness of biodiesel and its availability before a demand for biodiesel will be present in southwestern Idaho.

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Biodiesel is an alternative fuel composed of petroleum diesel fuel and a biofuel made from agricultural products such as rapeseed, yellow mustard seed, soybeans, or from previously used products such as waste cooking oils and yellow grease. When speaking about biodiesel it is usually described as BXX, such as B20 or B100. The number refers to the percentage of biofuel in the total fuel, for example, B20 means 20 percent biofuel and 80 percent petroleum diesel. (IDWR, 1, 2003) It has been shown in some tests and according to the Environmental Protection Agency, that biodiesel burns cleaner than petroleum diesel by releasing lower percentages of carbon monoxide, hydrocarbons, and particulates. (IDWR, 2, 2003)

The Idaho Energy Division within the Idaho Department of Water Resources (IDWR) started a biodiesel program in April of 2002 in southern Idaho called the Idaho B20 Biodiesel Program. The B20 program involves some partners which are receiving a buy down as part of the transition to full payment biodiesel. The buy down is the compensation of price difference between a gallon of petroleum diesel fuel and a gallon of B20 biodiesel. That buy down has been anywhere from 7 cents per gallon to 19.2 cents per gallon with an average buy down of approximately 16.2 cents per gallon. The funding for the buy down mainly comes from the U.S. Department of Energy, but soon the program will also be receiving funding from the Community Planning Association of Southwest Idaho. These partners

receiving the buy down are: BFI Waste Services of Idaho, Sanitary Services Company (SSC) out of Meridian, the Meridian School District, Head Start Program, City of Nampa, Trans IV Buses (Twin Falls) the Caldwell based Idaho Transportation Department – Incident Response units, and soon, the Blain County School District. Recently, both SSC and the Meridian School District converted to their own full payment of biodiesel. Starting next year, BFI is planning to operate their entire fleet with B20 under their own full payment. There are also other companies, not involved in the buy down, but operate with B20 under full payment; Idaho Power and Federal Government GSA vehicles. (Larsen, 2003)

Currently there are three locations in Idaho where B20 is available to the public and B20 Program Partners: Boise, Shoshone, and Twin Falls. The biofuel used to make B20 at these stations is made from virgin soy bean oil and is purchased as B100 from World Energy Alternatives, a national distributor. Once the biofuel is in Idaho, it is blended with petroleum diesel fuel to B20 by United Oil of Nampa in the Treasure Valley, and by BriCo of Idaho in the Magic Valley. To date, approximately 160,000 gallons of B20 has been purchased in Idaho, public and private, equating approximately 32,000 gallons of B100 purchased for blending. (Larsen, 2003)

The ultimate goal of the Idaho B20 program, is to make B20 available to the public at large in Idaho, thus creating a demand for a biodiesel production facility in the region. Therefore, a survey is desired to be administered to public and private biodiesel and petroleum diesel purchases to obtain an understanding of the attitudes towards biodiesel.

**Methods**

A survey was developed to gain understanding on the outlook on biodiesel of those purchasing biodiesel and also of those purchasing petroleum diesel. The design of a survey can be a complex process, yet using the guidelines by the American Society of Association Executives, effective question development can be achieved. In a survey, one wants to measure attitudes, behavior, actions, and attributes. Some of the recommendations by the Society are: questions measuring only one dimension, easy to answer and interesting questions, closed-ended questions and in the demographic questions, using equal categories for responses. (ASAE, 2003) The survey which was developed with assistance from a marketing professor, Doug Haines, of the University of Idaho, is attached at the end of the paper.

There were two different fueling stations used in the experiment which were approximately one mile from one another, with the intent of obtaining approximately equal survey response from both fuel stations. Both stations used Kicks 66 fuel, but Click's 66, Fuel Station 1, sold only biodiesel, and KJ's Superstore, Fuel Station 2, sold only petroleum diesel. The survey took place during normal business hours, 8a.m. to 6p.m., over a two day period.

The survey was then administered at those fueling station to individuals fueling a vehicle with either biodiesel or petroleum diesel. Respondents willing to take the survey were offered a key ring in

appreciation for their time. Upon completion of the survey, every item was tallied and recorded in a spreadsheet to then make any correlation from the responses. Prior to administering the survey, the goal was to obtain 50 surveys from each station.

**Results and Discussion**

It was established after the first survey that some of the questions were too vague to be answered without any assistance. Some of the questions had been skipped, so from that point on, the surveys were administered orally so as to obtain all possible information.

Due to a low volume of diesel purchasers at Fuel Station 2, the surveying was stopped with intentions of using another station with higher diesel purchases for the diesel user surveys. Unfortunately, this never occurred and therefore the total number of surveys taken at Fuel Station 2 was seven. Fuel Station 1 also did not yield very high numbers of biodiesel fuel purchasers, but over the period of two days, 25 surveys were completed. Therefore, approximately 22% of those surveyed were petroleum diesel purchasers and 78% of those surveyed were biodiesel purchasers. Because of this drastic difference, it is assumed that the results are biased toward those opinions from Fuel Station 2. Because the sample size is very small, thus introducing bias, statistical analyses would not give relevant information, and for this reason, data are presented as percentages of the total responses.

Data from both fuel station locations were combined and are presented in Tables 1 through Table 4. Table 1 represents customers surveyed who had heard of biodiesel, where they had heard about it, and if they thought it was available in their area.

**Table 1. Initial Knowledge of Biodiesel**

| Have you ever heard of biodiesel? | | | | |
|---|---|---|---|---|
| | Yes | No | | |
| | 56.3% | 43.8% | | |
| Where did you learn of biodiesel? | | | | |
| | Media | Work | Fuel Station | Other |
| | 33.3% | 38.9% | 11.1% | 16.7% |
| Is it available in your area? | | | | |
| | Yes | No | Unsure | No Response |
| | 43.8% | 12.5% | 37.5% | 6.3% |

It can be seen that over 56% of those surveyed had heard of biodiesel, but there should have been at least 78% percent who had at least heard of it, because that is the percentage of biodiesel purchasers surveyed. There were petroleum diesel purchasers who had indeed heard of biodiesel, nearly half, but there were many from Fuel Station 2, the biodiesel station, which had not heard of biodiesel. Not all customers at Fuel Station 2 realized they were purchasing biodiesel, nor fueling their vehicle with biodiesel. One of the pumps was clearly marked 20% Biodiesel, however, the other pump had no such

label. The survey administrator did not realize this situation until day 2, thereby, it was too late to note information on the surveys of those who used to labeled pump and those who hadn't. Also on the price reader board advertising fuel prices, the sign stated "Diesel", rather than "Biodiesel". It is important to note that there was information readily available inside the convenience store regarding biodiesel for customers; a brochure by the IDWR B20 Program was provided at the cashier counter. Another interesting point to note in Table 1 is that nearly 40% of those who had heard of biodiesel had heard about it from work; 85% of those customers who heard about it at work were involved in the B20 program sponsored by IDWR.

The information from Table 2a presents the attitudes of the public on biodiesel. The data has been condensed to illustrate the responses to some degree of agreement, some degree of disagreement and neutral/unsure since raw data in the survey, the response choices were strongly agree, agree, neutral/unsure, disagree, and strongly disagree. For example, all responses of strongly agree and agree have been combined to one degree of agreement. It must be stated that everyone, even those who had not heard of biodiesel initially, responded to all of these attitude questions. It was necessary for the survey administrator to give a brief description of the concept of biodiesel to those who hadn't ever heard of it. Because of the impromptu educational effort by the administrator, there will likely be some degree of bias in these questions for those who hadn't heard of biodiesel previously. Table 2b provides a legend to the questions in Table 2a.

**Table 2a. Opinions about Biodiesel**

| | Agree | Neutral/Unsure | Disagree |
|---|---|---|---|
| **2.1** | 71.9% | 25.0% | 3.1% |
| **2.2** | 62.5% | 37.5% | 0.0% |
| **2.3** | 90.6% | 9.4% | 0.0% |
| **2.4** | 48.4% | 25.8% | 25.8% |
| **2.5** | 75.1% | 21.9% | 3.1% |
| **2.6** | 28.1% | 37.5% | 34.4% |
| **2.7** | 21.9% | 75.0% | 3.1% |
| **2.8** | 12.6% | 84.4% | 3.1% |
| **2.9** | 40.7% | 53.1% | 6.2% |
| **2.10** | 18.7% | 37.5% | 43.8% |
| **2.11** | 65.6% | 31.3% | 3.1% |

| Table 2b. Question Legend | |
|---|---|
| **2.1** | Biodiesel can significantly reduce our dependence on foreign oil. |
| **2.2** | By using biodiesel I am contributing to a cleaner environment. |
| **2.3** | It is better to use biodiesel because it is made from renewable resources |
| **2.4** | It is worth paying extra for biodiesel. |
| **2.5** | People would buy more biodiesel if it were adequately advertised. |
| **2.6** | I am willing to go out of my way to buy biodiesel. |
| **2.7** | Biodiesel is better for my engine than regular diesel. |
| **2.8** | My vehicle performs better with biodiesel. |
| **2.9** | Biodiesel is the fuel I prefer to use in my diesel vehicle(s). |
| **2.10** | It is easy to get biodiesel in this area. |
| **2.11** | I would buy biodiesel more if were more conveniently available to my home or work. |

Other information desired, was too find out the dollar value per gallon of biodiesel most people would be willing to pay. It is well known that biodiesel is more expensive than petroleum diesel. It is important to find out if the public and business sectors think it is worth paying extra, and if so, how much extra. Table 3 presents the data of how much more per gallon those surveyed would be willing to pay for biodiesel instead of petroleum diesel. The table also presents the distance in miles that customers traveled to fuel that vehicle. From the data on distance, the survey administrator hoped to find out if it was merely for convenience the customers were purchasing their fuel at that station, or if it appeared they were going out of their way to buy fuel at that specific station.

| Table 3. Cost and Distance | | | | | | |
|---|---|---|---|---|---|---|
| How much more are you willing to pay to use biodiesel instead of diesel? | | | | | | |
| | 0 ¢ | 1-5 ¢ | 6-10 ¢ | 11-25 ¢ | 26-50 ¢ | 50 ¢ + |
| | 30.0% | 33.3% | 20.0% | 6.7% | 3.3% | 6.7% |
| How many miles is this pump from the permanent location of this vehicle? | | | | | | |
| | <5 | 6-10 | 11-25 | 26-50 | 51-75 | Over 76 |
| | 46.9% | 37.5% | 6.3% | 6.3% | 0.0% | 3.1% |

The data show that for the most part, customers were willing to pay from slightly extra, 1-5 cents, to a great deal extra, up to 50 cents, per gallon just to use biodiesel. It is important to note however, that the value of 30% customers who are not willing to pay extra should not be ignored. As far as distance, it is very obvious that nearly all customers are purchasing fuel close to their home or work, or out of convenience. The 3.1% traveling over 76 miles should be ignored because the respondent was a traveler who had just stopped at Fuel Station 1 while passing through town, therefore, not necessarily from southwestern Idaho. Another interesting note, of those 12.6% who have appeared to drive out of their way to fuel their vehicle, 6.3% had driven that far to specifically to purchase biodiesel at the only biodiesel pump station of which they were aware.

The only other information which was used for the purpose of analysis was the number of vehicles which were personal, business/commercial and government. One of the aspects the survey administrator was interested in was the volume of personal vehicles using biodiesel in comparison to the number of vehicles involved in the B20 program. Also, there was an interest in other business vehicles which were using biodiesel without any sort of buy down. Table 4 presents the personal, business/commercial, and government vehicles involved in the survey. Of those business and government vehicles, which consisted of 62% of the total surveyed, it was interesting to note that over 50% of that 62% were those involved in the B20 project sponsored by IDWR.

| **Table 4. Vehicle Status** | | |
|---|---|---|
| Personal | Business | Government |
| 37.5% | 56.3% | 6.3% |

Although all of the data collected was found to be quite interesting alone, and it does give important information as to the attitudes towards biodiesel in the area, there is more information that can be inferred from these responses. The question asking whether the respondents agree or disagree with the idea that biodiesel is easy to get in the area shows that less than 20% agreed to some extent and nearly half disagreed. So the questions arise: Who thinks it's difficult to get biodiesel in southwestern Idaho? Who thinks it's easy to get biodiesel? Why is such a large percentage neutral/unsure? With the information in Tables 5a to 5c, answers to these questions can be attempted.

| **Table 5a. Implications of Biodiesel Availability** | | | |
|---|---|---|---|
| **It is easy to get biodiesel in this area.** | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 18.8% | 37.5% | 43.8% |
| **Respondents : Agree** | | | |
| Had they ever heard of biodiesel? | | | |
| | Yes | No | |
| | 100.0% | 0.0% | |
| Were they buying petroleum diesel or biodiesel? | | | |
| | Petroleum | Biodiesel | |
| | 0.0% | 100.0% | |
| How far are they traveling to get biodiesel? | | | |
| | < 5 miles | 6-10 miles | 11-25 miles |
| | 100.0% | 0.0% | 0.0% |
| What are those vehicles used for? | | | |
| | Personal | Business | Government |
| | | 83.3% | 16.7% |
| How many vehicles part of the IDWR B20 project? | | | |
| | 100.0% | | |

| Table 5b. Implications of Biodiesel Availability | | | |
|---|---|---|---|
| **It is easy to get biodiesel in this area.** | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 18.8% | 37.5% | 43.8% |
| **Respondents : Neutral/Unsure** | | | |
| Had they ever heard of biodiesel? | | | |
| | Yes | No | |
| | 8.3% | 91.7% | |
| Were they buying petroleum diesel or biodiesel? | | | |
| | Petroleum | Biodiesel | |
| | 25.0% | 75.0% | |
| How far are they traveling to get biodiesel? | | | |
| | < 5 miles | 6-10 miles | 11-25 miles |
| | 100.0% | | |
| What are those vehicles used for? | | | |
| | Personal | Business | Government |
| | 33.3% | 66.7% | |
| How many vehicles part of the IDWR B20 project? | | | |
| | 11.1% | | |

| Table 5c. Implications of Biodiesel Availability | | | |
|---|---|---|---|
| **It is easy to get biodiesel in this area.** | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 18.8% | 37.5% | 43.8% |
| **Respondents : Disagree** | | | |
| Had they ever heard of biodiesel? | | | |
| | Yes | No | |
| | 78.6% | 21.4% | |
| Were they buying petroleum diesel or biodiesel? | | | |
| | Petroleum | Biodiesel | |
| | 28.6% | 71.4% | |
| How far are they traveling to get biodiesel? | | | |
| | < 5 miles | 6-10 miles | 11-50 miles |
| | 25.0% | 50.0% | 25.0% |
| What are those vehicles used for? | | | |
| | Personal | Business | Government |
| | 50.0% | 40.0% | 10.0% |
| How many vehicles part of the IDWR B20 project? | | | |
| | 20.0% | | |

The inferences that can be made from this information are simple. Those that believe it is easy to get biodiesel in the area were purchasing biodiesel and had to drive less than five miles to the fuel station

which sold biodiesel. Also, none of these respondents were fueling personal vehicles, and all of those vehicles being fueled were part of the IDWR B20 program.

For those respondents who were neutral or unsure as to whether biodiesel was easy to get in the area, over 90% of them had never heard of biodiesel, and, most of these respondents were unaware that they were purchasing biodiesel. The conclusion that respondents were unaware they were purchasing biodiesel came from the idea that if they were at Fuel Station 2, fueling with biodiesel, but claimed to had never heard of biodiesel, it was considered that they were unaware that they were fueling their vehicle with biodiesel.

For those respondents who disagreed that it is easy to get biodiesel in the area, a large majority, nearly 80%, had heard of biodiesel and many of them were purchasing biodiesel. Most of these respondents appear to be making a special trip to purchase biodiesel since 75% percent of those were traveling anywhere between 6 and 50 miles. Some of these respondents, 50%, were also fueling personal vehicles, and only 20% of those vehicles being fueled with biodiesel were part of the IDWR B20 project.

Another implication that can be made regarding the data collected is who agrees or disagrees it is worth paying extra for biodiesel. Inferences can be made as to possible reasons why these respondents would be willing to pay extra, or why they are not willing to pay extra. Tables 6a to 6c give the data to be able to draw these inferences.

| **Table 6a. Implications of Biodiesel Costs** | | | |
|---|---|---|---|
| **It is worth paying extra for biodiesel.** | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 51.6% | 25.8% | 22.6% |
| **Respondents : Agree** | | | |
| Had they ever heard of biodiesel? | | | |
| | Yes | No | |
| | 50.0% | 50.0% | |
| How much more per gallon are you willing to pay for biodiesel? | | | |
| | 0 ¢ | 1-5 ¢ | > 6 ¢ |
| | 0.0% | 53.8% | 46.2% |
| Biodiesel can reduce our dependence on foreign oil. | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 86.7% | 13.3% | 0.0% |
| By using biodiesel, I am contributing to a cleaner environment | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 80.0% | 20.0% | 0.0% |
| It is better to use biodiesel, because it is made from renewable resources. | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 100.0% | 0.0% | 0.0% |

| Table 6b. Implications of Biodiesel Costs | | | |
|---|---|---|---|
| **It is worth paying extra for biodiesel.** | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 51.6% | 25.8% | 22.6% |
| **Respondents : Neutral/Unsure** | | | |
| Had they ever heard of biodiesel? | | | |
| | Yes | No | |
| | 28.6% | 71.4% | |
| How much more per gallon are you willing to pay for biodiesel? | | | |
| | 0 ¢ | 1-5 ¢ | > 6 ¢ |
| | 28.6% | 28.6% | 42.9% |
| Biodiesel can reduce our dependence on foreign oil. | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 85.7% | 14.3% | 0.0% |
| By using biodiesel, I am contributing to a cleaner environment | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 71.4% | 28.6% | 0.0% |
| It is better to use biodiesel, because it is made from renewable resources. | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 85.7% | 14.3% | 0.0% |

| Table 6c. Implications of Biodiesel Costs | | | |
|---|---|---|---|
| **It is worth paying extra for biodiesel.** | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 51.6% | 25.8% | 22.6% |
| **Respondents : Disagree** | | | |
| Had they ever heard of biodiesel? | | | |
| | Yes | No | |
| | 87.5% | 12.5% | |
| How much more per gallon are you willing to pay for biodiesel? | | | |
| | 0 ¢ | 1-5 ¢ | > 6 ¢ |
| | 62.5% | 25.0% | 12.5% |
| Biodiesel can reduce our dependence on foreign oil. | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 50.0% | 37.5% | 12.5% |
| By using biodiesel, I am contributing to a cleaner environment | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 37.5% | 25.0% | 0.0% |
| It is better to use biodiesel, because it is made from renewable resources. | | | |
| | Agree | Neutral/Unsure | Disagree |
| | 75.0% | 25.0% | |

From Table 6a, it is seen for those who agreed it is worth paying extra for biodiesel, there was an even split between those who had heard of biodiesel prior to the survey and those who hadn't. It is

important to remember then, that the half who had not heard of biodiesel were given a brief description by the survey administrator prior to responding to those attitude statements. One can see that a high percentage, 46%, of those respondents would be willing to pay over 6 cents per gallon for biodiesel. Since there are such high percentages agreeing with the statements that biodiesel can reduce dependence on foreign oil, that it is cleaner for the environment, and that biodiesel is better since it uses renewable resources, 87%, 80%, and 100% respectively, shows that these are probably the reasons as to why they are willing to pay more per gallon.

A large percentage, 71%, who remained neutral or unsure of the statement that it is worth paying extra for biodiesel, had never heard of biodiesel prior to the survey. It makes sense then, as seen in Table 6b, that large percentages of these respondents also agreed with the statements of biodiesel reducing dependence on foreign oil, contributing to a cleaner environment, and better since it uses renewable resources, 76%, 81%, 76% respectively, since they were informed about biodiesel by the survey administrator prior to answering the attitude questions.

For those respondents who disagree with the idea that it is worth paying extra for biodiesel, most of them, 88%, had heard of biodiesel. Although most of them didn't think it was worth paying extra, there still was 25% who thought they would be willing to pay slightly extra per gallon, 1 to 5 cents. The respondents who disagreed that it is worth paying extra for biodiesel, showed significantly smaller percentages in agreement with the idea that biodiesel is cleaner for the environment, and reduction in foreign oil dependence, and better since it is made from renewable resources than those respondents who were in agreement or were neutral or unsure of paying extra for biodiesel, 37.5% to 80% and 71%, and 50% to 87% and 85%, respectively. This is perhaps an indication that some of those who have heard of biodiesel may misinformed in some respects.

**Conclusions**

To determine the attitudes towards biodiesel in southwestern Idaho, a survey which measured the attitudes was developed and administered at fuel stations in Boise, Idaho. From the survey, it was discovered that even after having the biodiesel available for over one year, nearly half had never even heard of biodiesel, and many people, 56%, didn't know it was available in the area. The survey found the attitudes that people have towards biodiesel differ. Those who hadn't heard of biodiesel prior to the survey were given a brief synopsis of what biodiesel is, and where it comes from. With that, most people think that biodiesel can reduce the dependence on foreign oil, that it is a cleaner fuel for the environment, and that it is a better fuel since it is made from renewable resources, 72%, 63%, and 91%, respectively. Many people, 75%, also stated that they would buy more biodiesel if it were more adequately advertised. The responses from the survey also showed that more people, 66%, would buy biodiesel if it were more conveniently available to their home or work. It appears from the results in the survey that the fueling

station to be conveniently located would need to be approximately five miles from the home of work for people.

A small group of people, 26%, do not believe it is worth paying extra for biodiesel, and many people, 44%, don't think it's easy to purchase biodiesel in the area. The survey data indicates that people who are willing to pay extra for biodiesel are typically only willing to pay from one to ten cents per gallon extra.

It was also shown, through the IDWR B20 program, that biodiesel awareness has been effective to those employees involved, but that this project has not helped in the awareness to the remainder of the public. All of these findings from the survey confirm that a more aggressive advertising campaign must be started to promote the awareness of biodiesel and its availability before a demand for biodiesel will be present in southwestern Idaho.

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This research was supported, in part by, the Energy Division of the Idaho Department of Water Resources (IDWR). John Crockett of IDWR assisted in the administration of the survey at the fuel stations, Kelly Feil of Click's 66 granted permission to administer the survey at his fuel station, Doug Haines of the University of Idaho assisted in the development of the survey and, Charles Peterson of the University of Idaho assisted in all aspects of the project.

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