What are the attitudes of Off-Highway Vehicle users towards their environmental impacts?

by

Gareth Villanueva

A Thesis Submitted to the Faculty of Social and Applied Sciences in Partial Fulfillment of the Requirements for the Degree of

Master of Arts in Environment and Management

Royal Roads University
Victoria, British Columbia, Canada

Supervisor: Dr. Leslie King
March 2019

© Gareth Villanueva, 2019
Committee Approval

The members of Gareth Villanueva’s Thesis Committee certify that they have read the thesis titled *What are the attitudes of Off-Highway Vehicle users towards their environmental impacts?* and recommend that it be accepted as fulfilling the thesis requirements for the Degree of Master of Arts in Environment and Management:

Dr. Leslie King [signature on file]

Dr. Chris Ling [signature on file]

Final approval and acceptance of this thesis is contingent upon submission of the final copy of the thesis to Royal Roads University. The thesis supervisor confirms to have read this thesis and recommends that it be accepted as fulfilling the thesis requirements:

Dr. Leslie King [signature on file]
Creative Commons Statement

This work is licensed under the Creative Commons Attribution-NonCommercial-ShareAlike 2.5 Canada License. To view a copy of this license, visit http://creativecommons.org/licenses/by-nc-sa/2.5/ca/.

Some material in this work is not being made available under the terms of this licence:

- Third-Party material that is being used under fair dealing or with permission.
- Any photographs where individuals are easily identifiable.
ATTITUDES OF OHV USERS

Contents

Committee Approval ....................................................................................................................... 2
Creative Commons Statement ......................................................................................................... 3
Contents .......................................................................................................................................... 4
Abstract ........................................................................................................................................... 6
Introduction ..................................................................................................................................... 7
Research Objectives ........................................................................................................................ 7
Literature Review ............................................................................................................................ 8
   Information Gathering ................................................................................................................. 8
   Values of OHV Users ................................................................................................................ 10
   Government Regulations ......................................................................................................... 12
   Impacts of OHV Use ................................................................................................................. 13
   The New Ecological Paradigm Scale ....................................................................................... 14
   New Ecological Paradigm Scale Alternatives ........................................................................... 16
Research Methodology ................................................................................................................. 18
   Methodological Approach and its Justification ....................................................................... 18
   Context of the Study Sites ........................................................................................................ 21
   Data Collection .......................................................................................................................... 24
   Project Participants .................................................................................................................... 26
   Data Analysis ............................................................................................................................. 27
Abstract

This study was designed to illuminate how Off-Highway Vehicle (OHV) users view their impact on, and relationship with, the environment. The target group for this study were individuals who rode any vehicle classified as an OHV including dirt bikes, All-Terrain Vehicles, and other similar vehicles. To discover what these attitudes were, in-person surveys and semi structured interviews were conducted using questions derived from the New Ecological Paradigm and weighted on a Likert scale to determine the strength of values. These in-person surveys were conducted at 2 separate locations in Alberta’s Eastern Slopes. Discovering the values OHV users hold in relation to their environmental impacts could allow the Alberta government to adapt their land-use policies in a way which satisfies their constituents while still protecting the environment. The compiled survey results will also inform future public education campaigns aimed at reducing damage caused by OHVs. It was found that members of OHV clubs were less likely to have pro-environmental worldviews than non-members.

*Keywords:* OHV, Off Highway Vehicle, environment
Introduction

Off-Highway Vehicle use in Alberta has grown significantly over the last few decades (“Data shows Alberta”, 2015). In fact, the number of registered OHVs in Alberta has nearly doubled, with “OHV registrations in Alberta [increasing] from 80 614 to 149 804 from 2004 to 2016” (Alberta Transportation, 2017). This is likely an underestimation of the number of OHVs in Alberta, since many Off-Highway Vehicle related offences stem from a failure to license an OHV. An off-highway vehicle is any vehicle “built for cross-country travel on land, water, snow, ice or marsh or swamp land or on other natural terrain” including dirt bikes, quads/all-terrain vehicles, side-by-sides, and many other vehicles (Government of Alberta, 2017). Alberta’s Eastern Slopes area, in the southwest part of the province, has proven to be an extremely popular area for OHV-based recreation. With the newly-created Castle Wildland Provincial Park and Castle Provincial Park, and the potential for the exclusion of the majority of OHV use in this area and others, political pressure has been growing for new solutions to balance OHV use on public land with environmental protection (“Alberta to expand”, 2017).

An important step in finding these solutions is developing an understanding of the attitudes, wants and needs of OHV users. OHV users are a unique and identifiable user group with their own ideas of how they would like to see public land managed. These desires have to be balanced with the desires of other user groups and the Alberta government’s commitment to protect the environment.

Research Objectives

What are the attitudes of Off-Highway Vehicle users towards their environmental impact? In particular, how do OHV users relate to their own personal impact on the environment? I predicted that OHV users would have a neutral view of their impact on the
environment and would be more likely to score low values on the New Ecological Paradigm (NEP) questionnaire, a questionnaire that measures the level of environmental concern and environmental worldview (Anderson, 2012, p.260).

The results of the NEP questionnaire would give me a better understanding of the attitudes of OHV users. In particular, it would let myself and other researchers understand how OHV users relate to the world around them. This enhanced understanding of the worldviews of OHV users can help the government and other land use planners more effectively deal with the challenge of how to include off-highway vehicle activity in certain areas. This research may also encourage the pursuit of more collaborative solutions since dialogue can lead to improved understanding of opposing viewpoints, and “learning across cultural boundaries cannot be created or sustained without initial and periodic dialogue” (Schein, 1993, para. 62).

**Literature Review**

**Information Gathering**

On the topic of off-highway vehicle use and the environment, much of the literature tends to employ the same approach. The most popular forms of information gathering appear to be mail questionnaires followed by on-site surveys, followed by web-based surveys. On-site surveys tended to be held in spring due to favourable weather conditions for off-highway vehicle riding (Kil, Holland, & Stein, 2012, p. 369). On-site surveys were held on different days of the week in order to get feedback from a variety of users (Albritton, Stein, & Thapa, 2009, p.60). Mail surveys were often sent out with postage-paid envelopes in order to encourage responses (Schuett & Ostergren, 2003, p.31). Follow-up postcards were sent one month after the initial surveys in order to encourage the remaining respondents to answer their surveys (Schuett & Ostergren, 2003, p.31). Response rates varied from 41% (Schuett & Ostergren, 2003, p.32) to
47% (Kil, Holland, & Stein, 2012, p. 369). From other surveys on similar topics, the response rates to mail questionnaires generally tended to be between 40-50% for OHV users.

Surveys have been used as a tool in numerous studies regarding OHV use and environmental issues. In particular, Albritton et al (2009) used a combination of on-site interviews and mail questionnaires to gather information regarding the differences between different types of OHV users and the conflicts between OHV user groups (p.60). Schuett and Ostergren (2003) used a mail-out survey with information culled from the lists of two groups of outdoor enthusiasts; these were the International Mountain Bicycling Association (IMBA) and the National Off Highway Vehicle Conservation Council (NOHVCC) (p. 31). Schuett and Ostergren also mailed out follow-up surveys one month later to encourage greater response rates. Kil et al. (2012) used an "on-site survey as the initial contact and a mail survey as a follow-up" (p. 369). Kil et al. focused on the differences between OHV users and non-OHV users in regards to what outcomes are most important to their recreation. The study was done with the help of a tool known as the Recreation Experience Preference scale. Haddock and Quinn (2015) used an online survey which was informed by feedback from three focus groups comprised of recreationists from the study area (p. 390). Haddock and Quinn's area of focus was recreation access management in southwestern Alberta, which is the area where I conducted my surveys.

A comprehensive study of OHV use in the United States was conducted by the United States Department of Agriculture Forest Service, the University of Georgia, and the University of Tennessee (Cordell, Betz, Green, & Stephens, 2008). This study provided a detailed breakdown of the demographics of OHV users in the United States, and compared these numbers to the demographics of the United States as a whole. This survey is referred to as the National Survey on Recreation and the Environment, or NSRE. The OHV user group tended to be
younger than the average age of all survey participants, with the mean age of OHV users being 34.9 years while the mean age of Americans as a whole was 43.4 years (Cordell et al, 2008, p.40). The OHV user group also had a higher proportion of males to females, with 60.2% of OHV users identifying as male and 29.8% identifying as female, compare to 47.5% of the general population identifying as male and 52.5% identifying as female (Cordell et al, 2008, p.40). The average age of Albertans was 37.8 years, according to a 2016 census (Statistics Canada, 2016, Census Profile). The average total income for Albertans was $62 778 (Statistics Canada, 2016, Census Profile). 50.1% of Alberta’s population identified as male (Statistics Canada, 2016, Age and Average Age and Sex).

Values of OHV Users

Researchers exploring similar topics on OHV use have generally approached their research from a sociological perspective with many of the studies seeking more intangible data such as attitudes, values, or perceived conflicts, such as when Albritton, Stein, & Thapa (2009) examined the difference between perceived conflict levels for All-Terrain Vehicle, Off-Highway Motorcycle, and Four-Wheel Drive Vehicle users. These attitudes and values included the way users feel about the environment and how they feel about other user groups. In order to gather this data, researchers generally employed questionnaires with statements where you could express your agreement or disagreement on a spectrum (Haddock & Quinn, 2015, p.391). The term 'goal interference' was referenced by Albritton, Stein, & Thapa (2009) and essentially means interfering with another's ability to do what they set out to do. For people who went outdoors for appreciative activities (hiking, camping, etc.), the presence of OHV tracks, litter, or excessive noise negatively impacted their ability to enjoy their time outdoors, which is an example of goal interference (Albritton, Stein, & Thapa, 2009, p.57).
Many OHV users whom I interviewed described themselves as a marginalized group, citing things such as a lack of meaningful consultation. While I could not find any literature detailing the unwillingness of marginalized groups to participate in research, there was research detailing efforts to increase the participation of marginalized groups in society, including a study which focused on the value of dialogue in addressing the challenges of working with stakeholders in unequal relationships (Baur, Abma, & Widdershoven, 2009). Since the Albertan OHV users that I interviewed view themselves as a marginalized group in an unequal relationship with the government, the aforementioned study could provide tools for a mediator to bring the provincial government and OHV users to the table to come up with an equitable solution which balances the rights of OHV users with the responsibilities of the provincial government.

Even though there is a great deal of research detailing the attitudes of OHV users as a group, the importance of capturing the attitudes of OHV users during the period of my study cannot be understated. My field surveys occurred in the summer of 2018, shortly after the Alberta government banned all OHV use in the Castle Management Area and the Porcupine Hills, both in southwestern Alberta. These surveys provide a valuable snapshot of the attitudes of an identifiable group during an important moment in their group’s history. In light of the fact that these OHV users self-identified as a marginalized group, the land closures for OHV use may even be viewed as an attack on their group identity.

One study compared OHV riders in Utah, OHV riders in the Crowsnest Pass area, and the general Albertan population. It found that the NEP responses of Crowsnest Pass OHV riders more closely mirrored the responses of Utah OHV riders than it did those of the Albertan population (Prescott, 2017, p.59). The study found that Crowsnest Pass OHV riders were less
supportive of the New Ecological Paradigm worldview than the average Albertan. The standard deviations were also higher for the Crowsnest Pass OHV riders, showing that they were not a homogenous group since there was such a strong variance of opinions within the group.

Smith, Burr, & Reiter (2010), in their study of OHV users and their environmental worldviews, found that OHV users are a “heterogeneous group of recreationists that vary in their behaviour, skills, and commitment to the activity” and “recreation planners should be cognizant of these differences and provide OHV trails and areas that facilitate both skill development and the opportunity for riders to teach and meet with others” (p.70). Another management implication was the need to increase environmental awareness and sensitivity to ecological impacts. The Bureau of Land Management noted that a key action item is to “maintain a public outreach campaign promoting a new OHV user ethic to respect public land resources” (Smith, Burr, & Reiter, 2010, p.70). It was also found that “[OHV] riders’ general beliefs about the environment do not tend to differ relative to an individual’s level of engagement in the activity”; therefore, “environmental education efforts might not need to be targeted to any one specific type of OHV rider” (Smith, Burr, & Reiter, 2010, p.70).

**Government Regulations**

Off-Highway Vehicles in Alberta are heavily regulated. The Off-Highway Vehicle Regulation, a regulation under the Traffic Safety Act (2000), regulates all aspects of OHV use in Alberta, from what documents the user must carry, to what equipment must be present on the OHV in order to be legally driven on public land. To give a more specific example, all OHVs in Alberta which are being driven on public land need to have valid registration, valid insurance, a properly displayed licence plate (i.e. not carried in the user’s backpack), a spark arrestor (a device which prevents sparks from leaving the muffler), a functional white front headlamp, and a
functional red rear tail lamp (Government of Alberta, 2017). In 2017, it became mandatory for all riders to wear helmets when riding OHVs. Lack of compliance with these rules can lead to fines ranging from $78 up to $310. These restrictions do not apply to private land.

Alberta’s regulatory framework and OHV regulations differ slightly from other Canadian jurisdictions. For example, in Alberta, all OHVs fall under the Off-Highway Vehicle Regulations whereas in Saskatchewan, there is the All Terrain Vehicle Act and the Snowmobile Act, two separate pieces of legislation with different rules. Under Saskatchewan’s All Terrain Vehicle Act, “No person shall operate an all terrain vehicle unless he holds a subsisting driver’s licence” (The All Terrain Vehicles Act, 1988, p.5). No such requirement is necessary for the operation of all terrain vehicles in Alberta. OHVs in British Columbia are subject to the Off Road Vehicle Act. One notable difference between OHV regulations in British Columbia and Alberta is the fact that British Columbia allows the use of government-approved stickers instead of licence plates on OHVs. Aside from a few key differences, OHV regulations across Canada are comparable. All require some form of proof of ownership for the OHV operator, and most jurisdictions have made helmets mandatory except for certain religious exemptions.

**Impacts of OHV Use**

Even though industrial activities like logging and mining have left their own marks on the landscape, OHV use has a unique range of impacts on the environment. For example, in the Castle region of southwestern Alberta, a government study found more than 1700 kilometers of OHV trails, which far outstripped logging or energy roads (Farr et al, 2018, p.25). The same government study also found more than 1600 stream crossings, sometimes up to 10 crossings per kilometer. These stream crossings lead to increased sediment in the water which harms trout spawning. The study also notes that the trail density in the parks exceeds the level which leads to
grizzly bear population decline. Another study regarding OHV use in the wetlands of Alaska showed that OHV use resulted in “increased drainage density and...altered downstream flow regimes, water quality, and aquatic habitat” (Arp & Simmons, 2012, p.751).


There is also the matter of recreational conflict among different user groups in parks and other public places. Indirect contact between user groups may lead to goal interference. When a user group perceives another group as “undesirable or a threat to one’s recreation goals, conflict results when members of the two groups confront each other” (Jacob & Schreyer, 1980, p.377). Off-highway vehicle use is sometimes seen as at-odds with other recreational pursuits, since it has a greater impact that foot traffic. There is even significant conflict within the Off-highway vehicle community, with four-wheel-drive vehicle operators experiencing significant goal interference as a result of the presence of dirt bike riders and all-terrain vehicle riders (Albritton, Stein, & Thapa, 2009, p.63).

The New Ecological Paradigm Scale

The New Ecological Paradigm scale originally began as the New Environmental Paradigm scale, created by Riley Dunlap and Kent Van Liere in 1978 (Dunlap and Van Liere, 1978). This original scale differentiated between two opposing worldviews: the anthropocentric
Dominant Social Paradigm, and the ecocentric New Environmental Paradigm. The original scale consisted of 12 items, or questions. This original scale “drew upon the interconnected aspects ‘limits to growth’, ‘balance of nature’, and ‘anti-anthropocentrism’ (Grendstad, 1999, 194). As the environmental and ecological fields changed over the years, a change was also necessary for the New Environmental Paradigm scale to maintain its validity. Several changes were made to the original NEP scale, and the number of questions was increased from 12 to 15. Five subdimensions were identified: the reality of limits to growth, anti-anthropocentrism, the fragility of nature’s balance, rejection of exemptionalism, and the possibility of an eco-crisis or ecological catastrophe (Grendstad, 1999, 195). This new scale was referred to as the New Ecological Paradigm, or NEP-R. Grendstad argued that the new NEP scale measured more than just the relationship between humans and nature, and that “correlates of environmental concern were found to be either nonexistent, statistically insignificant, or empirically quite weak” (Grendstad, 1999, 202).

Amburgey and Thoman (2012) compared three model structures of the New Ecological Paradigm scale:

(1) single-factor model: which assumes the NEP scale has a unidimensional structure, where all 15 items are scored in the same direction; (2) five uncorrelated factors model: which assumes the NEP scale consists of five distinct facets that uniquely predict environmental concern; and (3) second-order factor model: in which Dunlap’s five hypothesized dimensions are presented as lower order factors that load onto a higher order factor labeled Environmental Concern. Among the three models assessed, the second-order model provided the best fit for the data.
Amburgey and Thoman (2012) found that the best model to explain the New Ecological Paradigm scale was one that treated the NEP as a set of five correlated subscales instead of a single score reflecting environmental concern (p.235).

Xue et al. (2018) found that “Chinese NEP-R predicted respondents’ global warming risk perceptions; respondents who scored higher on ecocentrism and/or lower on anthropocentrism perceived greater risks, and, overall, those who perceived more risks reported engaging in more global warming mitigation behavior” (p.333). Xue et al. (2018) also found that “ecocentrism and anthropocentrism were significantly correlated for highly educated respondents (p.334). In other words, highly educated respondents were able to hold both ecocentric and anthropocentric worldviews at the same time. A study in Greece found that there is also a statistically significant correlation between an individual’s NEP score and their willingness to pay for renewable energy expansion (Ntanos, Kyriakopoulos, Skordoulis, Chalikias, & Arabatzis, 2019). A similar discovery was made by Ndebele and Marsh (2014) of the University of Waikato in New Zealand, who found that “a typical respondent with a high NEP Scale score is willing to pay on average $12.80 more per month on their power bill to secure a 10% increase in electricity generated from renewable energy sources compared to respondents with low NEP scores” (p.1).

**New Ecological Paradigm Scale Alternatives**

The New Ecological Paradigm scale is not without its competitors. The awareness of consequences scale (AC), the connectedness to nature scale, the inclusion of nature in the self scale (INS), the implicit associations test (IAT), and the environmental concern scale have all been suggested as alternatives in the past.
Awareness of consequences (AC) is exactly what it sounds like. “In the expanded model, norms about behavior to protect the environment are linked to awareness of consequences of ongoing or anticipated environmental conditions for self, for others, and for the biosphere” (Stern, Dietz, & Guagnano, 1995, p.728). To paraphrase, people who act in a way which protects the environment are more aware of the consequences of environmental degradation. Both the NEP and the AC “measure beliefs about human-environment relations” (Stern, Dietz, & Guagnano, 1995, p.739). It is possible that the two measures are measuring similar, yet different, topics within the realm of human-environment relations. “Several of the NEP items concerns beliefs about the laws governing human-environment interactions…[whereas] AC items…call for beliefs about future consequences of human interactions with the environment” (Stern, Dietz, & Guagnano, 1995, p.739).

The connectedness to nature (CNS) scale was “designed to tap an individual’s affective, experiential connection to nature” (Mayer & Frantz, 2004, p.504). It has also been shown to predict lifestyle patterns, ecological behaviour, and curriculum decisions among students (Mayer & Frantz, 2004, p. 505).

The inclusion of nature in the self (INS) scale discusses the “extent to which an individual includes nature within his/her cognitive representation of self (Schultz, 2002, p.67). A major drawback of this scale was that it required “the scale participants to have-or form-an abstract representation of their relationship with nature. People may not be able to accurately report their connection to nature at this abstract level” (Mayer & Frantz, 2004, p.504).

The implicit associations test (IAT) utilized computers, asking participants to categorize two different types of words using two keys on a computer. The speed with which participants categorize the words shows researchers how implicitly associated certain words are in peoples’
“However, researchers typically find startlingly low correlations between IAT scores and measures of relevant behaviours” (Schultz et al, 2004). Since this test needs a computer setup, it is also harder to administer than pen and paper surveys.

The Environmental Concern scale is a 16-item Likert scale assessing respondents’ concerns about conservation and pollution issues. This test was internally consistent. It is “a research tool capable of examining the correlates and determinants of attitudinal concern about environmental quality, longitudinal change in public attitudes, and the attitudinal impact of environmentally oriented policies, legislation, and educational efforts” (Weigel & Weigel, 1978, p.12).

The New Ecological Paradigm scale is an appropriate tool to use in the context of this study due to its long history of use as well as its ability to reliably predict certain behaviours such as global warming mitigation behaviour (Xue et al, 2018, p.333). The implicit associations test would have been too costly to carry out, while the connectedness to nature scale and the inclusion of self in nature scale would have measured things that I was not interested in.

**Research Methodology**

**Methodological Approach and its Justification**

For my thesis on the topic of the attitudes of OHV users towards their environmental impacts, I used a mixed methods approach, since it was descriptive research being used to describe and measure phenomena (in this case, attitudes) at a point in time (O’Leary, 2014, p.348). The phenomena in question are the attitudes of an identifiable group. A mixed methods approach has many strengths, such as data being more comprehensive, the strengths of one method overcoming the weaknesses of another method, the addition of insights and understanding that may have otherwise been missed, and increased generalizability of results.
A mixed method approach also adds value by increasing validity in the findings, informing the collection of the second data source, and assisting with knowledge creation (Hurmerinta-Peltomaki & Nummela, 2006).

I triangulated my data by gathering data from multiple designated OHV areas across the Eastern Slopes of the Rocky Mountains in western Alberta (O’Leary, 2014, p.358). The two sites I surveyed were McLean Creek Public Land Use Zone (PLUZ), and Ghost PLUZ (see Figure 1). Both sites can be accessed within one hour when driving from Calgary. The PLUZs share many similarities in terms of designated trail systems, proximity to a major population centre, and topography, allowing me to draw parallels between them. I also have a personal knowledge of these OHV zones, having worked in both of them for two seasons in the summers of 2015 and 2016. These areas represent a typical Albertan OHV experience due to their proximity to a major population center and their heavy use. The PLUZ provides an established trail network and some basic amenities, like washrooms and information kiosks, which make them attractive to OHV users. McLean Creek PLUZ has the added benefit of being adjacent to McLean Creek Provincial Recreation Area which has more amenities including a maintained campground and a convenience store with shower facilities. Ghost PLUZ also has numerous maintained campgrounds scattered throughout the area.
I decided that surveys were the most suitable tool since they can “generate standardized, quantifiable, empirical data” and “generate qualitative data through the use of open-ended questions”, and I collected both quantitative and qualitative data (O’Leary, 2014, p. 204). Quantitative data was gathered through surveys while qualitative data was gathered through semi-structured interviews with OHV users. Semi-structured interviews were conducted online and in-person throughout the Public Land Use Zones. Royal Roads University Research Ethics Board approved my research on May 7, 2018.

The research used both qualitative and quantitative methods and data. Quantitative data that was gathered, utilizing surveys, included demographic information such as age of riders, type of Off-Highway Vehicle being used, income, and gender (O’Leary, 2014, p. 203). This
allowed me to measure differences both within and between user groups. Qualitative data
collection included semi-structured interviews with open-ended questions such as preferred land
base, reasons for choosing to ride OHVs, and views toward environmental degradation.
Interviewees also got the chance to expand upon their answers from the New Ecological
Paradigm surveys. All of the quantitative and qualitative data, were derived from the surveys and
interviews. Qualitative data included attitudes surrounding OHV use in Alberta, and how OHV
groups in Alberta perceive the future of OHV use.

Over the course of approximately 31 semi-structured interviews, many unique
perspectives were brought up by the interviewees. Interviews followed the same questions as the
survey, but the interviewees were allowed to elaborate on answers and provide the rationale for
choices. One interview was conducted online with video-call software and was arranged in
advance, while the other interviews were conducted in the field when a survey respondent
indicated their interest. The interviews were semi-structured with opportunity for elaboration,
while the surveys do not allow for any elaboration. The topics focused on OHV use in Alberta
and issues with the sitting government. Some of the interviewees elaborated upon their answers
to the survey, but many just wanted a chance to be heard. I tried directing the conversation back
towards survey answers several times. These redirections were mostly successful.

Context of the Study Sites

Surveys were conducted at two sites in the Eastern Slopes region of Alberta's Rocky
Mountains, in the southwest of the province. The two sites were McLean Creek Provincial
Recreation Area (PRA) and Public Land Use Zone (PLUZ) (see Figure 2), and Ghost PLUZ. I
chose these areas due to their similarities in topography, trail networks, and user base. I am also
personally familiar with McLean PRA/PLUZ and Ghost PLUZ, having worked in both areas in
an enforcement capacity. In Figure 3, the areas which are shaded light green are the provincial parks, wildland provincial parks, and public land use zones; the darker green areas are national parks.

Figure 2: Villanueva, G. (2018). Photograph of McLean Creek PLUZ.
Figure 3: AB National and Provincial Parks. From Wikimedia Commons.
Data Collection

Data were collected through 53 surveys and 31 semi-structured interviews. Survey participants and interviewees were selected at OHV staging areas, where OHV users load and unload their OHVs. I approached every person that I saw at these staging areas, introduced myself, and asked if they had a few minutes to participate in my survey and interview. Most agreed to participate in my research. Through this research, several similarities with other have been noted. There is an abundance of grey literature and government documents on the topic of OHV use but a limited amount of academic literature. This presents us with a clear gap in the literature for OHV-related research which needs to be addressed. Much of the future research needs that were identified in this literature seemed to indicate that the government needed better information about attitudes held by OHV users and their impacts on the environment in order to develop better access management strategies (Haddock & Quinn, 2015, p. 399). My study directly addresses the subject of attitudes held by OHV users and how they perceive their impact on the environment.

I used a scale known as the New Ecological Paradigm to measure the underlying attitudes of OHV riders. This scale is considered a measure of environmental world view (Anderson, 2012, p. 260).

"The revised New Ecological Paradigm has 15 statements, called items. Eight of the items, if agreed to by a respondent, are meant to reflect endorsements of the new paradigm, while agreement with the other seven items represent endorsement of the [Dominant Social Paradigm]" (Anderson, 2012, p.260).

The Dominant Social Paradigm is “the view that humans are superior to all other species, the Earth provides unlimited resources for humans, and that progress in an inherent part of
human history” (Dominant social paradigm, Oxford Reference, 2018), while the New Ecological Paradigm is a pro-ecological worldview (Anderson, 2012, p.260). I added questions specifically focused on ATV use in addition to the original 15 items. These questions were a series of value statements which could either be agreed or disagreed with. Demographic questions relating to age and sex came at the end of the survey. Using a two-tailed t-test, I focused on whether the majority of riders fell into the New Ecological Paradigm or the Dominant Social Paradigm. I hypothesized that most OHV users would display the Dominant Social Paradigm worldview. I also documented what percentage favoured OHV-centric values over ecocentric values, as measured by my additional questions.

The survey was pretested with a focus group in Edmonton. I used my co-workers, who are Alberta Parks staff, since many of them are familiar with OHVs and the topic of OHV use in provincial protected areas. This pretest allowed me to focus my questions and avoid any potential bias in their wording. I also conducted mock interviews, also a form of pretest, with my focus group in order to come up with effective questions.

In the surveys, I used a Likert scale to measure the weighting of the responses. A Likert scale allows the researcher to assign a weight to each response, such as very dissatisfied to very satisfied (McLeod, 2008, para.3). This was an appropriate tool since it allowed for greater clarity when analyzing results and gave respondents the opportunity to express themselves more accurately. Some riders may feel very strongly about certain issues, but feel neutral on other issues. I wanted to capture these details.

The survey results were calculated and correlated with their scores on the NEP survey, using two-tailed t-tests and analysis of variance tests within Microsoft Excel. A t-test is a “statistical test that examines whether the population means of two samples greatly differ from
one another, using t-distribution which is used when the standard deviation is not known, and the
sample size is small” (Surbhi, 2016, para.4). Analysis of variance, or ANOVA, is “commonly
used in all those situations where a comparison is to be made between more than two population
means” (Surbhi, 2016, para.7). William Sealy Gosset, who created the t-test and went by the pen
name ‘Student’, found that sample sizes as small as four participants still generally presented a
normal distribution (Student, 1908, p.17). If the distribution was abnormal, the numbers were
counteracted by a larger standard deviation.

To supplement the survey, I conducted semi-structured interviews at the most popular
OHV staging areas, as well as conducting online surveys (see Appendix B for OHV Survey
Questionnaire). This allowed me to gather more in-depth qualitative information on the complex
attitudes surrounding OHV use. The semi-structured interviews covered the same questions as
the survey but allowed the respondents to provide more detailed answers. It also allowed the
interviewer to pursue interesting follow-up questions to the original conversation (O’Leary,
2014, p.218). Untranscripted, semi-structured interviews tended to be 10-30 minutes and covered
a broad range of topics, not all of which were related to OHV use. Their open-ended nature
meant that they veered into politics and unrelated social issues but I kept returning to the core
themes of this study. After the interviews had been completed, I would return to my vehicle and
write down as much information as I could remember about the discussions.

Project Participants

I set up a location in the OHV staging areas (where the vehicles are offloaded) where I
distributed hard-copies of the surveys to interested riders. If the riders were interested but didn't
have time to fill out the survey, I gave them a physical copy of the survey and asked them to scan
a completed copy and e-mail the results to me. Approximately 10% of riders who took surveys
home filled out and returned a completed copy. The request to scan and e-mail the results may have been off-putting. A prepaid envelope to return the completed surveys may have been more helpful and elicited a higher response rate.

**Data Analysis**

Fifty-three surveys were completed, which is more than an adequate sample size according to Student (1908, p.19). Indeed, according to Student, a sample size of just ten participants has a probability of 0.99252 of being between $-\infty$ and one standard deviation of the mean of the general population (1908, p.19). Survey responses were compared between different genders, different educational levels, age, user type (random camper, random day user, facility camper, & facility day user), and income. A random camper is defined as someone who camps outside of the designated camping facilities, typically using a trailer or tent in the Public Land Use Zone. A random day user does not camp overnight in the PLUZ and does not use the designated facilities like bathroom buildings and picnic sites. A facility camper stays overnight in the designated camping facilities. A facility day user will use the designated facilities like bathrooms and picnic sites but will not camp overnight.

Results were calculated and correlated with their scores on the NEP survey, using two-tailed t-tests and analysis of variance tests within Microsoft Excel. All data were entered into Microsoft Excel. Basic spreadsheets were kept with all of the data. Different columns of data were then re-arranged based on characteristics such as age, sex, and income, and t-tests and analysis of variance tests were conducted to check for correlations with New Ecological Paradigm scores.

Major themes of the interviews were noted and recorded. The semi-structured interviews were not transcribed at the request of the interviewees, as they were spontaneous and the
interviewees had already expressed their desire to not follow through with a structured interview. Themes from these interviews were subsequently recorded in my field journal. Major themes were present across many of these interviews. These themes included feelings of victimization and resentment against the sitting provincial government, a willingness of OHV users to self-police their community, and optimism that human ingenuity would be able to reverse the damage that humans had caused to the planet.

Results

Characteristics of OHV Users

Fifty-three surveys were completed. The sex ratio for OHV users was overwhelmingly male, with forty-three out of fifty-three riders identifying as male. Seven identified as female, one identified as trans-female, and two were unspecified (see Appendix A). These results skew far more heavily male than the results of the NSRE, with 81.1% of OHV users identifying as male for my survey compared to 60.2% of OHV users identifying as male for the NSRE (Cordell et al, 2008, p.40). These results are also far higher than the results of the 2016 census for the province of Alberta (Statistics Canada, 2016, Age and Average Age and Sex).

Survey respondents tended to self-identify as higher income earners, with twenty-two out of fifty-three riders claiming their income was above $100 000 per year; eight claimed to be earning between $80 001 and $100 000; ten claimed to be earning between $60 001 and $80 000; six claimed to earn between $40 001 and $60 000; and five claimed to earn less than $40 000. Two chose to not specify their incomes (see Appendix A). Since the survey asked for an income range and not an exact income, the average total income for OHV users in this survey cannot be calculated.
The ratio of single to married OHV users was close, with twenty-seven OHV users claiming to be married while twenty-two claimed to be single. Three were divorced, and one identified as in a common-law partnership (see Appendix A). 50.9% of my survey respondents identified as married, which is comparable to 50.1% of Albertans who claimed to be married on the last census (Statistics Canada, 2016, Census Profile). 5.7% of survey respondents were divorced, which is close to the 6.0% of Albertans who were divorced according to the 2016 census (Statistics Canada, 2016, Census Profile). 41.5% of survey respondents identified as single, while 27.5% of Albertans had never been married according to the census (Statistics Canada, 2016, Census Profile). There were some differences in wording between my survey and the census, so the category of ‘single’ could have included the census categories of ‘never married’ and ‘separated’, based on the respondents’ interpretation of the term. The categories of ‘divorced’ and ‘widowed’ were options in my survey.

Educational levels were fairly evenly split. Eleven OHV users (20.7% of survey respondents) identified high school as their highest level of education; twenty-three OHV users (43.3% of respondents) identified college as their highest level of education; and nineteen OHV users (35.8% of respondents) identified university as their highest level of education (see Appendix A). The Alberta census provided far more options for educational levels than I did with my survey, so a direct comparison is not possible. The NSRE found that 9.7% of respondents had not completed high school, 25.8% had completed high school as their highest level of education, 29.2% had gone to college or technical schools, and 33.4% had gone to universities (Cordell et al, 2008, p.49).

Age did not appear to be a significant barrier to Off-Highway Vehicle use. Nineteen respondents were between the ages of 21-30; seventeen respondents were between the ages of
eleven respondents were between the ages of 41-50; four respondents were between the ages of 51-60; and one respondent was over the age of 61. One respondent chose not to identify their age (see Appendix A). Since the survey did not ask for exact ages, the average age of OHV users who participated in this survey cannot be determined.

The most popular Off-Highway Vehicle was the dirtbike, with thirty-eight out of fifty-three respondents claiming the dirtbike was their sole Off-Highway Vehicle. Seven others identified themselves as owning dirtbikes in combination with another OHV, such as a snowmobile (1), an All-Terrain Vehicle (4), an All-Terrain Vehicle and a side-by-side (1), and a ‘trike’ (1). Five identified as only owning All-Terrain Vehicles; one identified as owning an All-Terrain Vehicle and a side-by-side; one identified as only owning a side-by-side; and one chose to not specify their OHV of choice.

Membership in OHV riding clubs is quite popular in Alberta, with nineteen out of fifty-three respondents belonging to an OHV club. Popular clubs included the Rocky Mountain Dirt Riders Association (commonly referred to as RMDRA), Second Gear Club, Alberta Off Highway Vehicle Association and the Calgary ATV Association.

Some riders were getting out very frequently, while many were casual riders. Twenty-two respondents rode their OHVs between 0-5 times per month; sixteen respondents were riding their OHVs between 6-10 times per month; two respondents were riding their OHVs between 11-15 times per month; and thirteen respondents were riding their OHVS more than 15 times per month.

The users were more likely to identify as “random” user groups, instead of user groups who utilized the facilities. Random user groups tended to camp in the Public Land Use Zone outside of established campsites, choosing any location they could access, and made no use of
established facilities such as day washroom facilities at the McLean Creek Camper Store, or the established day-use areas such as picnic sites.

Twenty-one respondents identified as solely random campers; nine respondents identified as random day users; two respondents identified as random camper/random day user; eight identified as solely facility campers; one identified as facility camper/facility day user; six identified as facility camper/random camper; and five identified as solely facility day users. One chose not to specify their user type.

Off-Highway Vehicle use in Alberta is dominated by higher-income males from a variety of educational levels, as evidenced by the results of my surveys. Marital status and age appear to have little effect on ridership, although ridership dips sharply over the age of 50, as evidenced by my lack of survey results from riders in that age category. The commanding majority of OHV users owned dirtbikes only (72% of respondents), which would explain why the most popular OHV clubs were the Rocky Mountain Dirt Riders Association (a dirtbike club) and the Second Gear Club (another dirtbike club), as evidenced by my survey results. OHV users were going out for rides on public land very frequently, with thirty-one out of fifty-three respondents (58%) riding their OHVs more than once per week.

There was a clear majority for the random user category, with thirty-two out of fifty-three respondents (60%) identifying solely as random campers and random day users; fourteen respondents (26%) identifying as either facility camper, facility day user, or both; and six respondents (11%) alternating between random camping and facility camping. Both categories have their own unique benefits. Random campers and random day users don’t face a lot of the restrictions that one would face in a registered campground. There are no noise limits or quiet hours when random camping, liquor bans don’t apply when random camping since a Public Land
Use Zone is not a provincial park, and you can have as many campers as your patch of land can fit. Facility campers enjoy maintained campsites with dedicated firepits, firewood can be delivered straight to your campsite, many of the campsites back directly onto the designated trail system, and there are maintained bathrooms with showers. Disputes between campers in registered campsites are also resolved more easily than disputes between random campers, since the rules regarding conduct in registered campgrounds are more clearly defined and more easily enforceable than the rules for Public Land Use Zones.

**Attitudes of OHV Users**

On the statement “OHV riders are entitled to access public land”, twenty-four respondents strongly agreed, twenty-five agreed, three were unsure, zero disagreed, zero strongly disagreed, and one did not answer. For the statement “OHV use does not cause more damage than other recreational activities”, ten strongly agreed, nineteen agreed, ten were unsure, twelve disagreed, one strongly disagreed, and one did not answer. Regarding the statement “OHV use has a positive impact on Alberta”, twelve strongly agreed, twenty-seven agreed, eleven were unsure, one disagreed, one strongly disagreed, and one did not answer. In regards to the statement “OHV use is an Albertan tradition”, twelve respondents strongly agreed, twenty-six agreed, twelve were unsure, two disagreed, zero strongly disagreed, and one did not answer. As for the statement “OHV users have been victimized by the Alberta government”, nineteen strongly agreed, twenty-three agreed, five were unsure, four disagreed, one strongly disagreed, and one did not answer. I did not provide an exact definition of the word “victimized” to the survey respondents since I wanted to allow respondents to perceive the word however they deemed appropriate.
A convincing majority of respondents felt that OHV riders were entitled to access public land, with 92% of respondents either agreeing or strongly agreeing with the statement. These surveys were handed out shortly after two controversial public land closures down in the Castle Special Management Area (half of the trail network was closed in June 2018) and the Porcupine Hills (several trail restrictions were put in place in 2018), with rumours of closures in the Bighorn Backcountry being circulated.

Seventy-nine percent of respondents agreed or strongly agreed that OHV users have been victimized by the government. During the course of my field surveys, many respondents expressed frustration with the government, claiming that they felt the government had ignored their concerns. Despite the Alberta government consulting numerous user groups regarding the future of OHV use in the province, going as far as conducting numerous town hall meetings on the topic, OHV users felt that their concerns had been ignored.

Seventy-four percent of respondents agreed or strongly agreed that OHV use has a positive impact on Alberta. While the survey did not specify the exact nature of this positive impact, most respondents tended to think of this question in terms of positive economic impact. In many of my post-survey discussions, respondents mentioned the positive benefits including the cost of the OHV, government revenue in the form of registration fees, and the volunteer work performed by OHV clubs in the province. This volunteer work included trail building and trail maintenance as well as the installation of ‘trail mats’ in ecologically sensitive areas in order to reduce soil erosion and rutting.

Seventy-two percent agreed or strongly agreed that OHV use is an Albertan tradition. While I did not provide a definition of “tradition” to respondents, they felt strongly about the history of OHV use in the province. While there are many definitions of tradition, the definition
that is most appropriate for this discussion would be “a belief or story or a body of beliefs or stories relating to the past that are commonly accepted as historical though not verifiable” (Merriam-Webster, 2019). By this definition, it is not important whether OHV use in Alberta truly has deep historical roots, but whether or not it is perceived as having deep historical roots. Survey respondents told me that OHV use has a history spanning many decades in Alberta, and that many of them use OHVs on farms across the province. Several of the riders I surveyed had been riding on public land for a few decades.

Fifty-five percent of respondents agreed or strongly agreed that OHV use does not cause more damage than other recreational activities. This was the most contested statement. When I spoke with the respondents after the completion of the surveys, many claimed that OHV use was comparable to other recreational activities, such as equestrian riding. Some also appeared to conflate industrial and recreational activities, mentioning that active logging and natural gas operations that were taking place in many Public Land Use Zones.

Thirty-five out of fifty-three respondents fell into the New Ecological Paradigm, meaning that they were more likely to have pro-environmental worldviews. Sixteen respondents were in the Dominant Social Paradigm, meaning that they were more likely to have pro-human worldviews. One respondent was perfectly balanced between the two worldviews.

When comparing New Ecological Paradigm scores with other factors such as age, income, and sex, some interesting results can be observed. When comparing males and females, the males were more likely than females to be in the Dominant Social Paradigm, with 30% of male respondents and 14% of female respondents being in this group; however, the p value was 0.14, meaning the differences were not statistically significant. There was no discernible correlation between income and NEP scores, with a p value of 0.66 after an analysis of variance
test. The same can be said for marital status, with single and married OHV users presenting comparable NEP scores, resulting in a p value of 0.33 after conducting a two-tailed t-test. There was no statistically significant correlation between age and NEP scores, with an analysis of variance test providing a p value of 0.45, but further research needs to be done, primarily focusing on getting results from older age brackets in order to compare NEP scores. No statistically significant correlation was observed between user type (random vs. facility camper/day user) and NEP scores, with a p value of 0.28 after an analysis of variance test.

Regarding NEP scores and education, OHV users who only had a high school education were far more likely to fall into the New Ecological Paradigm, with 91% of respondents being in the New Ecological Paradigm. 61% of respondents with a college diploma were in the New Ecological Paradigm, with 35% of respondents fitting into the Dominant Social Paradigm, and the remaining 4% of respondents being evenly balanced between the two worldviews. 61% of respondents with university degrees were in the New Ecological Paradigm, with the remaining 39% of respondents in the Dominant Social Paradigm. After an analysis of variance test, these results were determined to be not statistically significant, with a p value of 0.37.

Interestingly, members of OHV clubs were more likely to fall into the Dominant Social Paradigm. 47% of OHV club members were in the DSP, with the other 53% in the NEP. By contrast, 24% of respondents who weren’t in OHV clubs were in the DSP, while the other 76% were in the NEP. This difference was statistically significant, with a p value of 0.02 after conducting a t-test.

**Interviews**

Of the 23 survey participants who agreed to participate in a follow up interview, only one actually followed through. When I sent follow-up e-mails to the e-mail addresses indicated on
their surveys, I received no responses so I cannot determine their reasons for not participating in the interview. Considering the lack of responses for follow-up interviews, future researchers should focus on on-site interviews. Of the 30 on-site semi-structured interviews carried out in the field, they typically occurred in OHV staging areas after the individual had completed the survey. Sometimes the survey respondents would begin sharing their opinions with me before writing the survey and asking for my opinions but I would inform them that I didn’t want to taint their survey results with my viewpoint. As a result, many participants would write the survey and then speak with me about their own viewpoints. They expressed an unwillingness to participate in structured interviews, citing privacy concerns and a sense of fatalism, since their protests against land closures in the past had yielded very few positive results.

Some felt that human ingenuity would enable mankind to avert any ecological disasters. Other felt that the Earth was so resilient that it would be able to heal itself no matter what humans did. A common theme was that technology would advance to the point that it would be able to undo any damage caused. This included the recent advances in solar panel technology, as well as improvements to wind and nuclear energy technology.

Some claimed that improper disposal of garbage was a greater threat than pollution. This is possibly due to the fact that overflowing garbage dumps are an easier idea to comprehend than global warming, since the garbage is visible while increased carbon dioxide levels aren’t as obvious. Multiple times, I heard people say that humans were growing to become better stewards of the planet.

One problem that was identified was that we expect the Earth to heal at our pace. People have trouble thinking in terms of decades, let alone millennia. This response appears to be tied in
with the idea that we can avert ecological catastrophe through technological intervention. As our technology improves, the healing process should speed up.

One rider adamantly stated that OHV riders aren’t necessarily entitled to riding on public land, and that no one is entitled to anything. Several of the survey participants expressed unease with the word ‘entitled’, claiming that the word was too loaded.

Some families use OHV riding as a way to teach their children about nature and conservation, and to show them the beauty of the Earth. They felt that it was an easier way to immerse their children in nature without being forced into ‘tourist traps’.

There was also frustration expressed over what several OHV users described as “government lies” leading up to the closures of the Castle Special Management Area and the Porcupine Hills. They felt that their concerns had been ignored, despite a scientific article being published by Alberta Environment and Parks directly addressing the topic of OHV use in southwestern Alberta (Farr et al, December 2017). The article claimed that roads and trails for both industrial and recreational use “are likely the most significant anthropogenic feature in the Castle region because of the human activities and impacts they facilitate” (Farr et al, December 2017, p.7). In addition to this, Farr et al (December 2017) claimed:

- limiting or reducing land use and human activities in the region is expected to decrease vegetation disturbance, lower rates of invasive species infiltration and expansion,
- improve the condition of headwater streams, increase the viability of westslope cutthroat trout and bull trout populations, and reduce the risk of grizzly bear mortality (p.8).

This paper very clearly explains the damage caused by motorized recreational vehicle usage, and states that limiting or reducing their use on the land will have significant positive impacts on the environment.
There appears to be a willingness of many riders to take on more of a self-policing or community policing role. Some riders go out of their way to confront and educate other riders about poor riding habits and bad behavior in the bush. In some cases, this even went as far as taking photographs of licence plates and threatening to send the information to law enforcement unless the accused parties cleaned up the trash that was left at their campsite. Riders were aware that if they didn’t police their own community better, more land closures were possible.

**Limitations**

One difficulty that I encountered during this study was the amount of physical ground that I needed to cover in order to get from one OHV staging area to another. McLean Creek PLUZ was more manageable than the Ghost PLUZ, taking approximately one hour to drive from the northern boundary of the PLUZ to the southern boundary. This time doesn’t include the stops at staging areas along the way. Ghost PLUZ was far larger, taking over 2 hours to drive from the northern boundary to the southern boundary.

Another difficulty was trying to predict when OHV riders would be present at the staging areas. While inclement weather was an obvious deterrent to riders, it was hard to ascertain the riders' whereabouts on days with favourable weather. On weekdays, the majority of riders tended to begin riding in the late afternoon or early evening. On weekends, riders began showing up at the staging areas early in the morning and continued throughout the day.

Another limitation to my research was the hesitancy of Off-Highway Vehicle clubs to participate in my research. In particular, the Alberta Off-Highway Vehicle Association and the Rocky Mountain Dirt Riders Association initially displayed interest in my research and even agreed to distribute my survey among their club members. After seeing my survey, they stopped
replying to any of my e-mails or phone calls. Since communication was cut off, it is hard to
determine what their exact reasons were for refusing to participate.

Of the 53 survey participants, 23 agreed to be contacted for a follow-up interview to
elaborate on their survey answers. Only one of the 23 respondents actually completed a follow-
up interview. Since communication with the other participants was cut off, it is hard to determine
why they decided to withdraw from the interview process.

My own personal biases and past history with OHV users from an enforcement capacity
was disclosed as part of my research proposal. While I feel that my biases did not affect the
study, the manner in which I approached survey participants may have been a bit strong. Much
of the initial resistance that I encountered during my field surveys was due to the fact that people
felt that my research sounded too much like "government research". I found myself constantly
reassuring survey participants that I was conducting this research as a university student and not
as a government agent.

Discussion

The actual impacts of improper OHV use on the environment cannot be understated. The
general ecological impacts of linear features, trails, and roads on soil and vegetation are well-
documented, and in general include increased rates of soil erosion and compaction, destruction
and loss of vegetation cover, loss of species richness, shifts in species composition, and habitat
fragmentation (Weaver and Dale 1978, Kay 1981, Forman and Alexander 1998, Stokowski and
Pickering and Hill 2007, Dickson et al. 2008, Geneletti and Dawa 2009, Burgin and Hardiman
2012). The presence of roads and trails may also play a role in invasive species introduction and
dispersal (Robinson et al., 2010, Trombulak and Frissell, 2000). It is important to note that even
with this preponderance of evidence being widely available, the majority of OHV users who were surveyed agreed with the statement “OHV use does not cause more damage than other recreational activities”.

OHV clubs in Alberta have long been involved in volunteer work in Alberta’s public lands. From my own personal experience, I have seen groups like the Rocky Mountain Dirt Riders Association and the Second Gear Club host fundraisers and participate in trail building and trail re-routing. The Jeep Junkies Association would assist Alberta Parks by dragging abandoned vehicles out of the backcountry so they could be towed. On the websites of these OHV clubs, they also include sections describing their land advocacy work (RMDRA, 2018). This land advocacy is defined as “promoting responsible motorcycle trail riding in Alberta to ensure this privilege is available to this and future generations” and “problem solving designed to protect personal and legal rights of off-road motorcycle enthusiasts and to insure dignified access to Alberta’s public land” (RMDRA, 2018). Since these OHV clubs don’t publish the cost of the volunteer work they do, it is impossible to determine the total value of their contributions to Alberta’s public lands.

The responses to my interview questions were very insightful and revealing. Many respondents displayed optimism that mankind would be able to mitigate, or even reverse, the damage which had been done to the planet. Some strong opinions were shared that our technology and ingenuity would overcome the dangers of climate change. This is consistent with the findings of the Crowsnest Pass OHV survey results, which found that the OHV users were more likely to fall into the Dominant Social Paradigm and believe that “human ingenuity will make sure that we do not make the Earth unlivable”, which is one of the measures on the New Ecological Paradigm scale (Anderson, 2012, p.261).
Conclusions, Recommendations, & Suggestions for Future Research

What do these results tell us? There is no easy answer. Ecocentric and anthropocentric worldviews are held across all groups interviewed, no matter how the respondents are divided, such as by sex, age group, etc. The ratios are similar across age groups, income levels, marital status, and user type. There is a statistically significant correlation between New Ecological Paradigm scores and membership in OHV clubs. Members of OHV clubs were approximately twice as likely to be in the Dominant Social Paradigm than riders who were not affiliated with any OHV clubs. OHV users tend to be younger and wealthier than the general population, with a higher proportion of males to females (Cordell et al, 2008, p.40). Since my survey provided age ranges and income ranges, it is impossible to determine their exact mean age and income.

It is clear that OHV users cannot be viewed as a single monolithic group. There are great variances of opinion within the community. Some users support trail closures and a more managed recreational system. Others feel that the new system implemented by the Alberta government, featuring heavy restrictions on OHV use on ‘threatened land’, was put in place without enough user input (Alberta releases new rules, The Star Edmonton, 2018). During semi-structured interviews in the OHV staging areas, several riders viewed the introduction of a ‘trail access fee’ favourably. There is a similar system in place in British Columbia, where riders pay for a ‘trail pass’ and are given access to well-maintained trails and a limited number of riders.

Recommendations

More dialogue between OHV users and the government should be encouraged, especially in southern Alberta where public trust has been seriously eroded since, as mentioned earlier, “learning across cultural boundaries cannot be created or sustained without initial and periodic
dialogue” (Schein, 1993, para. 62). The process of dialogue will allow all sides to gain a greater understanding of the other stakeholders’ viewpoints. There is no definitive ‘end’ to dialogue, since dialogue is a process, but the goal of this dialogue should be to share knowledge and opinions and create a land management solution which doesn’t leave anyone feeling disenfranchised or ignored. Much of the frustration expressed by OHV users centered around the feeling that their input regarding the future of public land had been ignored by the Alberta government. This frustration came to a head with the public land closures in the Castle area and the Porcupine Hills.

**Suggestions for future research**

More structured interviews need to be conducted. While riders were very comfortable casually discussing OHV issues at the staging areas, they were far less willing to participate in structured interviews. Out of the 23 survey participants who initially agreed to participate in follow-up interviews, only one actually followed through with a structured interview. Many riders expressed privacy concerns and appeared reluctant to participate since they felt the results would be ignored by the government, just as all their protests had been ignored. One OHV user refused to participate in either the survey or interview, claiming that it sounded too much like a government survey and “no good can come of it”.

There were many lessons learned for refining the method of both the survey and the interview. The first would have been to emphasize conducting the interview as soon as possible. The difficulty in getting survey participants to participate in a follow-up interview could have been avoided if more interviews were conducted in the field at the moment the surveys were completed. The second would have been that joining social media groups for OHV riders in Calgary would have allowed me to anticipate when and where OHV group rides would be
occurring, making it easier to distribute surveys. This could have allowed me to gather a much larger sample size. The third would be to change the order of my survey’s questions. The order of the questions may have been off-putting to potential survey participants, since the New Ecological Paradigm contains several value statements designed to evoke an emotional reaction, and the NEP questions were placed before the demographic questions in my survey. Switching the order of questions may have made the survey more palatable to potential participants.

Suggestions for future researchers would be to gather a larger sample size by recruiting additional people to distribute surveys. A greater focus on McLean Creek PLUZ instead of Ghost PLUZ would have likely recruited a greater number of survey participants due to the shorter distances between OHV staging areas in McLean Creek PLUZ, which would have allowed me to cycle through staging areas more quickly than I was able to in the geographically expansive Ghost PLUZ. Conducting the same survey in British Columbia would be interesting, since there may be provincial differences in attitudes towards environmental impacts. Further research should be conducted on the correlations between New Ecological Paradigm scores and sex, education, and membership in OHV clubs. These were the factors which exhibited the greatest disparities in NEP scores. A separate study should be conducted on whether policies which are successful with the general population would enjoy the same success with OHV users. Since they are such a unique group, a unique management strategy may be necessary. A similar survey could be conducted in the same geographical area using the Environmental Concern scale instead of the New Ecological Paradigm scale. Researchers could return to this geographical area and offer more probing questions in a free-flowing interview.

In conclusion, members of OHV clubs are twice as likely to express the Dominant Social Paradigm worldview than non-members. OHV users are likely to be young, wealthy, and male.
There is a great variety of opinions within the OHV user community and they cannot be treated as a single uniform group. The need for dialogue between the government and OHV user groups is continual. There is a need for more academic papers on the topic of OHV users, their attitudes, and the impacts of OHV use on the environment. Increased environmental awareness and sensitivity to ecological impacts among OHV users should also be encouraged.
References


ATTITUDES OF OHV USERS


https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/dt-td/Rp-eng.cfm?TABID=2&LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GK=0&GRP=1&PID=109523&PRID=10&PTYPE=109445&S=0&SHOWALL=0&SUB=0&Temporal=2016&THEME=115&VID=0&VNAMEE=&VNAMEF=


Stokowski, P.A., LaPointe, C.B. (2000). Environmental and social effects of ATVs and ORVs: an annotated bibliography and research assessment. School of Natural Resources, University of Vermont, Burlington, VT. Retrieved from:
https://www.uvm.edu/~snrvtdc/trails/ohvbibliogVT00.pdf.


Surbhi, S. (2016, May 25). Difference between t-test and ANOVA. Retrieved from
https://keydifferences.com/difference-between-t-test-and-anova.html


Appendix A: Visual Representations of Category Breakdowns

**Survey Respondents**

- Male: 81%
- Female: 13%
- Trans-Female: 2%
- Other: 4%

**Income**

- >$40 000: 42%
- $40 001-60 000: 15%
- $60 001-80 000: 19%
- $80 001-100 000: 9%
- $100 001+: 11%
- Other: 4%

**Appendix B: OHV Survey Questionnaire**

**NEP: Agree/Disagree with the following statements (Please circle your answer)**

1. We are approaching the limit of the number of people the Earth can support.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

2. Humans have the right to modify the natural environment to suit their needs.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

3. When humans interfere with nature it often produces disastrous consequences.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

4. Human ingenuity will insure that we do not make the Earth unlivable.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

5. Humans are seriously abusing the environment.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

6. The Earth has plenty of natural resources if we just learn how to develop them.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

7. Plants and animals have as much right as humans to exist.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.
   
<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

9. Despite our special abilities, humans are still subject to the laws of nature.
10. The so-called “ecological crisis” facing humankind has been greatly exaggerated.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

11. The Earth is like a spaceship with very limited room and resources.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

12. Humans were meant to rule over the rest of nature.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

13. The balance of nature is very delicate and easily upset.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

14. Humans will eventually learn enough about how nature works to be able to control it.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

15. If things continue on their present course, we will soon experience a major ecological catastrophe.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

**OHV Questions (Please circle your answer)**

1. What days of the week do you normally ride? (Sun/Mon/Tue/Wed/Thu/Fri/Sat)

2. How many times a month do you ride your ATV on public land? (Specifically from May-September) (0-5, 6-10, 11-15, 15+)

3. Are you a member of an OHV club? (Yes/No)
• optional: which OHV clubs are you a member of?

4. What types of OHV do you own? (dirtbike, ATV, side-by-side, other)

Agree/Disagree with the following statements (Rate from strongly disagree/disagree/unsure/agree/strongly agree):

5. OHV riders are entitled to access public land

6. OHV use does not cause more damage than other recreational activities

7. OHV use has a positive impact on Alberta

8. OHV use is an Albertan tradition

9. OHV users have been victimized by the government

Demographic Questions (Please circle your answer)

1. Age? (0-20, 21-30, 31-40, 41-50, 51-60, 61+)

2. Sex? (Male, Female, Other)

3. Income? (under $40 000, $40 001-60 000, $60 001-80 000, $80 001-100 000, $100 001+)

4. Marital status? (Single, Married, Divorced, Widowed)

5. Which of the following categories do you fall into? (choose which suits you best)
   • facility camper (camps in a registered campsite, uses built facilities)
   • facility day user (does not intend on camping, uses built facilities)
   • random camper (camps on public land in an unregistered campsite)
   • random day user (does not intend on camping, doesn't use built facilities)

*note: built facilities include docks, piers, interpretive centres, etc. It does not include designated trails.

6. What is your educational level?
   • High school
   • College
   • University
   • No high school

7. Are you willing to be contacted for a follow-up interview? (Yes/No)

8. Would like to receive a summary of the results of this research project? (Yes/No)
• If yes, please send your contact e-mail to garethvillanueva@gmail.com
Survey Consent Form

Hello. My name is Gareth Villanueva. I am a Master's of Art/Science in Environment and Management student with Royal Roads University. I am inviting you to participate in a survey on the attitudes of Off Highway Vehicle (OHV) Users towards the environment. The results of this survey will be analyzed as part of my thesis. I am looking for OHV users who ride in Alberta, particularly in the areas of McLean Creek PLUZ, Ghost PLUZ, and Willow Creek PLUZ. The survey consists of 32 questions, including statements to be measured on a weighted scale (strongly agree, agree, unsure, disagree, and strongly disagree) as well as demographic questions. It is expected to take 10-15 minutes to complete the survey.
Survey results will only be viewable by me. Survey results will be kept completely confidential. No personally identifying will be recorded. You are free to not participate. You can withdraw from the survey at any time while it is being answered; however, once the survey has been submitted, results cannot be withdrawn. Any questions regarding the survey can be directed to me at garethvillanueva@gmail.com.

The authenticity of my research project can be verified by contacting my academic supervisor, Dr. Leslie King at Royal Roads University, at Leslie.king@royalroads.ca

Your participation will help me understand how OHV users view their interactions with the environment and will guide us towards more collaborative solutions when creating new recreational opportunities in Public Land Use Zones. The results of this study may have an impact on the reputation of off-highway vehicle users.

Research results will be published with my final thesis by Royal Roads University.
If a survey has been completed and submitted, it is assumed that consent has been given.

Submission of this survey is an indication of your willingness to participate in this research project. Once the survey has been submitted, it cannot be withdrawn.

Please retain a copy of this consent form for your own records. Thank you for your participation.

Informant signature ___________________________ Date

Informant name (print)

Researcher signature ___________________________ Date