

**A PROCESS EVALUATION OF THE ORAL RABIES VACCINATION (ORV)  
PROGRAM IN ALLEGHENY COUNTY**

by

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**ABSTRACT**

Rabies Virus (RABV) is a deadly pathogen that causes disease in humans and animals. In Pennsylvania, RABV is endemic among wild animals, such as raccoons, skunks, and bats. The public health significance of this issue is in part due to the rare possibility of RABV transmission to humans, thus it is imperative that public health institutions control wild animal rabies cases. The “Raccoon Oral Rabies Vaccination (ORV) Program” is a one-week program that has taken place in Allegheny County, Pennsylvania, every August since 2002. The main goal of the program is to manage wild animal rabies cases by orally vaccinating raccoons, which are the primary carriers of RABV in Pennsylvania. Since the program is planned to continue for years to come, with the goal of eventually eliminating RABV, it is essential to evaluate the implementation or process of the program. This preliminary evaluation will help gain knowledge about program activities and fine-tune existing program operations and strategies, mainly focusing on stakeholder involvement (i.e., organizers and volunteers). This evaluation may also be useful to document activities of raccoon baiting week for potential replication in other counties.

Our preliminary process evaluation utilized responses to a stakeholder survey collected shortly after the program end date in August, 2016. The survey was divided into various aspects of the program, including participant details, recruitment of participants, training to bait, and general baiting experiences.

Many respondents to our post-baiting survey made helpful comments and suggestions on the various aspects of the ORV baiting program. Their insight into the program was useful for documenting overall activities and providing recommendations. Although some limitations to this essay exist, the importance of evaluating the process of the ORV baiting program is more significant. We learned that there are various aspects of the program that may benefit by minor adjustment. These include recruitment strategy, scheduling methods, training plans, and overall baiting experience. By offering recommendations that refine various features of the program process, we want to continue the ORV baiting program in a more efficient and enjoyable manner for years to come.

## TABLE OF CONTENTS

<b>PREFACE.....</b>	<b>X</b>
<b>LIST OF ACRONYMS .....</b>	<b>XI</b>
<b>1.0 INTRODUCTION.....</b>	<b>1</b>
<b>1.1 RACCOON ORAL RABIES VACCINATION BACKGROUND.....</b>	<b>10</b>
<b>1.2 RACCOON RABIES BAITING PROCESS.....</b>	<b>11</b>
<b>1.2.1 PARTICIPANTS.....</b>	<b>12</b>
<b>1.2.2 RECRUITMENT .....</b>	<b>12</b>
<b>1.2.3 SCHEDULING.....</b>	<b>14</b>
<b>1.2.4 TRAINING .....</b>	<b>14</b>
<b>1.2.5 BAITING EXPERIENCE.....</b>	<b>14</b>
<b>2.0 ASSESSMENT OF RACCOON RABIES BAITING WEEK PROCESS.....</b>	<b>17</b>
<b>2.1 METHODS.....</b>	<b>17</b>
<b>2.2 RESULTS.....</b>	<b>17</b>
<b>2.2.1 PARTICIPANTS.....</b>	<b>18</b>
<b>2.2.2 RECRUITMENT AND SIGN-UP.....</b>	<b>19</b>
<b>2.2.3 TRAINING .....</b>	<b>21</b>
<b>2.2.4 BAITING EXPERIENCE.....</b>	<b>22</b>
<b>3.0 DISCUSSION.....</b>	<b>27</b>

<b>4.0</b>	<b>CONCLUSIONS .....</b>	<b>30</b>
	<b>BIBLIOGRAPHY .....</b>	<b>34</b>

## LIST OF TABLES

Table 1. Basic demographics of program participants who completed post-baiting survey. ....	18
Table 2. Survey responses to participant’s sense of urgency to sign-up for baiting program. ....	20
Table 3. Survey responses to participant’s sense of difficulty to get permission from supervisor to miss work during baiting program.....	21
Table 4. Survey responses to participant’s sense of difficulty to miss work during the baiting program.....	21
Table 5. Survey responses to participant’s experience during the morning(s) of baiting program. .....	26
Table 6. Survey responses to participant’s experience with assigned team(s). ....	26
Table 7. Survey responses to participant’s experience with assigned baiting location. ....	26

## LIST OF FIGURES

Figure 1. Distribution of rabies variants in the United States.....	4
Figure 2. Cases of rabid foxes, raccoons, skunks, and bats in 2014 in the United States .....	5
Figure 3. Distribution of rabid raccoon cases in the United States.....	6
Figure 4. Fishmeal-polymer ORV bait (left) and a coated ORV sachet (right).....	7
Figure 5. Wildlife rabies reservoirs in the U.S. and current ORV baiting zones in black.....	8
Figure 6. WS 30-year raccoon RABV elimination prediction.....	9
Figure 7. 2016 raccoon ORV distribution map.....	10
Figure 8. Enlarged photo of an ORV bait in a gloved hand. ....	11
Figure 9. Responses to number of years involved in ACHD baiting program. ....	18
Figure 10. Number of days survey respondents participated in baiting program.....	25

## **PREFACE**

I would like to acknowledge and thank all the volunteers and organizers at the Allegheny County Health Department and United States Department of Agriculture Wildlife Services for their guidance and expertise throughout the project, especially my preceptor and friend Lori Horowitz.

## **LIST OF ACRONYMS**

ACHD	Allegheny County Health Department
CDC	Centers for Disease Control and Prevention
NRMP	National Rabies Management Program
ORV	Oral Rabies Vaccine
PA	Pennsylvania
RABV	Rabies Virus
USDA	United States Department of Agriculture
WS	Wildlife Services

## 1.0 INTRODUCTION

Rabies is a zoonotic fatal disease that is caused by rabies virus (RABV) transmitted to humans via infectious saliva (through bites or scratches) from both domestic and wild animals.<sup>1</sup> Sylvatic rabies was recognized in eastern United States (U.S.) in the 18<sup>th</sup> century, and was considered widespread in 1960.<sup>2</sup> Before 1960, the majority of rabies cases were in domestic animals.<sup>3</sup> Today, wild animals account for more than 90% of reported rabies cases in the U.S.; the animals predominantly infected are raccoons, bats, skunks, foxes, and mongooses (in Puerto Rico).<sup>4</sup> Five RABV variants are associated with each reservoir species and are confined to specific regions within the United States (**Figure 1**).<sup>4</sup> Cross species transmission of the virus can occur, such as a raccoon transmitting to a dog, but in general the specific variant of the virus is transmitted within the species with which it is associated.<sup>4,5</sup> Since 1990, raccoon rabies cases have remained the highest of the five animals: 1,822 rabid raccoons were reported in 2014 (**Figure 2**).<sup>4</sup> Raccoon rabies cases are mainly clustered in the eastern region of the U.S., where 20 states are considered enzootic and accounted for 98% of all rabid raccoons reported in 2014 (**Figure 3**).<sup>4</sup>

As one would expect, it is crucial to control this fatal virus due to the rare possibility of human transmission, and control the spread in wild and domestic animals. The public health costs associated with rabies detection, prevention, and control are estimated to be over \$300 million dollars per year.<sup>3</sup> This includes costs of pet and livestock vaccinations, postexposure prophylaxis (PEP) for individuals bitten by wild or domestic animals, animal control and

surveillance, laboratory maintenance costs, and education efforts.<sup>3,6</sup> Despite the high cost to control wildlife rabies, a recent study has shown that for every dollar spent on rabies management, the return value in benefits could reach \$6.35.<sup>6</sup>

In 1995, the United States Department of Agriculture (USDA) Wildlife Services (WS) initiated the National Rabies Management Program (NRMP) that aimed to combat wildlife rabies.<sup>6</sup> WS distributes over 10 million Oral Rabies Vaccination (ORV) baits a year, which are made up of a sachet or plastic packet containing the Raboral VR-G® rabies vaccine.<sup>5,6</sup> In order to appeal to wildlife, the sachets are sprinkled with a fishmeal coating, while the plastic packets are coated in a fishmeal polymer and are about the size of a matchbox (**Figure 4**).<sup>5</sup> WS focused on containing raccoon rabies by initiating a vaccination zone stretching from Maine to Alabama, as well as managing canine rabies in south Texas (**Figure 5**).<sup>5,6</sup> As a result of the NRMP, WS has successfully prevented the westward spread of raccoon rabies in eastern U.S., and have eliminated the domestic dog-coyote variant of rabies in the United States.<sup>6,7</sup> WS is now focusing on pushing the raccoon RABV boarder eastward until it is eventually eliminated in the United States.<sup>7</sup> WS is working on a 30-year raccoon RABV elimination strategy that is shown in **Figure 6**, which aims for elimination by the year 2050.<sup>7</sup> **Figure 7** depicts the areas in the U.S. that were raccoon baited in 2016, which reflects the eastern U.S. raccoon rabies border.<sup>8</sup> Of the 10 million ORV baits distributed, 95% are released from fixed-wing aircrafts or helicopters, and the remainder of the baits (approximately 513,765) are distributed by hand.<sup>8</sup>

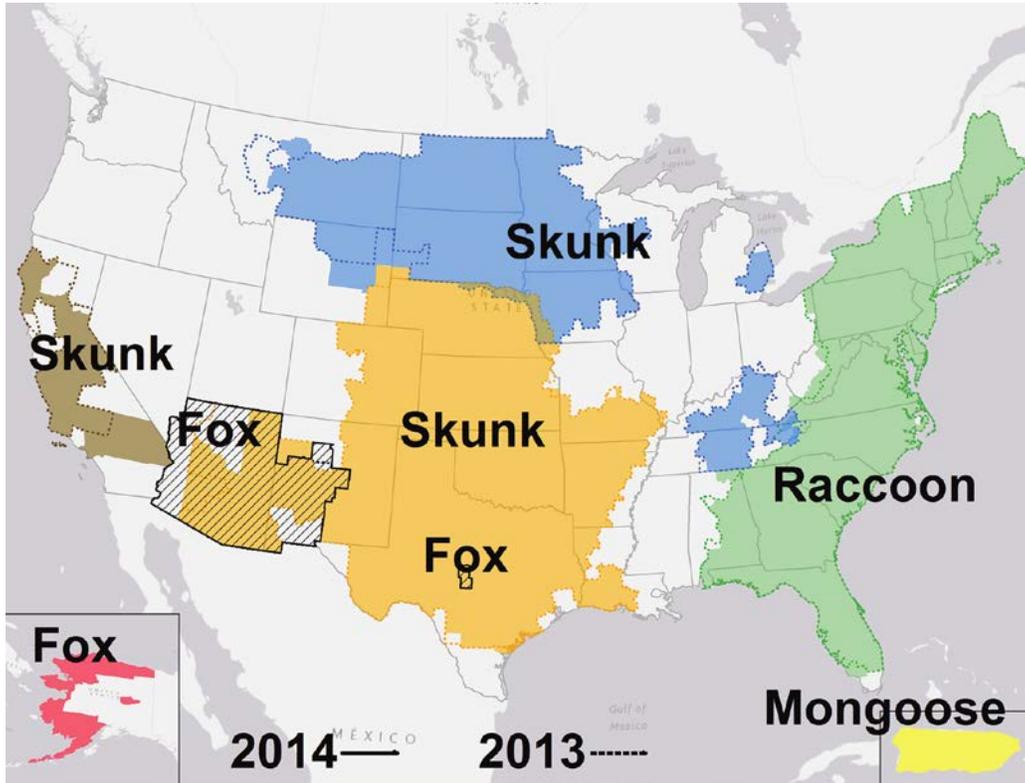
Hand or ground baiting by vehicle reaches 4% of the total area baited in the NRMP, and is especially important for urban areas where baits cannot be distributed via aircraft.<sup>5</sup> This is due to safety risks and the potential for humans and domestic animals coming in contact with the baits.<sup>5</sup> Without doubt, ground baiting calls for a more involved process, requiring a large amount

of volunteer participation.<sup>7</sup> Fifty nine percent of all ground baiting occurs in Pennsylvania, where 301,320 ORV baits were distributed in 2015.<sup>7</sup> The majority of ground baiting occurs in Allegheny County, PA where the urbanized Greater Pittsburgh area is located. Allegheny County, PA is considered the largest ground baiting effort in the United States, WS has collaborated with the Allegheny County Health Department (ACHD) to distribute ORV baits by vehicle.<sup>8</sup> Raccoon vaccine baiting takes place yearly in Allegheny County for one week in August (since 2004) and is formally known as “Raccoon ORV Baiting Week” or “Raccoon Baiting Week.”

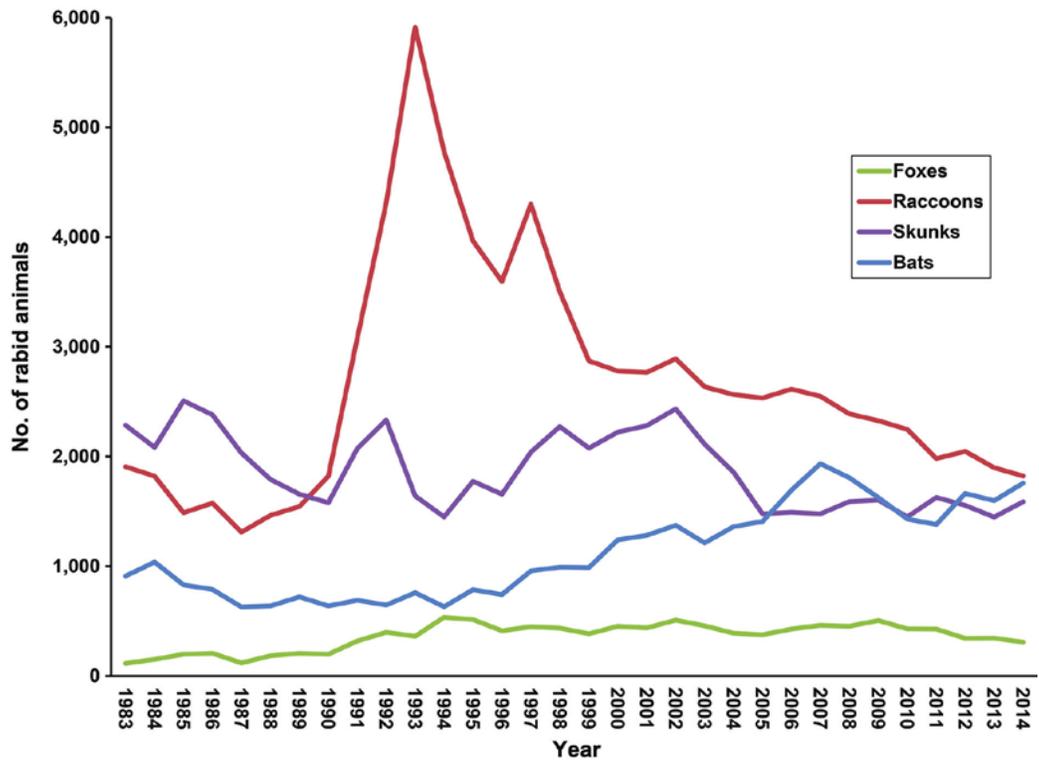
During raccoon baiting week, over 100 volunteers voyage out to nearly every street and road in the county by vehicle to spread ORV baits. Participants are trained to distribute the ORV baits in areas known to be affiliated with wild raccoons, such as green spaces, waterways, and other food resource areas. According to the WS 30-year raccoon elimination plan, Allegheny County will be the first highly populated (urban) area to be eliminated of raccoon rabies.<sup>7</sup> Thus, it is imperative to retain the ACHD and WS relationship in order to see the goal accomplished. August 2016 was the fifteenth raccoon baiting week that took place in Allegheny County, yet an evaluation of the program has never been conducted.

This essay focuses on an evaluation of the process of the Allegheny County raccoon baiting week. Though the effect on wildlife rabies cases is important, it is beyond the preview of this study. Our process evaluation aims to improve and account for the baiting program’s public health actions. We utilized a survey designed for stakeholders who are involved in the program to gain insight into program activities and respective significance. Rarely is a public health program perfect, and thus we hypothesized that there are aspects of the baiting program that could be improved. It is also important to document activities of raccoon baiting week for

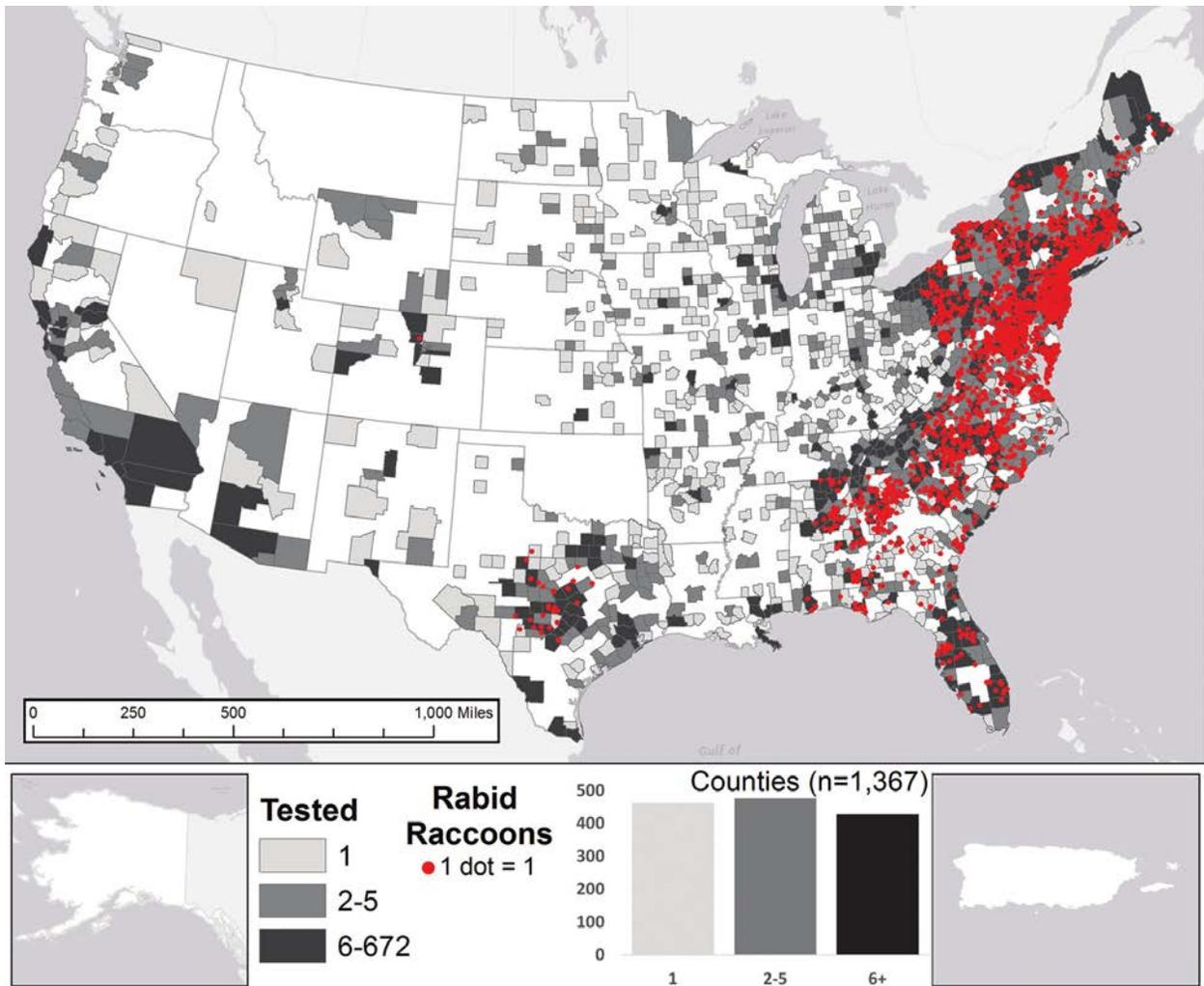
potential replication in other counties if need be. The evaluation is divided into various features of the program; participants, recruitment of participants, scheduling participants, training to bait, and general baiting experience.



**Figure 1.** Distribution of rabies variants in the United States.



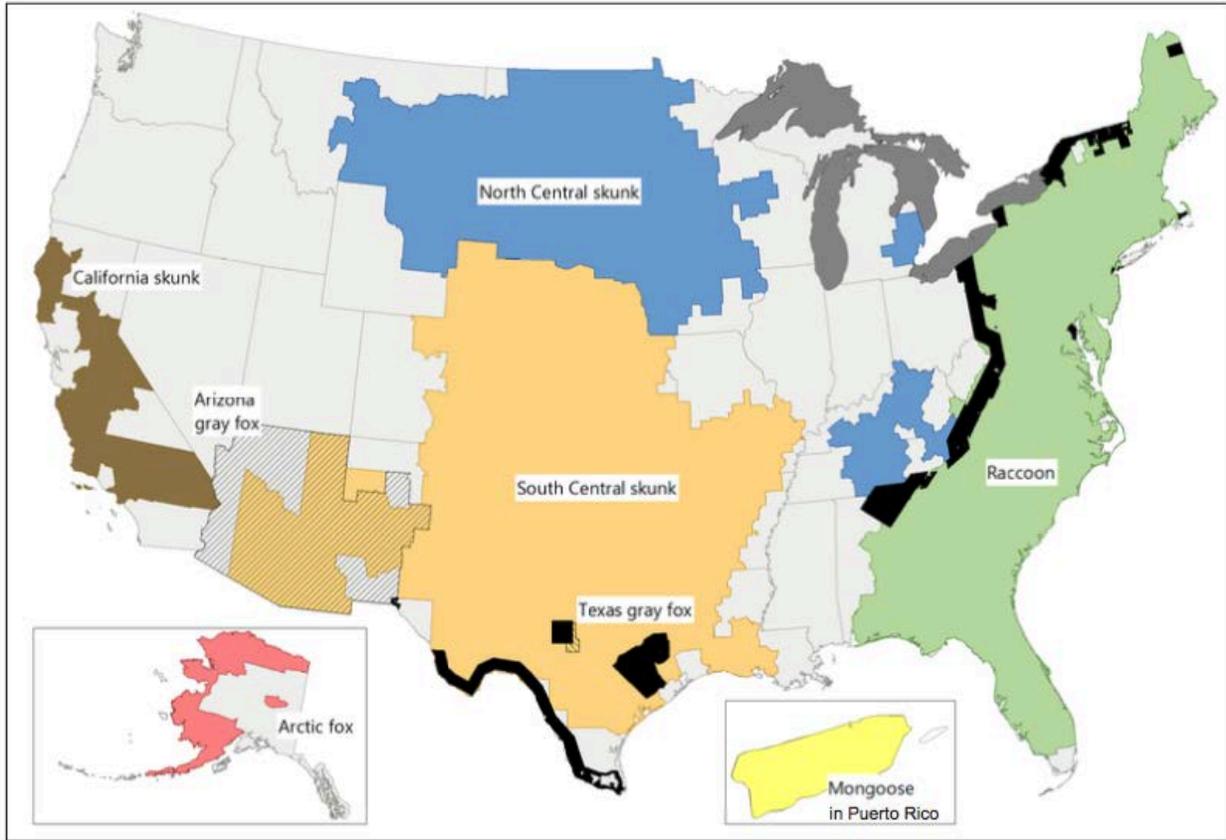
**Figure 2.** Cases of rabid foxes, raccoons, skunks, and bats in 2014 in the United States.



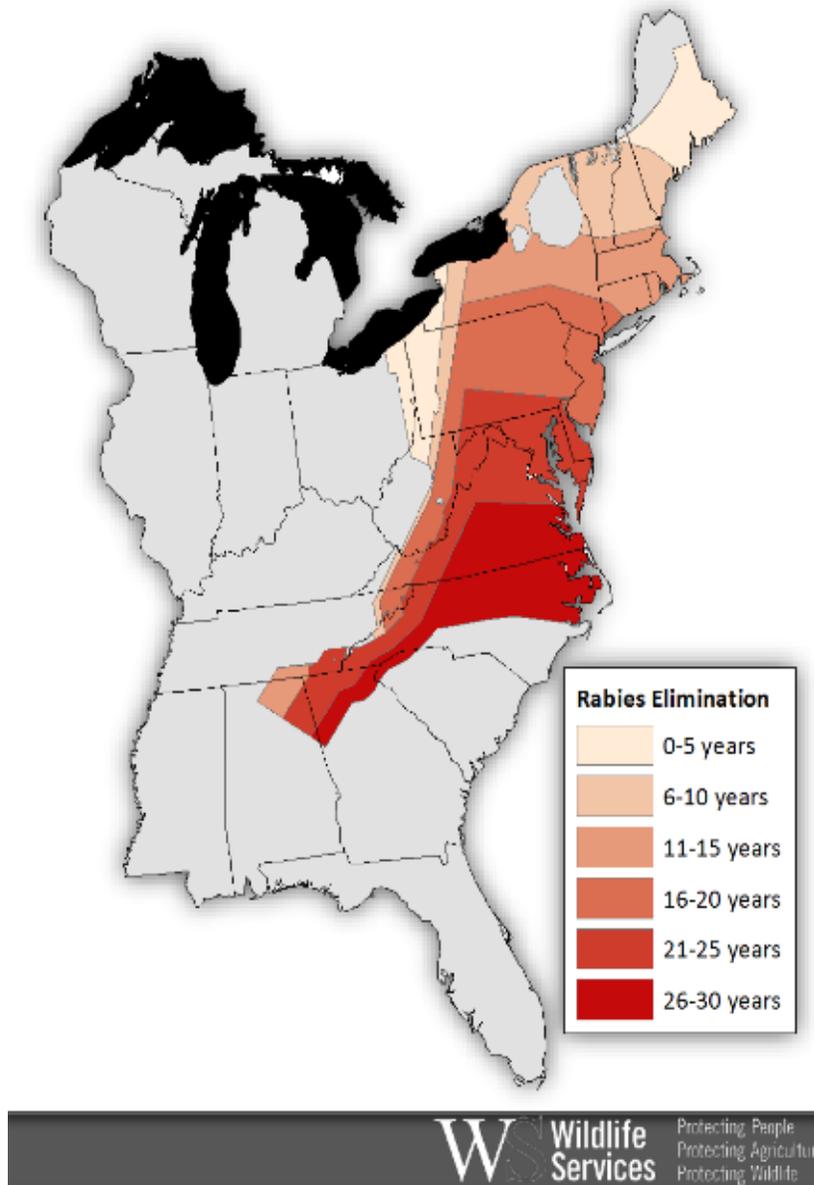
**Figure 3.** Distribution of rabid raccoon cases in the United States.



**Figure 4.** Fishmeal-polymer ORV bait (left) and a coated ORV sachet (right).



**Figure 5.** Wildlife rabies reservoirs in the U.S. and current ORV baiting zones in black.



**Figure 6.**WS 30-year raccoon RABV elimination prediction.

ORV Daily Status Map

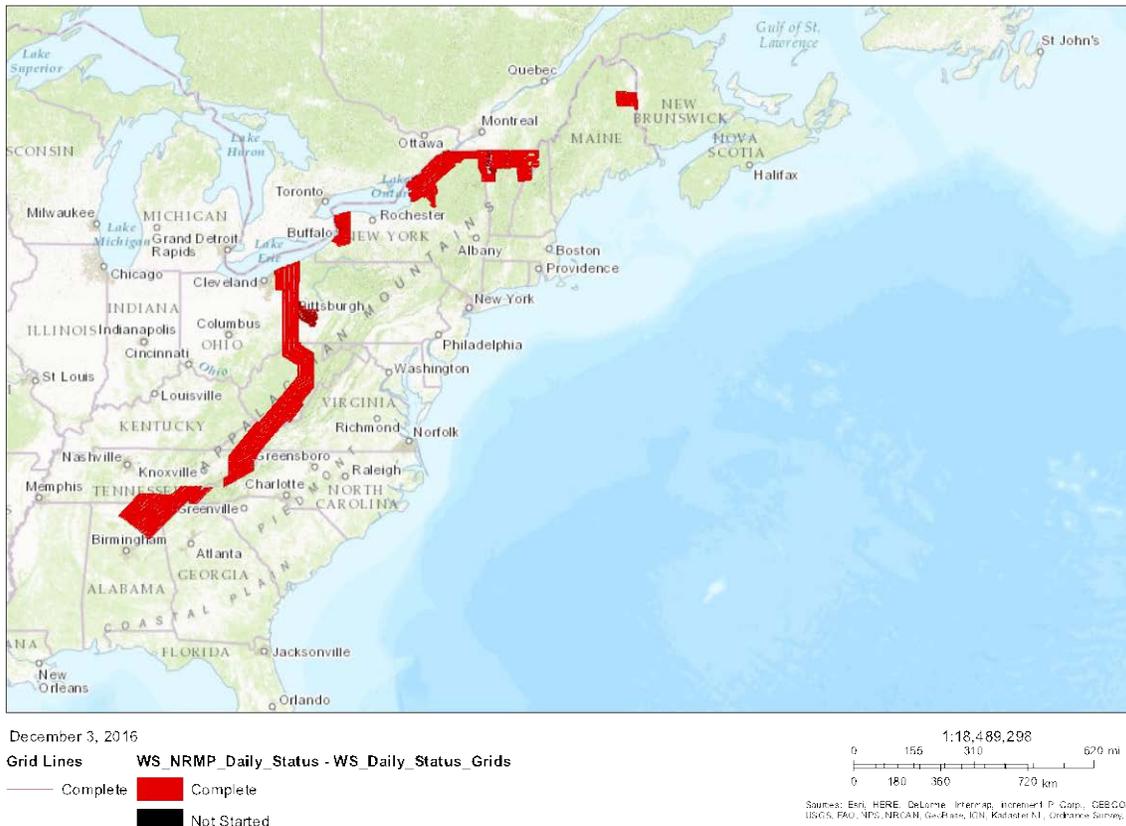


Figure 7. 2016 raccoon ORV distribution map.

## 1.1 RACCOON ORAL RABIES VACCINATION BACKGROUND

The ORV baits that are used during Allegheny County’s baiting week contain the recombinant rabies vaccine known as Raboral V-RG®. The vaccine itself is carried in a plastic sachet encased in a solid fishmeal-based coating to entice raccoons to consume them (see **Figure 8**).<sup>9</sup> ORV baits are developed and manufactured by Merial, Inc. (the animal health division of the Sanofi

company), and are approved for immunizations of raccoons and coyotes.<sup>10</sup> These baits have been used in the United States since 1990, and currently are distributed in sixteen states, including Pennsylvania.<sup>11</sup>

The ORV baits are about the size of a matchbox and rely on the fishmeal polymer coating to appeal to raccoons in the wild. Raboral V-RG® immunizes raccoons during the eating process, where the vaccine is exposed to tissues in the animal's mouth and elicits an immune response against RABV.<sup>10</sup> After consumption of the ORV bait, the animal becomes protected against the rabies virus in approximately ten to fourteen days.<sup>10</sup> In Allegheny County, the ORV baits are provided to ACHD by a partnership with the USDA Wildlife services.



**Figure 8.** Enlarged photo of an ORV bait in a gloved hand.

## **1.2 RACCOON RABIES BAITING PROCESS**

Since the first rendition of the rabies baiting program in Allegheny County, one or two people have been in charge. In August 2016 the administrator of the program was Lori Horowitz, an ACHD employee; it was her first time doing so. I was chosen as her intern and we had the

pleasure of . Planning the program began four months prior to the program start date and mostly focused on figuring out what to do first. There was little to no instruction left from the previous organizers. We knew the basic overview of the program because Lori had participated in previous years. What is described here is the process of the raccoon baiting week program from the perspective of both an organizer and a participant.

### **1.2.1 PARTICIPANTS**

ACHD employees are key participants in the program but are not required to be involved. The employees get paid their regular salary to bait with the program and have the opportunity to leave their normal job to help during the five days of baiting. Since the program has been ongoing for 15 years, many ACHD employees are familiar with the project and are often eager to be involved. ORV baiting requires multiple hours of driving to reach all parts of the county. ACHD utilizes only county-owned vehicles for baiting purposes, which can be driven only by county employees. Outside volunteers are also welcomed, but these participants are not allowed to drive the county vehicles because of insurance issues. Outside volunteers range from interested University of Pittsburgh students and professors to ordinary citizens looking to assist in public health endeavors. Volunteers are partnered into teams of two or three to journey out to the field where they distribute baits in designated areas.

### **1.2.2 RECRUITMENT**

Since ACHD employees are the only individuals allowed to drive the county vehicles, the majority of recruiting efforts are spent reaching out to them. The program intern from the

previous year of the baiting program spent her efforts drafting approximately 50 teams that are assigned to specific locations within Allegheny County. The teams are based on the size and geographic position of Allegheny County's. For example, some teams were assigned only one municipality to be completed in three consecutive days due to larger surface area and other factors determined by the USDA, while other teams were assigned five smaller municipalities that neighbor each other to be completed in one day. With the teams already set up, the main task is to recruit at least 100 volunteers to fill the slots.

All of the estimated 300 ACHD employees received three e-mails asking for their help sent on behalf of Lori and I. The first e-mail was sent roughly seven weeks prior to the program start date, the second was sent three weeks prior as a reminder, and the third was sent ten days prior as a last call. Included in the e-mail was a web link to the SurveyMonkey® website that allowed interested volunteers to sign up by filling out the sign-up survey. Outside volunteers were recruited through posted flyers and the ACHD website which both contained the SurveyMonkey® sign-up survey link.

The sign-up survey consisted of five questions. The first question asked about the respondent's basic information including name, contact information, whether or not they worked for ACHD, and if so what division. The second question asked the respondent to select one to five of the dates (August 8 – 12) that they were able to bait. The third question asked if there was a specific location where they would prefer to bait, possibly a location that they were familiar with or had baited in previous years. The fourth question asked if there was a specific person with whom they would like to be partnered or teamed. The final question asked the respondent to choose one of the two mandatory training sessions offered by the USDA Wildlife Services.

### **1.2.3 SCHEDULING**

All responses from the SurveyMonkey® sign-up survey were individually exported into a spreadsheet. Respondents were then sent a confirmation e-mail notifying them of the days they were scheduled to be trained and to bait, as well as an overall verification that their sign-up had been received. Approximately one week prior to the program start date, the volunteers were assigned to teams and sent an e-mail notifying them of their teammates and respective contact information so that they could reach out and decide a morning start time.

### **1.2.4 TRAINING**

Baiting training is mandatory for all volunteers, even if an individual has baited in previous years. Training is provided by the USDA Wildlife Services and lasts approximately one hour. Due to the large number of volunteers, the 2016 training was split into two sessions and volunteers chose one to attend. During the training, a USDA representative presented background information about the importance of raccoon baiting, how and where to safely bait, and where to avoid baiting. Following the one-hour session, volunteers were required to sign baiting consent form, and were presented with a complimentary ACHD baiting t-shirt.

### **1.2.5 BAITING EXPERIENCE**

Baiting takes place for five working days in August; participants can opt to bait one to five days. This year, 302,040 baits needed to be spread as evenly as possible throughout Allegheny County. Volunteers are expected to complete a full working day, which is eight hours including a lunch

break of up to one hour. Participants can begin baiting as early as 6am, and are recommended to begin by at least 9am. The morning of a baiting day, volunteers meet at the designated building where an office is set up to welcome baiters.

Once volunteers enter the office, they sign in with organizers at the counter station. Each team is given items it will need throughout the day: a checklist of instructions, keys to a designated vehicle, an ACHD gas card with instructions on how to use it, an ACHD phone number in case of emergency, a map of the designated baiting location, a highlighter and pen to mark the map, an emergency strobe light for the top of vehicles, two large magnets for the side of vehicles that state “Allegheny County Health Department Rabies Vaccination Program,” three pairs of latex gloves, alcohol hand sanitizing wipes, and pamphlets in case normal citizens inquire about the program. Teams then sign out a county vehicle (ACHD driver), are sent to the upper car lot to retrieve their vehicle, and are instructed to pick up their ORV baits at the USDA refrigerated trailer in the lower car lot. Subsequently, teams collect their designated number of baits in boxes (the number of baits depends on assigned location) and are given a folder with information from the USDA Wildlife Services. As soon as teams have their vehicles loaded, they head to their baiting location.

When the teams reach their location, they pull over and put the strobe light on the top of the vehicle and the two aforementioned magnets on both sides of the vehicle. With the flashing light and emergency blinkers on, the driver travels at approximately 25 miles per hour while the passenger safely throws the ORV baits out of the passenger window and into appropriate baiting areas at a rate of roughly two baits per five seconds. On the map provided, the passenger marks the roads they have baited with a highlighter pen. Some areas take more than one day to bait, so it is useful to know which areas remain to be baited in case it is not the same team baiting the

following days. Once finished with a day's work of baiting, teams will go back to the Central Supply office and return the vehicle keys, supplies, baits (if any remain), and a record of the number of miles driven. Baiting week was considered completed when the 302,040<sup>th</sup> bait was thrown out of the vehicle. This year, baiting week was successfully completed in five days and did not have to continue into a second week, which has occurred in previous years. This was able to happen because Lori and I volunteered to take on any area that was not baited. I stood in all five days, and thus was not able to fully help Lori assist volunteers during the mornings or evenings. Likewise, when Lori and I were out baiting, two employees from the Central Supply building had to take over our tasks if need be.

## **2.0 ASSESSMENT OF RACCOON RABIES BAITING WEEK PROCESS**

### **2.1 METHODS**

In order to assess the process of raccoon baiting week in Allegheny County, we relied on the stakeholders of the program to give us their viewpoint. For this situation, a stakeholder is an individual who participated in the baiting program and is interested in its success. A survey was designed to ask stakeholders (who were allowed to respond anonymously) about various aspects of the baiting program and their experiences, while also inviting them to provide comments or suggestions. The survey questions asked about the following components: basic demographics, signing up and recruitment, scheduling, training, baiting experience, and overall comments or suggestions about the program as a whole. Shortly after the program end date, all participants were sent e-mails that included a link to this survey via SurveyMonkey®.

### **2.2 RESULTS**

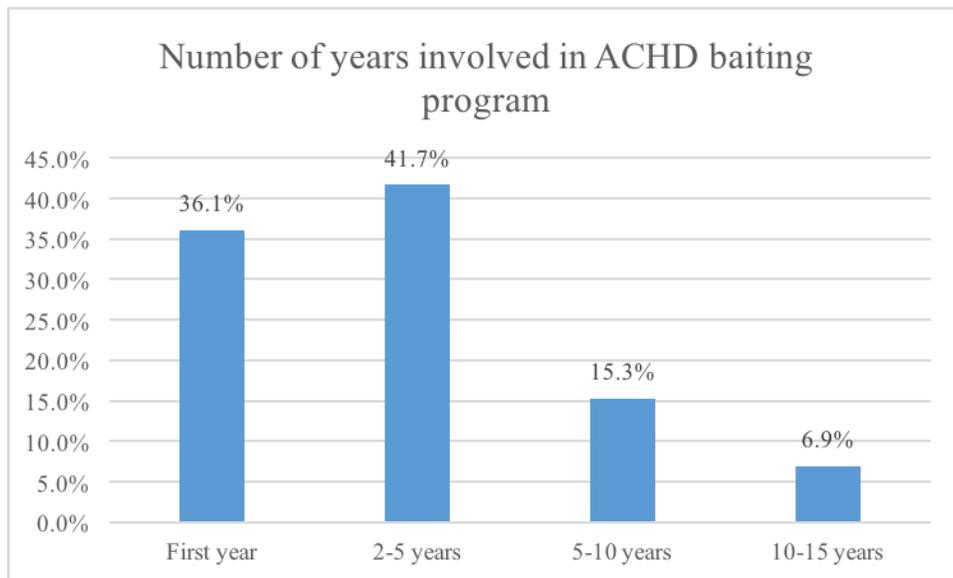
Of the 97 stakeholders who were invited to participate in the post-baiting survey, 72 responded, a response rate of 74%.

## 2.2.1 PARTICIPANTS

The majority of survey respondents were ACHD employees (82%), while 14% were outside volunteers, and 4% were student volunteers (**Table 1**). Shown in **Figure 9**, most respondents have been involved in the ACHD baiting program for less than five years (77%), while a moderate percentage experienced baiting week for their first time in August 2016 (36%).

**Table 1.** Basic demographics of program participants who completed post-baiting survey.

Answer Options	Response Percent	Response Count
Allegheny County Health Department employee	81.9%	59
Student Volunteer	4.2%	3
Outside Volunteer	13.9%	10
<i>Total Responses</i>	<b>72</b>	



**Figure 9.** Responses to number of years involved in ACHD baiting program.

## 2.2.2 RECRUITMENT AND SIGN-UP

No questions were asked about the recruitment method; however, a few comments emphasized a need for more publicity about the program or about the sign-up. One respondent said, “Not well enough publicized. I know lots of people who would have volunteered and others who did volunteer but who found out about it too late.”

In terms of the sign-up survey, most respondents found this method convenient. On a scale of one to five, the average rating for the sign-up survey was 4.39. When asked if there were any suggestions about the sign-up method, respondents reflected on lag time between initial sign-up and ultimate team assignment. Others commented on whether a sign-up survey was necessary at all. One respondent said, “It is ok to do a sign-up survey, but I remember thinking to myself, ‘is this really necessary[?] I have been doing this for 15 years, they know I am going to rabies bait.’ In the past, I just sent an email to the coordinator. So, it seemed like overkill to me, but I realize everyone wants to use the latest widgets to get things done nowadays.” Nonetheless, other respondents were satisfied with the sign-up survey and felt as though their needs were met.

When participants were asked about their sense of urgency to sign up for the baiting program, the majority (51%) answered that they wanted to sign up as soon as possible, while 35% put off signing up a few times, and 10% answered that they put off signing up because it does not matter how soon or late they sign up (**Table 2**). Comments related to this question reflected that a higher sense of urgency was associated with being assigned their requested baiting location(s) and team partner(s) as early as possible. On the other hand, numerous individuals noted that they needed their supervisor’s permission before they signed up. Three separate respondents expressed that they were told by their supervisors not to sign up for the baiting program until approval had been given to them, yet approval was never given, and they

eventually signed up anyway. Respondents were asked how difficult it was to get permission from their supervisor to miss work for the baiting program; more than half declared that it was very easy (60%) and only 3% said it was very difficult (**Table 3**). When asked how difficult it was for them to miss their normal work during baiting week, 42.3% answered somewhat easy, while 27% answered somewhat difficult (**Table 4**).

Survey respondents were asked if they would prefer a real-time sign-up method, such as an online google document. While 37.5% said they would prefer this method, 32% said they would not prefer this method, and 31% did not have an opinion on the matter. One significant comment noted “that [a real-time sign-up method] makes it possible for someone to claim an area that is routinely baited and well known by another person/team. Also, previous spreadsheet sign-up was problematic due to multiple people trying to edit at the same time.” Many commented that this method might confuse older participants due to novel technology that they might not be familiar with.

**Table 2.** Survey responses to participant’s sense of urgency to sign-up for baiting program.

<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
I wanted to sign up as soon as possible	50.7%	36
I put off signing up a few times, but I eventually got around to it	35.2%	25
I put off signing up because it doesn’t matter how soon or late I sign up	9.9%	7
I didn’t know we could/had to sign up, I thought we just showed up	0.0%	0
<b><i>Total Responses</i></b>	<b>71</b>	

**Table 3.** Survey responses to participant’s sense of difficulty to get permission from supervisor to miss work during baiting program.

<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
Very easy	59.7%	43
Somewhat easy	20.8%	15
Somewhat difficult	5.6%	4
Very difficult	2.8%	8
<b>Total Responses</b>	<b>72</b>	

**Table 4.** Survey responses to participant’s sense of difficulty to miss work during the baiting program.

<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
Very easy	18.3%	13
Somewhat easy	42.3%	30
Somewhat difficult	26.8%	19
Very difficult	5.6%	4
This does not apply to me	7.0%	5
<b>Total Responses</b>	<b>71</b>	

### 2.2.3 TRAINING

Respondents rated the information during the mandatory baiting training as an average of 3.75 on a scale of five based on how helpful or informational the training was. Most respondents commented on how the same information is repeated year after year, and can become tedious. Despite this, one respondent commented “[training] is important to have every year, you really do forget some of the small things no matter how many times you've baited.” Overall, first-time baiters found the training very helpful and some even suggested incorporating a video into the

training for further information. At the same time, individuals who have attended the training for more than two years had a general attitude of the training session being unnecessary. One respondent suggested dividing the sessions into two, one being a new volunteer training and the other a veteran volunteer training, so that newcomers could ask questions without feeling like a hindrance to veteran baiters.

#### **2.2.4 BAITING EXPERIENCE**

The majority of respondents participated for one day (48%), while 13% participated for all five days (**Figure 10**). When respondents were asked about the flow of the morning(s) of the baiting program, most answered that everything was organized and efficient and that their team was well prepared to go out and bait. Only one person answered that it was a complete disaster and that everything should be changed because they were not prepared to go out and bait (**Table 5**). Respondents commented on several uncertainties such as where they were supposed to park, meet their teams, and receive supplies they needed. One commented that it would be more productive to have the welcome stations set up outside instead of inside the Central Supply office. Others suggested posting large signs in order to uniformly direct volunteers and increase efficiency.

The majority of respondents knew the partner(s) in their team (**Table 6**). Most commented that knowing their partner made a more preferable baiting experience. Likewise, having their team member's contact information was of great importance when deciding on a morning meeting time. One respondent suggested having ACHD employees ask family or friends if they would like to partner with them instead of recruiting outside volunteers who have no affiliation with ACHD in order to make the experience more enjoyable. Another respondent

did not request their partner, but their partner requested them, and suggested making sure the partnering was mutually agreed upon before assigning teams. Other respondents were concerned about difficulties getting in touch with their team members they did not previously know, some could not contact of their partners at all, which was problematic because they were not able to designate a start time.

The greater number of survey respondents were not familiar with their assigned baiting location (57%), while 32.4% answered that they knew their assigned location because they requested it (**Table 7**). Ten percent of respondents were not comfortable with being assigned a location that they were unfamiliar with. One person commented that they were not aware that they would have to navigate in unfamiliar territories, and would have appreciated a notification on this matter. While some criticized baiting in new territories by commenting that people should be assigned only in areas they know, others found it fun to explore new areas. A large portion (47%) of individuals did not know their assigned baiting location, but were comfortable learning a new area.

On a scale of one to five, a 3.77 rating average was given to helpfulness of the maps created for specific baiting areas. When asked if respondents would like to see changes to the maps, 39% said yes. A great number of suggestions and comments about the maps were given, including adding more definitive boundaries, incorporating landmarks, adding a starting location, specifying where not to drive such as private roads and driveways, adding more street names, having a one page map for each municipality instead of breaking up bigger locations into multi-paged maps, adding baiting hotspots, adding directions from the Central Supply building to the specific location, adding a pre-plotted route to bait, and doing away with the map altogether and rely solely on technology. An online map was available for the 2016 baiting season; respondents

who tried this version noted that it was often difficult to utilize and that parts of their area were not available or not working.

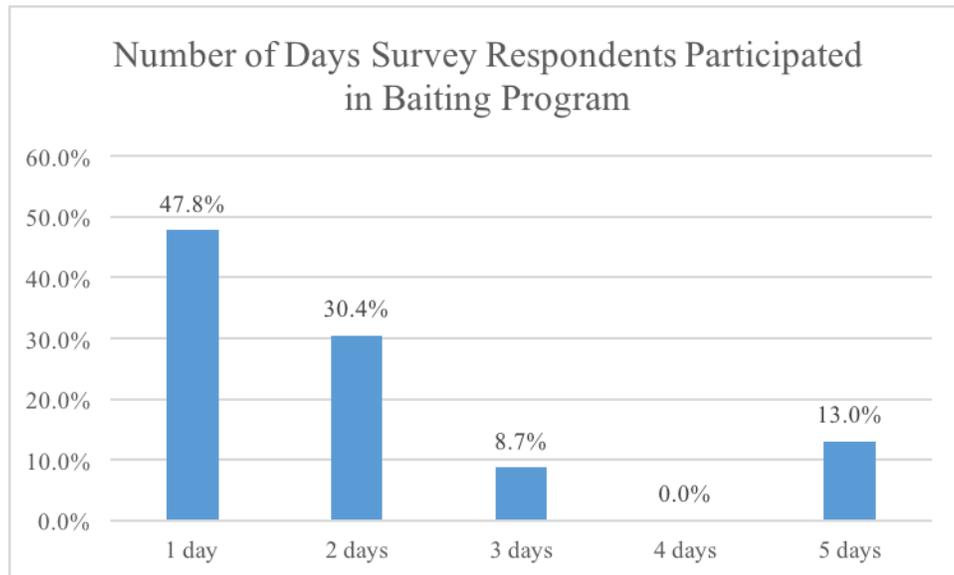
When respondents were asked about their experience upon returning to the Central Supply building after their day(s) of baiting, an average rating of 4.35 out of five was given based on the clarity and efficiency of the process. Most comments again focused on confusion from lack of directions or signage. One respondent suggested, “have someone there to greet each incoming vehicle, confirm into which recycle bin the empty boxes were to go and into which dumpster the trash was to go. [Also,] have someone on hand to help baiters with questions about paperwork.” Other respondents noted that their ease was associated with the experience of veteran team members who knew the process from previous years. Another who had participated in previous years was still confused, and said “Even after 15 years, I can never remember if you guys want the [paperwork] at the end of the day. And of course, we always forgot to record the final mileage on the vehicle. Giving back unused baits was also a little unclear.”

The bulk of respondents (76%) said they would bait again next year, while 23% were not sure if they would participate, and one respondent declared that they would not participate in the program next year. Respondents were asked to leave any additional comments or suggestions about the baiting program. Examples of stakeholder suggestions are as follows:

- *I know there [were] difficulties with outside volunteers this year. One individual that was signed up to bait with my team didn't show up and didn't call to let anyone know, so we were delayed getting started to wait for her. I definitely think this happens more often with outside volunteers, so that should be considered for next year. At the same time, one ACHD employee I baited with stated he thinks his wife would love to do this with him next year, and has community service hours she can take off from work for things like this. So I think that if you have a connection to an ACHD employee, you should still be able to volunteer in the future (if outside volunteers are banned next year). I think if a person has a connection to an employee and can have the support of that employee they should*

*be allowed to sign up. I think there are a lot of reliable outside volunteers, they just need to have a closer connection to ACHD and feel more committed.*

- *On the last day of baiting, our vehicle had under a quarter tank of gas, baits were under the seat & in the door shelving - smelled horrible; when getting the vehicle cleaned, discovered prior team did not throw out their baiting boxes - instead left them in the trunk.*
- *My biggest pet peeve with the program is the weak support received from the highest management for the "recruitment" process. If the Director wants this program to be done, she should say to her Deputies, "I want this done!" Then there is none of this business of "Well you can volunteer, but you have to check with your supervisor." Baloney. If she wants it done, then people will have to see that it gets done. Otherwise you have the situation we face - an ever dwindling number of "volunteers."*
- *We should look at a way to reduce the amount of paperwork, perhaps by having all necessary info on just one sheet (even a tabloid folded in half would be cool). Also, new shirt design with a raccoon on it.*



**Figure 10.** Number of days survey respondents participated in baiting program.

**Table 5.** Survey responses to participant's experience during the morning(s) of baiting program.

<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
Everything was organized and efficient, my team was well informed and well prepared to go out and bait.	70.0%	49
Some things were not clear to our team, but for the most part I was well prepared to go and bait.	24.3%	17
The process was confusing and unorganized. We eventually got out to bait, but it took a while.	4.3%	3
It was a complete disaster, everything should be changed because I was not well prepared to go out and bait.	1.4%	1
<i>Total Responses</i>	<b>70</b>	

**Table 6.** Survey responses to participant's experience with assigned team(s).

<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
I knew my partner(s) because I requested them.	43.1%	31
I knew my partner(s) but I did not request them.	22.2%	16
I did not know my partner(s) beforehand, but I felt comfortable baiting with them.	33.3%	24
I did not know my partner(s) beforehand and I did not feel comfortable baiting with them.	1.4%	1
Other	15.3%	11
<i>Total Responses</i>	<b>72</b>	

**Table 7.** Survey responses to participant's experience with assigned baiting location.

<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
I knew the location(s) I was assigned because I requested this.	32.4%	23
I knew the location(s) I was assigned but I did not request this.	12.7%	9
I did not know the location(s) I was assigned, but I was comfortable learning a new location.	46.5%	33
I did not know the location(s) I was assigned and I did not feel too comfortable with this.	9.9%	7
Other	14.1%	10
<i>Total Responses</i>	<b>71</b>	

### **3.0 DISCUSSION**

Overall, respondents were satisfied with the 2016 ACHD baiting program. That said, many were willing to offer comments or suggestions to improve the program's efficiency and overall baiting experience. Most respondents were ACHD employees. Not only are these individuals the only ones who are allowed to drive the county vehicles that are utilized in baiting week, they also get paid their regular salary to participate, and are important for representing the public health values embedded in ACHD.

Although multiple e-mails were sent out to ACHD employees to recruit for the program, many respondents thought that this method could be improved. This may be due to the fact that not every employee routinely checks their e-mail. Many employees do not work in an office setting on a daily basis so may benefit from being informed about baiting week by their supervisors or administrators. Likewise, many expressed that by notifying employees that they could invite a friend or family member may benefit the overall experience, as well as increase the number of interested volunteers. This effort would be an alternative to recruiting outside volunteers who have no affiliation with ACHD. It was noted that some outside volunteers were not able to be contacted by their ACHD team members, some not showing up at all, and without any notice, which caused complications and delays on baiting days. Surprisingly, no comments were made about offering incentives. This may be due to the fact that ACHD employees are being paid, or that their true intent is for the betterment of public health in Allegheny County.

Sign-up was done online. The majority of respondents were satisfied with this method, but a large portion wanted to see changes to some aspects. One suggestion was faster follow-up time from when individuals first signed up to when they were notified of their assigned teams and locations. These comments were likely from those volunteers who did not know their partners, and needed to contact them to decide a morning meeting time. Numerous volunteers were waiting for approval by their supervisors before they signed up to participate in the program, which caused them to sign up later rather than sooner. It was evident that some respondents' work coverage needed to be established before signing up, which is understandable, but that their supervisors failed to follow up with any accommodations. Others were grateful that their supervisors were willing to let them take up to five days off work to participate in the program. It is understandable that ACHD services must not be interrupted by the baiting program; however, it may be beneficial that supervisors allow their employees to participate in this important public health program.

The post-baiting survey made it apparent that procedures for the mornings and evenings of the baiting program were somewhat confusing. Many suggested posting large signs, or setting up stations outside so that instruction would be more clear. This could mean that an organizer is stationed at the Central Supply building during mornings when volunteers arrive, and in the evenings when volunteers are through with a day of baiting. Participants noted that there were too many papers to read and keep track of; they suggested reducing the volume of paperwork or organizing it in a compact booklet. Volunteers also expressed that they were going back and forth to the office to get items they forgot or were not given; they suggested having "kits" of supplies and paperwork ready to go, and to have someone available to thoroughly explain all

activities. Having said that, it could be very beneficial to explain this process step-by-step during the training session instead of the day of.

Many people offered suggestions on the maps given to teams. While some are more reasonable than others, it must be noted that there are 130 municipality maps that are created each year, making it very difficult to add a multitude of changes to each map. Some suggestions that may be both feasible and useful are updating street names yearly, adding a small number of landmarks to each map, adding a route starting point, and creating one-paged maps instead of multi-paged maps. Since a number of respondents were uncomfortable baiting in an area they were unfamiliar with, it may be of value to include a warning or disclaimer on the sign-up survey that individuals may encounter this situation, and to contact an organizer as soon as possible in order to make proper arrangements beforehand.

## 4.0 CONCLUSIONS

The NRMP in the U.S. is important to containing and eventually eliminating wildlife rabies. While the majority of ORVs are distributed by aircraft, ground baiting plays a significant role in eliminating rabies in urban areas where distribution by aircraft is not feasible. Fifty nine percent of ground baiting occurs in Allegheny County, which is considered the largest ground effort in the United States. This essay reported on activities of the raccoon ORV baiting program in Allegheny County, while presenting insights from stakeholders and organizers.

There are limitations to this essay. Not all volunteers and organizers completed the survey, 74% participated in the post-baiting survey. It was initially proposed to conduct in-depth interviews with a select few stakeholders; however, time constraints did not allow for this.

Ultimately, our most notable recommendations are as follows. First, recruitment should be focused solely on ACHD participants, with the exception of outside and student volunteers who have been involved for the past few years (this mainly refers to University of Pittsburgh faculty and students). This is because ACHD employees are the only individuals who are allowed to drive the county vehicles. Likewise, allowing ACHD employees to invite their friends and family to be a part of their team may be a fair incentive. It may be wise to start drawing attention to baiting week up to two months in advance, in order to make individuals aware of the program as much as possible. This can be done by informing supervisors or administrators first, so that they are aware that they will need to arrange coverage for their staff. Many interested

volunteers were told not to sign up until they were given approval by their supervisor, but never got this approval. Because of supervisor or work-related issues, many participants had to cancel or change their baiting date last minute, which caused significant delays to arranging teams. A possible solution to this problem would be to notify all ACHD supervisors via e-mail at least eight weeks in advance that we will be recruiting volunteers for the baiting program. This e-mail should emphasize that the program needs as many volunteers as possible, and that we would appreciate any collaboration.

ACHD employees may be more interested in participating if they were encouraged to invite a friend or family member to join their baiting team. This should not be a problem with any ACHD policies, as long as all individuals attend the training session. On the sign-up survey, it is also imperative to include multiple disclaimers including these: ACHD participants may be chosen to drive a vehicle during baiting, participants may have to navigate in unfamiliar areas, participants may be partnered with an individual they do not know, participants may not be given the partner or location they requested, and ACHD employees must have permission from their supervisors before signing up. With these disclaimers set, participants can contact organizers immediately so that their requests can be accommodated. Signing up for the program should be closed at least 7 days prior to the training day. This allows for ample time to schedule all volunteers, and inform them of their teams so that they can get in contact with them to decide a meeting time.

To accommodate both experienced and new volunteers, separate training sessions may be beneficial: one session to refresh experienced baiters on important components of the program, and the other being a more in depth training that encourages discussions and questions from volunteers. In addition, it would be very helpful if the organizer(s) of the program presented the

baiting day activities in a step-by-step fashion during training sessions. This way, volunteers would know exactly what to expect when they arrive on the morning(s) of the baiting program, and when they return after a day's work of baiting. This explanation would ideally consist of a computerized presentation with pictures, which would help volunteers to familiarize themselves with the process.

Furthermore, in order to reduce the amount of confusion on the mornings and evenings of the program, we recommend posting large signs that instruct volunteers where to get all supplies needed for the day. This would first be the Central Supply office. The sign would state that volunteers need to check in here first. At least two organizers should be present to assist teams at all times when they arrive and are being signed in. Supplies would ideally be prepared beforehand as "kits" and be organized by team. Volunteers would still need to go from the office, to the car lot, and then to the baiting trailer to pick up their ORV baits. However, volunteers would be familiarized on the overall process thanks to the explanation given during training. A sign should also be placed on the USDA trailer that contains ORV baits, and would indicate that this is where the baits are to be picked-up and dropped off at the end of the day if need be.

Changes to the 130 municipality maps will likely take a great deal of time. This effort should preferably focus on updating street names yearly, adding a small number of landmarks, adding a route starting point (with an address to ease navigation), and creating one-paged maps instead of multi-paged maps.

Concluding a day's worth of baiting should also incorporate at least two organizers being present at all times to assist volunteers with their final tasks. If possible, volunteers would be aware of what they are expected to do once they get back to the Central Supply office, thanks to a thorough explanation given during training. Lastly, overall respect must be promoted for

county vehicles. These vehicles are ordinarily used by ACHD employees on a daily basis, or may be used by another baiting team the following day. Thus, the vehicle should be cleaned and inspected prior to the end of use.

Ultimately, the main goals of this essay were to report on ACHD's ORV baiting program and to improve the programs efficiency and overall experience for years to come. It is crucial to evaluate the process of public health programs in order to account for activities and fine-tune existing program operations and strategies. Likewise, this evaluation may be useful to document activities of raccoon baiting week for potential replication in other counties. Since a bigger goal of the ORV baiting program is to eventually eliminate RABV in Allegheny County, it is valuable to make inquiries about the current state of the program process, and make an effort to recommend any changes that may improve the program in order to reach this goal.

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