Report to United States Department of Agriculture Federal-State Marketing Program for "Increasing Pollination Revenue and Guaranteeing Unadulterated Honey from Wyoming"

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Federal-State Marketing Improvement Program

Final Performance Report

For the Period of [October 1, 2013 – September 30, 2015]

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Recipient Name: University of Wyoming

Project Title: Increasing Pollination Revenue and Guaranteeing Unadulterated Honey from Wyoming

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Background

Worldwide, honey bees pollinate approximately 70% of the world's food production, increasing global food production values by as much as $195.8 billion a year (United Nations Environment Program, 2010). In the United States, beekeepers use bees to generate income from pollination services as well as produce honey. For some beekeepers, pollination services income now exceeds honey production income (Burgett, Daberkow, Rucker, & Thurman, 2010). Concurrently, the domestic honey market has experienced considerable challenges (e.g., disease and habitat loss). In fact, United States beekeepers only produce approximately 30% of the US honey supply. It is essential to understand all facets of beekeeping enterprises to explore beekeeper adaptation and resilience to market and environmental challenges. In Wyoming, beekeepers need baseline pollination market information to achieve their market potential in the state, region and nation.

Wyoming pollination market challenges

Over the last decade, Wyoming beekeepers have increased their winter-month employment by providing pollination services to out-of-state fruit and vegetable growers on the West Coast (Wyoming State Beekeepers Association, 2010). In 2013 there were 35,000 bee colonies in Wyoming, but it was unknown what percentage is used for pollination. Rucker et al. (2012) report 90 percent of honeybee colonies in a neighbouring region, the Pacific West, are available for pollination. In 2009, national annual beekeeper pollination revenue, $350 million, exceeded that of honey, $208 million (Rucker, et al., 2012). If 90 percent of the honeybee colonies in Wyoming

were available for pollination, the statewide economic value may be $4.6 million.[1] Unfortunately, little data has been available about the market for Wyoming pollination services either within or outside of Wyoming.

Wyoming beekeepers need pollination market information to achieve regional and national competitiveness. It is currently unclear how industry structure and organization influences honey and pollination market competitiveness in Wyoming. For example, what is the optimal firm size to enter the pollination market? Other regions, such as the Pacific Northwest, are more equipped with market information to enter pollination contract negotiations (Burgett, et al., 2010; Rucker, et al., 2012).

Overcoming Pollination Market Information Deficiencies

This pollination business information void creates marketing challenges for multiple parties. First, beekeepers do not have clear pollination market price information. Pollination contracts are negotiated on an individual basis without market-clearing price information. Further, they are highly variable, ranging from $3.11 per colony for pollinating crops such as vetch to $75.61 per colony for almond pollination. The lack of pollination market information leaves new and less experienced beekeepers at a disadvantage in pollination contract negotiations.

Second, agribusinesses servicing the beekeeping industry may better meet beekeeper needs with clearer information about industry structure and competitiveness for both pollination services and beekeeping. Beekeepers are serviced by a number of agribusiness supply businesses and act as their own suppliers (e.g., selling queen bees, grown bees, and honeycomb foundation) (Morse, 1994). The profit of those servicing the Wyoming beekeeping industry is limited by the dearth of industry information.

Goals and Objectives

Our long-term research goals are to provide market information to enable Wyoming beekeepers to overcome pollination service marketing challenges. Our long-term outreach goal is to support Wyoming beekeepers in evolving pollination market to capture greater economic value for their services and strengthen the Wyoming rural economy. We laid out the following research and outreach objectives and sub-objectives for this proposal:

- **Research Objective:** Measure the value of pollination services in Wyoming's economy and assess Wyoming's pollination industry structure and organization.
- **Outreach Objective**: Provide beekeepers with industry and market information to leverage their pollination contract negotiating position.

We accomplished these objectives using a mail survey of beekeepers in Montana, Utah, and Wyoming. The survey took place in the Spring of 2014.

[1] This economic value estimate assumes a beekeeper receives $145 per colony for pollination (Rucker, et al., 2012). The total revenue from pollination assumes each colony services two crops a year.

The questionnaire included questions about beekeepers experiences contracting bees for pollination services both in-and out-of-state. The total number of beekeepers surveyed and their response rates are listed in Table 1. Overally, we had a 44 percent response rate from the survey sample.

Table 1. Numbers of beekeepers registered and surveyed in Montana, Wyoming, and Utah

Region	Number of Registered Beekeepers	Number of Surveyed Beekeepers	Beekeepers Surveyed (Percent)	Number of Responses from Surveyed Beekeepers	Response Rate (Percent)
Montana	239	120	50	41	34
Utah	645	323	50	140	43
Wyoming	142	142	100	76	54
Total	1026	585	57	257	44

Fourteen percent or 38 of the 260 survey respondents were involved in a pollination contract. The average size of operation is similar across the two groups.

Contribution of Project Partners

This project would not be possible without the help and cooperation of academic and industry partners. First, we thank Drs. Kynda Curtis, Utah State University, and Anton Bekkerman, Montana State University. They lended their expertise and regional insights to the survey development. They also helped obtain beekeeper addresses in Montana and Utah.

We are especially grateful for our relationship with and support from the Wyoming Beekeepers Association. They invited our research team to their annual meeting during the project development phase. There, we were able to obtain beekeeper input into the survey and rally support for a positive survey response.

Results, Conclusions, and Lessons Learned

Beekeepers involved in pollination contracts (Pollinators) have 25.82 colonies on average (σ=14.58 colonies) while those who are not in pollination service contracts had 25.77 colonies on average (σ=14.27 colonies). The majority of beekeepers with pollination contracts were located in Utah (32 percent) and Wyoming (45 percent). Only 24 percent of beekeepers in Montana had pollination contracts.

The most popular and profitable crop to pollinate was almonds in California. The mean contract rate received by beekeepers for almonds was \$139.83 (σ=\$33.44) and apples was \$41.25 (σ=\$14.93) in 2013. Continued analysis of the data show the size and age of the beekeeping enterprise affect pollination servicing profitability. Older, more established beekeeping businesses are more likely to have direct contracts with growers. This reduces the fees to contract brokers and may also reduce contracted transportation costs.

As we continue to work with these data, we will focus on the factors affecting pollination servicing profitability, especially for almond pollination.

Lessons Learned

One of the biggest challenges to surveying pollination service producers is to identify the population. The vast majority of registered beekeepers are hobbyist managing ten or fewer colonies. Pollination servicing tends to occur amoung beekeepers with larger colonies numbers (e.g., more than 100 colonies), but not always. Further, they are not required to identify themselves in any way to the state (e.g., registering as a pollination service provider). Therefore, in order to identify the target population, we had to survey a large number of beekeepers. Even at that, we have a relatively small number of beekeepers involved in pollination, barely adequate for statistical analysis.

We were generally pleased to the overall response from beekeepers. Although there was a relatively small number involved in pollination, the overall response rate was good, 44 percent. Often individuals would follow up or write notes to ensure their survey was received.

We would advise others to be sure to have the support of the industry group and out-of-state partners ahead of research initiation. Compared to other recent projects we have done, these relationships made this project more successful.

Evaluation

The project is evaluated as a research and extension project—outputs include scholarly writing, research presentations and publications, and general educational presentations and publications. The research outputs include a master's thesis, working papers, and research poster presentations at conferences. The pollination servicing data analyzed to estimate the profitability of pollination servicing for Ms. Buddhika Patalee's masters thesis, completed in May 2016. We also presented a poster entitled "A Supply-Side Analysis of the Pollination Industry Costs and Revenue Structures in the Northern Rockies" at the 2016 Pacific Northwest Regional Economics Conference in Vancouver, Washington.

The background and information from this project informed a 2015 *Choice's* publication entitled "Integrated Ecological and Economic Considerations for Pollinator Habitat Policy." In conjunction with this article, we presented a nationwide webinar on the topic for government officials and policy makers through the AAEA and C-FARE webinar series. It was one of the best, virtually attended seminars for that series with over one hundred viewers.

Our community and regional outreach has included presentation to local and state beekeeping and agricultural groups. In 2014, we presented a poster promoting participation in our research and information about pollination services at regional Agricultural Experiment Station field days. Also in 2014, we presented a brief overview of research objectives and prelimary results to the Wyoming State Beekeeper Association at the annual meeting in Casper, Wyoming.

Current or Future Benefits/Recommendations for Future Research

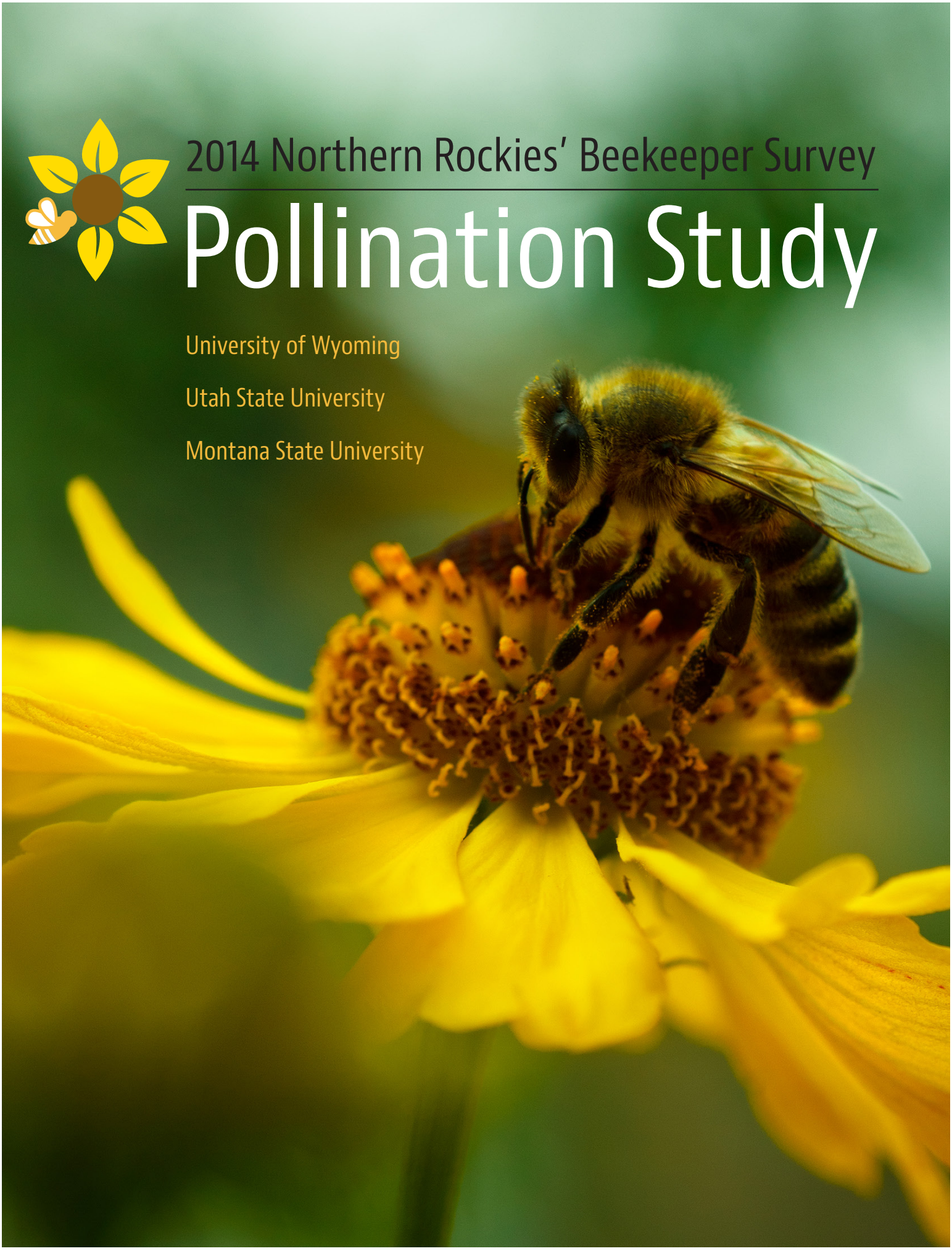
This project is providing researchers and producers with a benchmark for pollination services production costs. Prior to this work, little was known about the costs and profitability associated with pollination servicing. As more of our results are published, and more research is conducted, the cost structure of this industry will be clearer.

Future research may focus on conducting additional surveys to compare cost trends to the baseline. In addition, more attention is needed to access the costs and benefits of offering pollination services beyond almonds in California. While there are revenue opportunities for a number of alternative crops, few beekeepers in the Rocky Mountain region pursue them. It is not clear whether market prices or structure are hurdles to the alternative crops.

Project Beneficiaries

The primary beneficiaries of this project are new and existing beekeepers interested in expanding into pollination servicing. Already, new beekeepers interested in pollination services have found our presentations helpful to understand the costs and benefits of entering the industry. These are typically young and small-scale beekeepers in rural areas of the state.

The results of this work may also be beneficial to specialty crop growers. They may use the information to understand the supply-side costs of an business input and, possibly work with beekeepers to reduce these costs.



2014 Northern Rockies' Beekeeper Survey

Pollination Study

University of Wyoming

Utah State University

Montana State University

2014 Northern Rockies' Beekeeper Survey

Pollination Study

The objective of this survey is to assess the beekeeping industry in Montana, Utah, and Wyoming. Specifically, we wish to gain greater insight into beekeepers' role in pollination in the West. Our goal is to help beekeepers, such as you, to navigate the pollination market and secure the highest returns in both the honey and pollination markets. Your responses are voluntary and will be fully anonymous and confidential to all researchers. We expect this survey to take less than 30 minutes of your time. We greatly appreciate your time and consideration for this work.

MONTANA STATE UNIVERSITY

Utah State University
APPLIED ECONOMICS

University of Wyoming
Agricultural and Applied Economics

Section I. Pollination

1. What state is your beekeeping business located in?

   ☐ Montana(1) ☐ Utah(2) ☐ Wyoming(3)

2. How many honeybee colonies do you manage? _____ colonies

3. Are you in an agreement with a grower or broker to provide crop pollination services?

   ☐ No(0) ☐ Yes, direct with grower(s)(1) ☐ Yes, through a broker(2)

   If your answer to question 3 is **YES**, please answer the remaining questions in Section I. If your answer to question 3 is **NO**, please proceed to Section II.

4. Are your colonies transported out of your home state to any of the following states to perform pollination services? (check all that apply)

☐ Arizona(1)	☐ Mississippi(6)	☐ North Dakota(11)	☐ Washington(16)
☐ California(2)	☐ Montana(7)	☐ Oregon(12)	☐ Wyoming(17)
☐ Florida(3)	☐ Nebraska(8)	☐ South Dakota(13)	☐ Other(18) _____
☐ Idaho(4)	☐ Nevada(9)	☐ Texas(14)	
☐ Louisiana(5)	☐ New Mexico(10)	☐ Utah(15)	

5. In the last three years, for which crops did you provide pollination services and what is the average number of colonies you have placed on **in-state** pollination or nectar source? (answer all that apply)

Pollination Source (In-State)	Days of Pollination	Number of Colonies	Average Frames per Colony	Colonies Per Acre
1. Alfalfa(a)	___ days	___ colonies	___ frames	___ colonies
2. Apples(c)	___ days	___ colonies	___ frames	___ colonies
3. Cherries(f)	___ days	___ colonies	___ frames	___ colonies
4. Clover(g)	___ days	___ colonies	___ frames	___ colonies
5. Rapeseed(j)	___ days	___ colonies	___ frames	___ colonies
6. Squash and/or Pumpkins(l)	___ days	___ colonies	___ frames	___ colonies
7. Vetch(k)	___ days	___ colonies	___ frames	___ colonies
8. Other(m) _____	___ days	___ colonies	___ frames	___ colonies

6. In the last three years, for which crops did you provide pollination services and what is the average number of colonies you have placed on **out-of-state** pollination or nectar source? (answer all that apply)

Pollination Source (Out-of-State)	Days of Pollination	Number of Colonies	Average Frames per Colony	Colonies Per Acre
1. Alfalfa(a)	___ days	___ colonies	___ frames	___ colonies
2. Almonds(b)	___ days	___ colonies	___ frames	___ colonies
3. Apples(c)	___ days	___ colonies	___ frames	___ colonies
4. Blueberries(d)	___ days	___ colonies	___ frames	___ colonies
5. Broccoli(e)	___ days	___ colonies	___ frames	___ colonies
6. Cherries(f)	___ days	___ colonies	___ frames	___ colonies
7. Clover(g)	___ days	___ colonies	___ frames	___ colonies
8. Cranberries(h)	___ days	___ colonies	___ frames	___ colonies
9. Melons(i)	___ days	___ colonies	___ frames	___ colonies
10. Rapeseed(j)	___ days	___ colonies	___ frames	___ colonies
11. Squash and/or Pumpkins(l)	___ days	___ colonies	___ frames	___ colonies
12. Vetch(k)	___ days	___ colonies	___ frames	___ colonies
13. Other(m) _____	___ days	___ colonies	___ frames	___ colonies

7. Did you cooperate with any other beekeepers in transporting your colonies out-of-state (e.g., shared space on a semi-truck)?

☐ Yes(1) ☐ No(0)

8. In the last three years, did you pay rent to have your bees held at holding yard? If so, what was the rental rate?

☐ Yes(1) $_____ per colony ☐ No(0)

9. According to your response in question 5 and 6, please indicate if you **received payment** for your pollination services by reporting the average gross price per colony you received in 2013: (answer all that apply)

Pollination Source	**Average In-State Rate Received**	**Average Out-of-State Rate Received**
1. Alfalfa(a)	$_____per colony	$_____per colony
2. Almonds(b)	$_____per colony	$_____per colony
3. Apples(c)	$_____per colony	$_____per colony
4. Blueberries(d)	$_____per colony	$_____per colony
5. Broccoli(e)	$_____per colony	$_____per colony
6. Cherries(f)	$_____per colony	$_____per colony
7. Clover(g)	$_____per colony	$_____per colony
8. Cranberries(h)	$_____per colony	$_____per colony
9. Melons(i)	$_____per colony	$_____per colony
10. Rapeseed(j)	$_____per colony	$_____per colony
11. Squash and/or Pumpkins(k)	$_____per colony	$_____per colony
12. Vetch(l)	$_____per colony	$_____per colony
13. Other (m)_____	$_____per colony	$_____per colony

10. According to your response in question 5 and 6, please indicate if you **paid** for the opportunity to access a nectar source or a honey production yard by reporting the average rental price you **paid** per colony or for the total yard rental, depending on you situation, in 2013: (answer all that apply)

	Average In-state Rental Paid		**Average Out-of-State Rental Paid**	
Pollination Source	Per Colony **OR**	Total Yard Rental	Per Colony **OR**	Total Yard Rental
1. Alfalfa(a)	$_____per colony	$_____for yard	$_____per colony	$_____for yard
2. Almonds(b)	$_____per colony	$_____for yard	$_____per colony	$_____for yard
3. Apples(c)	$_____per colony	$_____for yard	$_____per colony	$_____for yard
4. Blueberries(d)	$_____per colony	$_____for yard	$_____per colony	$_____for yard
5. Broccoli(e)	$_____per colony	$_____for yard	$_____per colony	$_____for yard
6. Cherries(f)	$_____per colony	$_____for yard	$_____per colony	$_____for yard
7. Clover(g)	$_____per colony	$_____for yard	$_____per colony	$_____for yard
8. Cranberries(h)	$_____per colony	$_____for yard	$_____per colony	$_____for yard
9. Melons(i)	$_____per colony	$_____for yard	$_____per colony	$_____for yard
10. Rapeseed(j)	$_____per colony	$_____for yard	$_____per colony	$_____for yard
11. Squash and/or Pumpkins(l)	$_____per colony	$_____for yard	$_____per colony	$_____for yard
12. Vetch(k)	$_____per colony	$_____for yard	$_____per colony	$_____for yard
13. Other(m) _____	$_____per colony	$_____for yard	$_____per colony	$_____for yard

11. According to your response in question 5 and 6, please indicate if you **gave an in-kind rental payment (or a gift such as honey) in lieu of money, to pollinate crops** by reporting the type and quantity of gifts given for access to a nectar source or honey production yard in 2013: (answer all that apply)

	To In-State Grower		To Out-of-State Grower	
Pollination Source	**Type of Gift**	**Quantity of Gift per Colony**	**Type of Gift**	**Quantity of Gift per Colony**
1. Alfalfa(a)				
2. Almonds(b)				
3. Apples(c)				
4. Blueberries(d)				
5. Broccoli(e)				
6. Cherries(f)				
7. Clover(g)				
8. Cranberries(h)				
9. Melons(i)				
10. Rapeseed(j)				
11. Squash and/or Pumpkins(l)				
12. Vetch(k)				
13. Other(m) _____				

Section II. Honey Production and Marketing

1. How many of your colonies produced honey in 2013? _____ colonies

2. What were the total pounds of honey you harvested in 2013? _____ pounds

3. Do you preform your own honey extraction?

☐ Yes(1) ☐ No(0)

4. Where are you currently marketing your honey and what was the average price per pound in 2013 that you received? (answer all that apply)

Distribution Channel	Price per pound	Number of pounds
☐ Cooperative (e.g., Sue Bee Honey)(1)	$_____ per pound	_____lbs
☐ Commercial Extractor (Non-Cooperative)(2)	$_____ per pound	_____lbs
☐ Farmers' Market(3)	$_____ per pound	_____lbs
☐ Own Stand/Retail Outlet(4)	$_____ per pound	_____lbs
☐ Wholesale(5)	$_____ per pound	_____lbs
☐ On-line(6)	$_____ per pound	_____lbs
☐ Local Food Co-op(7)	$_____ per pound	_____lbs
☐ Other(0) _____	$_____ per pound	_____lbs

5. What do you think consumers value most about your honey? (Check one or all that apply.)

☐ Color(1)
☐ Geographic Origin(2)
☐ Nectar Source(3)
☐ Your Reputation(4)
☐ Processing(5)
☐ Raw State(6)
☐ Other(0)_____

6. In the last five years, have you altered your marketing strategies to sell honey or honey products in local markets (e.g., farmers' markets, local retail stores, CSAs, etc.)?

☐ Yes(1) ☐ No(0)

7. There may be additional, untapped opportunities for honey producers to gain increased value for their honey. Please indicate which of the following possible programs you find appealing. Please rate them individually on a scale from 1 to 5 where 1 is not appealing and 5 is very appealing. Please circle the number that corresponds to your interest in each marketing idea.

Marketing Strategy	Not Appealing	Less Appealing	Neutral	Somewhat Appealing	Very Appealing
1. Guaranteeing ethical production practices(a)	1	2	3	4	5
2. Marketing under a regional or Rocky Mountain origin label(b)	1	2	3	4	5
3. Promoting pollinator habitat(c)	1	2	3	4	5
4. Specialty product marketing including mead, vinegars, salves and creams, etc.(d)	1	2	3	4	5

Section III. General Business Information

1. Are you the owner and operator of your beekeeping business?

☐ Yes(1) ☐ No(0)

2. What is the primary form of ownership for your beekeeping business?

☐ Sole proprietorship(1)
☐ Partnership(2)
☐ Limited Liability Corporation(3)
☐ Corporation(4)
☐ Joint Venture(5)
☐ Other(0) _____

3. How many years has your beekeeping business or enterprise been in operation? _____ years

4. In 2013, did you keep bees as part of a larger agricultural business?

☐ Yes(1) ☐ No(0)

5. If the answer to question 4 is yes, select all of the agricultural enterprises that you keep bees as part of: (check all that apply)

☐ Grain(1)
☐ Dairy(2)
☐ Fruits(3)
☐ Vegetables(4)
☐ Livestock(5)
☐ Hay or Alfalfa(6)
☐ Aquaculture(7)
☐ Other(0) _____

The following questions all pertain to the time period from **January 1, 2013 to December 31, 2013**.

6. Approximately how much did you spend on varroa mite and other disease and parasite prevention, antibiotics, and equipment sterilization in 2013? $_____

7. How much did you spend on live bees in 2013, including queen bee replacement? $_____

8. Approximately how much did you spend, total, on supplemental feeding for your bees in 2013? $_____

9. In 2013, approximately how much time did you spend managing hives or colonies for pollination?
_____ hours per week

10. In 2013, how many hours of labor did you **hire** to help care for the colonies providing pollination services?
_____ hours per week

11. If the answer to question 11 is greater than zero, what was the total wages paid to hired labor? $_____

12. Approximately how much did you spend on transportation costs to transport colonies to their pollination sites or nectar sources in 2013 (total, both in-state and out-of-state)? $_____

13. Compared to the last five years, which of the following options best describes your 2013 expenses?

- ☐ Extremely High(1)
- ☐ Higher than Average(2)
- ☐ Average(3)
- ☐ Lower than Average(4)
- ☐ Extremely Low(5)

14. Did you invest in or repair hives in 2013? If so, how many hives were bought and repaired and what was the total cost?

Total Hives Repaired/Bought(a) _____ Total Cost(b) $ _____

15. Approximately how much did you spend on the following expenses in 2013 at both the whole farm level (your total enterprise if it includes activities besides beekeeping) and/or within the beekeeping enterprise? (If beekeeping is your only enterprise, please list expenses in that category only.)

Overhead Item	**Whole Farm**(W)	**Beekeeping**(B)
Accounting/Legal Fees(a)	$_____	$_____
Advertising(b)	$_____	$_____
Computer/Office Equipment(c)	$_____	$_____
Education(d)	$_____	$_____
Farm Shop(e)	$_____	$_____
Vehicles(f)	$_____	$_____
Property/Casualty Insurance(g)	$_____	$_____
Packaging(h)	$_____	$_____
Publications(i)	$_____	$_____
Umbrella Insurance(j)	$_____	$_____
Utilities/Phone(k)	$_____	$_____

16. In 2013, what were your gross revenues on your entire agricultural operation (including beekeeping and other enterprises)?

- ☐ Less than $0(1)
- ☐ $0 to $500(2)
- ☐ $500 to $1,000(3)
- ☐ $1,000 to $4,999(4)
- ☐ $5,000 to $9,999(5)
- ☐ $10,000 to $19,999(6)
- ☐ $20,000 to $39,999(7)
- ☐ $40,000 to $59,999(8)
- ☐ $60,000 to $99,999(9)
- ☐ $100,000 to $249,999(10)
- ☐ $250,000 to $499,999(11)
- ☐ $500,000 to $999,999(12)
- ☐ $1,000,000 or more(13)

17. Did you receive wages from off-farm employment in 2013?

- ☐ Yes(1)
- ☐ No(0)

If you answered **YES** to question 18, please continue to the next two questions. If you answer **NO** to question 18, please continue to question 21.

18. Approximately how many hours do you work per week in your off-farm employment? _____ hours

19. Approximately what is your off-farm employment annual salary?

- ☐ $0 to $500(1)
- ☐ $500 to $1,000(2)
- ☐ $1,000 to $4,999(3)
- ☐ $5,000 to $9,999(4)
- ☐ $10,000 to $19,999(5)
- ☐ $20,000 to $39,999(6)
- ☐ $40,000 to $59,999(7)
- ☐ $60,000 to $99,999(8)
- ☐ $100,000 to $249,999(9)
- ☐ $250,000 to $499,999(10)
- ☐ $500,000 to $999,999(11)
- ☐ $1,000,000 or more(12)

20. What is the highest degree of education you have completed?

- ☐ Less than high school(1)
- ☐ High School Diploma(2)
- ☐ Some college(3)
- ☐ Bachelor's degree(4)
- ☐ Graduate degree (e.g., M.Sc. or Ph.D.)(5)
- ☐ Professional degree (e.g., medical or law degree)(6)

21. What is your age? _____ years

22. Are you male or female?

- ☐ Female(1)
- ☐ Male(0)

23. Are you of Hispanic, Latino, or Spanish origin? (check all that apply)

- ☐ No, not of Hispanic, Latino, or Spanish origin(1)
- ☐ Yes, Mexican, Mexican America, Chicano(2)
- ☐ Yes, Puerto Rican(3)
- ☐ Yes, Cuban(4)
- ☐ Yes, another Hispanic, Latino, or Spanish origin(0)_____

24. Do you consider your race to be...(check all that apply)

- ☐ White(1)
- ☐ Black, African American, or Negro(2)
- ☐ American Indian or Alaska Native(3)
- ☐ Asian(4)
- ☐ Native Hawaiian or Pacific Islander(4)
- ☐ Other(0)_____

Additional Thoughts and Comments:

_____

_____

_____

<u>Thank you</u> for completing your survey. We greatly appreciate your cooperation and will guard the confidentiality of your responses.

Please place the survey in the self-addressed and stamped return envelope. As you do so, please fold it so that it is as flat as possible to ensure timely delivery. Mail in the survey and return post card separately.

Pollination Services Marketing Survey of Montana, Utah and Wyoming Beekeepers

M.A. Buddhika Patalee*; Mariah Ehmke*, PhD; Chian Jones Ritten*, PhD; Dasom Lee**; Kynda Curtis***, PhD; Anton Bekkerman****, PhD

*University of Wyoming, **Korean University, ***Montana State University, ****Utah State University

Introduction

Bee pollination can facilitate the production of many commercially important crops such as almonds, apples, and cherries while converting them into larger, higher yielding, and faster ripening fruits. Pollination fee determination depends on several factors including crop type, pollination area, beekeeper availability, and the number of colonies that produce honey. Within the US, bees pollinate nearly 40 million acres of crop lands. The value of commercially pollinated crops exceeds $14 billion a year (Kasina et al., 2009).

Problem Statement

The US has the world's most widespread and active pollination market. In the last few years, the supply of honeybees for pollination has declined due to environmental threats (Dixon (2009), disease risk (Genersch, 2010), and increased application of pesticides (Aliouane at al., 2009). On the other hand, there is an increase demand in managed honeybees due to increase in monoculture crops and increase demand in commercially pollinated crops. In order to overcome these challenges, more information is needed about the marketing and profitability of pollination services in the West.

Study Objectives

- Measure the size and scope of pollination services based in Northern Rockies
- Determine the cost drivers in firm operations
- Analyze the costs and industry structure to develop strategy recommendations for new and existing industry entrants

Methods

Data were collected from registered beekeepers in Montana, Utah, and Wyoming. There are total 1,027 registered beekeepers in all three states including 239 in Montana, 645 in Utah, and 142 in Wyoming.

All the beekeepers in Wyoming and half of the beekeepers in other two states were selected using random sampling technique.

Total Sample Size = 498

Montana = 101

Utah = 269

Wyoming = 128

Data Collection

Data were collected through a Mail Survey. The mail survey was conducted in two rounds from April to June of 2014.

The questionnaire was sent to all selected participants in round one. Records were maintained in order to identify the participants who did and did not respond. In the round two, the survey questionnaire was resent to non-respondents from round one.

Survey Questionnaire

Survey Questionnaire consisted with three sections.

Section I

Pollination Service Information

(contract type, crops, payments, rental fee)

Section II

Honey Production and Marketing

(honey production, marketing strategy)

Section III

General Business Information

(cost and revenue data for overall farm operation and beekeeping enterprise)

Data Summary

Followings are the summary statistics of beekeepers who are providing pollination service in state as well as out states.

Participants' Response Rates

Montana = 43%

Utah = 49%

Wyoming = 58%

Total No of beekeepers' responses who participate in pollination service = 37

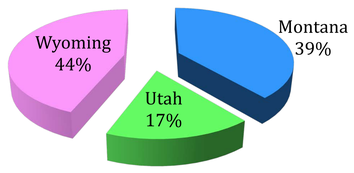


Figure1. Percentage of beekeepers participate in pollination service

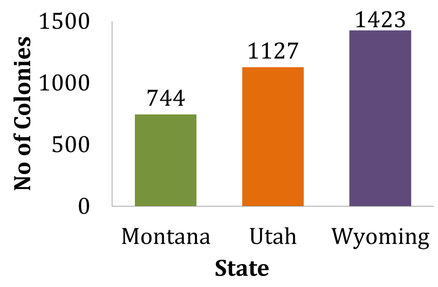


Figure 2. Average number of colonies

Table 1. Beekeeper contract type

State	Type of Contract			
	Direct with Growers		Through a Broker	
	No of Beekeepers	Percentage	No of Beekeepers	Percentage
Montana	5	62.5	3	37.5
Utah	6	50	6	50
Wyoming	9	52.94	8	47.06

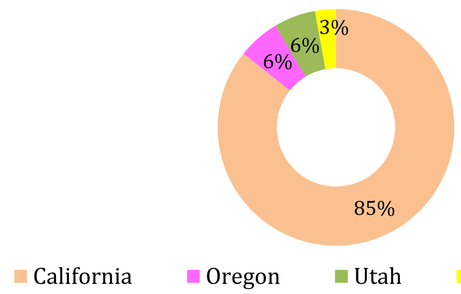
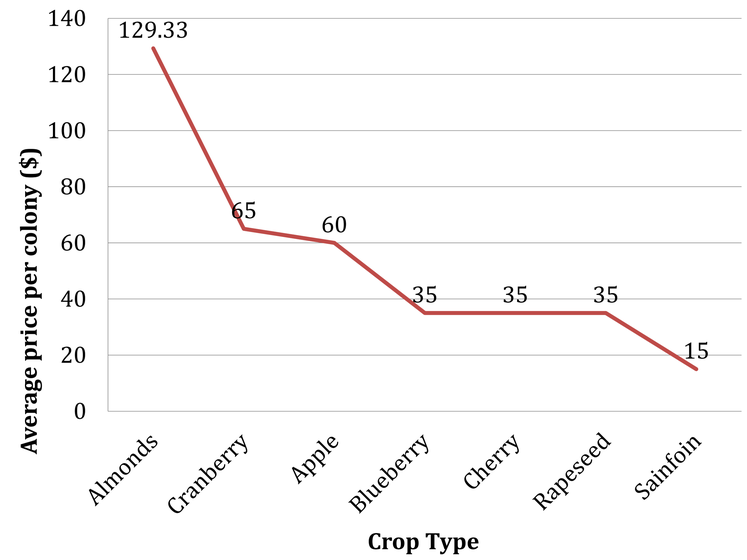


Figure3. States receiving out-of-state pollination service

Table 2. Average price per colony beekeepers receiving in Wyoming for different crops providing outstate pollination service



Conclusions

- According to the summary statistics, Wyoming beekeepers have the highest average number of colonies employed for both in-state and out-state pollination.
- Considering the type of pollination contract (e.g., Direct with growers vs through a broker), direct grower contracts were most prevalent in all the three states.
- California is the most desirable pollination destination for most of the beekeepers in all the three states. Eighty five percent of those beekeepers providing pollination service send colonies to California.
- Almond offer the highest pollination prices for Wyoming beekeepers followed by cherry and apple crops.

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