Economic Assessment of Morel (*Morchella* spp.) Foraging in Michigan, USA

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Economic Assessment of Morel *(Morchella* spp.) Foraging in Michigan. USA. Wild–foraged mushrooms represent a natural resource that provides economic value to foragers through both market and nonmarket recreational channels. Despite the importance of non–timber forest resources for sustainable management of forestlands, little attention has been paid to *who* forages for wild mushrooms, *why* they choose to forage, *where* they go, and *what economic value* is generated. This report draws upon survey data from 78 foragers who are certified to sell their mushrooms and 85 noncertified foraging enthusiasts. Its goal is to understand foraging patterns and values for morels (*Morchella* spp.) in the State of Michigan (USA). Most foragers spend fewer than 10 days each year foraging, and those who sell their morels are most likely to sell to local restaurants, pubs and bars, and informally to their friends. Certified foragers who choose to sell their morels sell for an average price of $36 per pound ($36/lb) for fresh black or yellow morels. Costs to supply fresh morels ranged widely among the 16 certified sellers who reported full cost details; over 70% of morels were supplied at costs below $30/lb, but some certified sellers incurred costs in the hundreds of dollars per pound. Recreational morel gatherers paid $43 to $335 per trip of foraging morels, with a median value of $93 per trip. Morel foragers also search for other mushrooms with oyster mushrooms (*Pleurtous* spp.), chanterelles (*Cantharellus* spp), hen–of the–woods (*Grifola frondosa*), and chicken–of–the–woods (*Laetiporus* spp) being the most popular.

Key Words: Morels, Foraging demand, Foraging supply, Nonmarket valuation

Introduction

Wild mushrooms represent a non–timber natural resource that can be harvested renewably. From an economic standpoint, the foraging of wild mushrooms offers both market and nonmarket values. As a commercial product, they meet demand in the gourmet foods market. At the same time, the very process of mushroom foraging is an attractive recreational activity for outdoor enthusiasts. Those two very different sources of value capture the distinction between marketable resources such as timber, which has its commercial value captured in market prices, and the other resources (e.g., ecosystem services) that provide nonmarket value (Pearce 2001). As with many non–timber forest products, the economic value of wild mushrooms remains understudied (Frey et al. 2019; Loomis et al. 2019).

Morels are among several wild mushrooms in the United States that often are sold for their high–end gourmet characteristics. Morels are the mushroom fruiting bodies produced by fungi in the genus *Morchella* and can be found in a large range of U.S. forestland, making their economic importance of

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particular interest. Morels can also be easily dried, allowing for the possibility of an extended shelf life relative to other wild–foraged mushrooms. Despite the high market prices that morels might receive, profitable cultivation remains elusive (Pilz et al. 2007). Foraging for wild morels is a longstanding tradition in the Great Lakes Region of the United States. The temperate climate, with cool wet springs, and large tracts of mixed forest support reliable yields of wild morels (Hallen 2015). Morels can be particularly abundant following tree die–offs and after wildfires, with some morel species adapted to each kind of disturbance (Hallen 2015; Larson et al. 2016). For instance, in the decades following the extensive elm die–off caused by the invasive Dutch elm disease, *Ophiostoma ulmi*, a noticeable increase in production of yellow morel species (*Esculenta clade*) was noted in association with dead elm trees across the U.S. Midwest (Thompson 1994). However, only black morel species (*Elate clade*) are associated with fires.

In late spring, many people forage morels recreationally in public forests, parks, and recreational areas. Interest in the pastime has expanded in recent years, adding pressure on policymakers to include mushroom foraging in their forest resource management plans (de Frutos et al. 2019; Górriz–Mifsud et al. 2017). Heightened interest in wild–mushroom foraging in Michigan (morels in particular) prompted establishment of a state–level "Wild–Foraged Mushroom Certification" program in 2015 under the auspices of the Michigan Department of Agriculture and Rural Development (MDARD) (Sirrine 2017). Certified commercial mushroom foragers may legally offer unprocessed wild fungi for sale.

Despite this potential for economic revenue, few studies have systematically collected data on wild–mushroom commerce in the United States (Pilz et al. 2007). One exception is Wiita and Wurtz (2004), who interviewed 36 noncertified people from the morel mushroom industry in Alaska. As such, one benefit of the Michigan Wild–Foraged Mushroom Certification program enables estimates of how the commercial economic value of morel foraging compares with the associated nonmarket recreational value of foraging as recreational activity. This article exploits that difference by comparing samples of state–certified foragers with recreational foragers, exploring differences in behavior and the kinds of economic value that each kind of forager derives from harvesting wild morels.

Apart from academic interest, the wild–foraged mushroom business can provide income–generating opportunities that might be especially relevant for disadvantaged residents in rural communities (Cai et al. 2011). However, only a few studies in Alaska and the Pacific Northwest (Pilz et al. 2007; Wiita and Wurtz 2004) have focused on who gathers morels in the United States, where they forage, how they sell their products, or how much money and time they spend in pursuit of their quarry. There is even some evidence that the wild–mushroom market in the Pacific Northwest has expanded significantly for the past few decades (Frey et al. 2018).

Understanding the supply and demand for wild morels is of particular interest in light of recent attempts to cultivate morels in the midwestern United States (Dissanayake et al. 2021; Longley et al. 2019). Adding cultivated morels to the wild–foraged morel market also has the potential to reduce harvest pressure on forestland, with associated sustainability concerns. Though some sustainability concerns have arisen due to high harvest amounts in the Pacific Northwest and prolonged harvest pressure in Europe, evidence indicates that declining mushroom production in Europe (Pilz and Molina 2002), is not chiefly due to overharvest, but rather due to land conversion, soil compaction, and climactic vicissitudes (Egli et al. 2006). If cultivated morels can be shown to be biologically feasible, the next question will be whether they can be commercially successful. The answer depends in part on the existing market for wild–foraged morels.

This article reports results of a 2020 survey of Michigan morel foragers, including foragers both with and without certification from the State of Michigan to market their fungi. We describe who forages for morels in Michigan, how they forage and market their harvest, what other mushroom species they collect, and the costs underpinning the economic supply of morels and demand for morel foraging trips.

Methods

To capture morel foraging as both a commercial and a recreational activity, we surveyed both commercial and recreational foragers. While anyone may harvest morels and other

fungi from state and federal lands for their own consumption, the State of Michigan enforces the U.S. Food Code, which requires anyone selling wild–foraged mushrooms in the state to possess a Wild–Foraged Mushroom Certification from the Michigan Department of Agriculture & Rural Development (MDARD). This certification allows them to be listed in the official database of Certified Mushroom Foragers. This is particularly important as the training focuses on reducing the serious health risks posted by misidentifying wild mushrooms. Indeed, the goal of the training was to identify more accurately who constituted an "expert" forager (Sirrine 2017). As of May 2020, 495 individuals had earned the certification, meaning that these individuals had been certified to forage commercially for wild mushrooms during the past five years. Individuals in this database who had valid email addresses constitute the certified sample. Because no database of recreational morel foragers exists, we utilized the "snowball" sampling method to capture this population. In snowball sampling, researchers offer the survey instrument to interested individuals and invite them to share it with others (Creswell 2014). The survey instrument was shared via Facebook groups of morel enthusiasts. Results from this non–random sample of recreational morel foragers are reported as the snowball sample.

The survey questionnaire was distributed online using the Qualtrics® platform. To ensure accuracy, the instrument was pretested with university personnel and three morel foragers. The questionnaire included four major sections. The first consisted of two screener questions to determine whether the respondent 1) had completed Michigan's wild–foraged mushroom certification, and 2) had foraged for morels since January 2018. The second section asked about potential interest in cultivating morels, other fungi foraged, and morel sales practices, including quantities sold and prices received. The third section consisted of demographic questions. The survey closed with questions about destinations and travel costs to forage for morels (Mendelsohn 2019).

We used a travel cost approach to estimate the cost of supplying morels, based on a subsample of respondents who sold morels in Michigan in 2019. For respondents who resided in Michigan, sold morels, reported foraging trips in 2019, and reported their destinations, we calculated estimates of the implied costs of time spent and travel cost. A total of 16 respondents met these specifications.

Time spent was calculated as the sum of hours reported traveling, gathering morels, cleaning, and preparing them, and selling them. By far the most time was spent gathering morels, which we calculated as the number of adults multiplied by the hours they spent foraging (assumed to be 4 hours per trip) and driving (at 60 miles per hour). We based the value of time spent on commercial morel activities on the median wage in farming, fishing, and foraging in Michigan for 2019 of $13.69/hour (U.S. Bureau of Labor Statistics) plus standard regional fringe benefits for the Eastern North Central region, which are typically additional to an employee's salary (31.2% of total compensation). We adjusted wage income for combined marginal state and federal income tax rates by multiplying by 84% (equal to subtracting 4% Michigan state plus 12% federal tax for the $10,000–$39,000 income interval). We calculate the after–tax total compensation for forager i as:

$$Compensation_i = \left(Wage \times 0.84 + \left[\frac{31.2}{68.8}\right] \times Wage\right).$$

Travel distance was the roundtrip distance reported to the three main morel gathering sites, multiplied by the number of foraging trips to each site. Although some multiple day trips were reported, we assumed no costs of meals or lodging. Travel cost was simply calculated as the total distance traveled for morel gathering in 2019 times the business travel mileage rate of the U.S. Internal Revenue Service for 2019, which was $0.58 per mile. This rate includes both the fixed costs of vehicle ownership plus the costs of fuel.

The cost per pound of morels sold was calculated as the sum of time and travel costs divided by the number of pounds of fresh morels sold in 2019 (both yellow and black). Dried morels sold are not included in these calculations because few respondents reported selling them.

In order to estimate the nonmarket value of morel foraging for recreational purposes, we applied a modified travel cost approach to the snowball sample of respondents who were not certified to sell morels in Michigan. For those

respondents who resided in the state, reported foraging trips in 2019, and reported their destinations, we calculated the implied costs of time spent and travel cost, using methods appropriate for recreational willingness to pay (Lupi et al. 2020). A total of 18 respondents met these specifications.

Time spent was the sum of hours reported traveling and gathering morels. We calculated time spent gathering morels as the number of adults multiplied times foraging time (4 hours per trip) plus one–half of the hours spent driving at 60 miles per hour. We estimated the hourly value of recreational time using the U.S. Census median, pre–tax household income for Michigan in 2015–2019 of $57,144 divided by work hours/year (2,080 = 260 days x 8 hours/day) and divided again by the number of persons per household (2.47). We then adjusted this to a post–tax value by multiplying by 84%, as in the case of the certified foragers. The resulting calculated value of recreational time came to $9.34 per hour.

Travel distance was calculated the same as on the commercial supply side. However, the travel cost was calculated using the moving expense mileage rate of the U.S. Internal Revenue Service for 2019, which was $0.20 per mile. This rate includes only the variable costs of travel (largely fuel). The cost per trip was calculated as the sum of time and travel costs divided by the number of trips taken for morel foraging in 2019.

Results

The survey was released on June 18, 2020, and remained available to respondents until September 30, 2020. Data were collected during the COVID–19 pandemic, though questions asked participants to respond to the way they forage in a "typical year." A total of 163 individuals completed the survey, including 78 certified mushroom foragers and 85 noncertified foraging enthusiasts. The response rate to the Certified Sample was 15.8% of the population of 495 Certified Mushroom Foragers on the MDARD list. Table 1 presents the sample demographics.

We compared the education level of morel foragers with the Michigan population at large. Morel foragers tend to be more educated than the Michigan population. While only 30% of the Michigan population has completed a four–year college degree, among certified morel gatherers, over half have either a four–year college degree (31%) or an advanced degree (23%). Another 40% have some college (including a two–year degree) experience. Just 7% have high school/GED or less education. Education levels are slightly lower in the snowball sample, but still higher than the state average. Approximately a quarter of the sample have a four–year college degree and 16% have an advanced degree. That said, there are apparent differences between the "snowball" sample of morel enthusiasts versus those who are certified by the state. For example, a greater proportion of certified foragers (54%) have a higher education while only 41% of the snowball sample had earned an advanced degree. Furthermore, a lower proportion of certified foragers had terminated their education in high school (7%) than was the case in the snowball sample (19%).

These higher education levels do not necessarily translate to a higher annual income. Over half of the individuals earned less than $80,000 annually. Among certified foragers, 36% earn less than $40,000, compared to 21% in the snowball sample and 34% statewide. Despite the large share with low incomes, there is also a notable slice of high–income earners, with 23% of the certified sample and 27% of the snowball sample earning over $100,000. We also collected data on race and ethnicity of individuals who forage for morels in Michigan. Contrary to the diversity indicated by Pilz et al. (2007), our study suggests that morel foragers in Michigan are overwhelmingly white. Caucasian foragers accounted for 91% of certified and 92% of snowball sample members. The share of whites among morel foragers far exceeds their 75% share of the state population. Among non–whites, 3% of the snowball sample were Asian, while 7% of the certified and 4% of the snowball sample identified as "other."

In a typical year, both certified and uncertified morel hunters spend an average of 16 days foraging morels. These results are provided in Table 2.

As highlighted in Fig. 1, most foragers spend less than two weeks foraging in a typical year. The modal respondent spends 10 days or less each year foraging for morels. Virtually all morel hunters consume at least some of their morels

Table 1. Sample demographics compared to Census estimates.

Variable	Level	Certified (%)	Snowball (%)	MI Census[1] (%)
Education	High School/GED or less	7	19	38
	2-Year College Degree (Associates)	13	18	9
	Some College	27	22	23
	4-Year College Degree (BA, BS)	31	25	18
	Advanced Degree (M.S., Ph.D., J.D., etc.)	23	16	12
Annual household income	Less than $20,000	11	6	15
	$20,000 - $39,999	25	15	19
	$40,000 - $59,999	9	27	17
	$60,000 or greater	55	53	49
Race	White	91	92	75
	Asian	0	3	3
	American Indian or Alaskan Native	1	0	1
	Hispanic, Latino, or Spanish	0	1	5
	Black or African American	1	0	14
	Other	7	4	2

Denotes 2019 estimates for the American Community Survey from the U.S. Census Bureau. Number of observations = 78 Certified mushroom foragers and 85 non-certified foraging enthusiasts.

(96% of both samples), and about half of the individuals give some away (56% of certified and 47% of snowball sample).

One–third of certified morel hunters sell them, as do 10% of the snowball sample. The great majority of both samples store their morels under refrigeration (84% of the certified and 71% of the snowball sample). Figure 2 separates data from the certified sample into the group that sell morels (N=25) and the group that indicated that they do not sell morels (N=50). Those groups that sell morels tend to earn a slightly lower household income, with the most common response being between $20,000 and $39,000. Figure 3 compares the education of morel sellers to non–sellers. Those who choose not to sell morels are also more likely to have earned an advanced degree (M.S., Ph.D., J.D., etc.).

Certified mushroom collectors reported foraging more frequently on every land type than respondents in the snowball sample, with the

Table 2. Duration of foraging, morel uses, and storage.

Variable	Levels	Certified	Snowball	Number of Responses
Days to pick morels		16.4	16.0	54 Certified
		(15.1)	(12.9)	59 Snowball
What do you do with your morels?	I give them away	56%	47%	
	I sell them	33%	10%	75 Certified
	I consume them	96%	96%	73 Snowball
Do you store harvested morels with refrigeration?	Yes	84%	71%	74 Certified 73 Snowball

Numbers in parentheses are standard deviations.

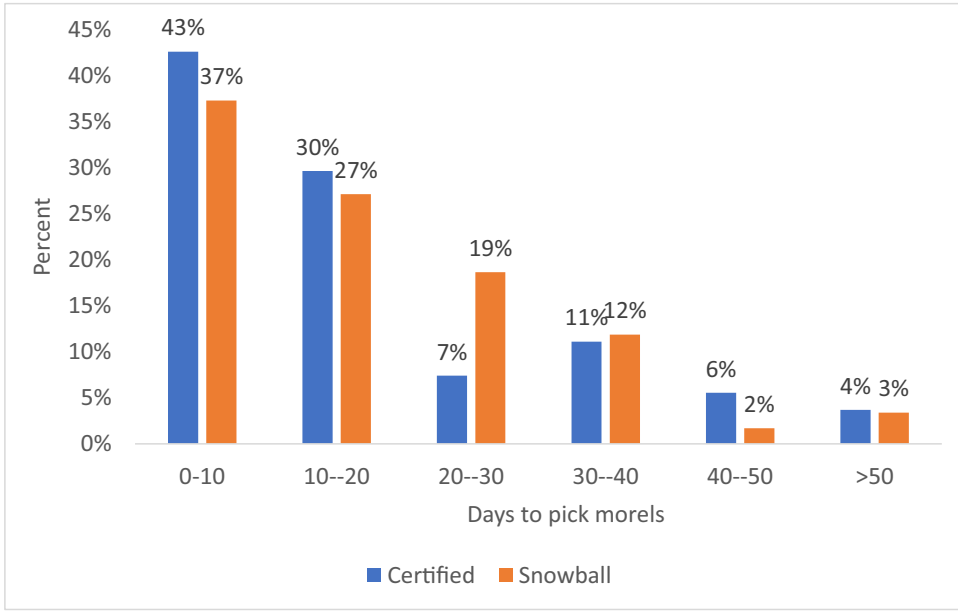

Fig. 1. Duration of Morel Seeking.

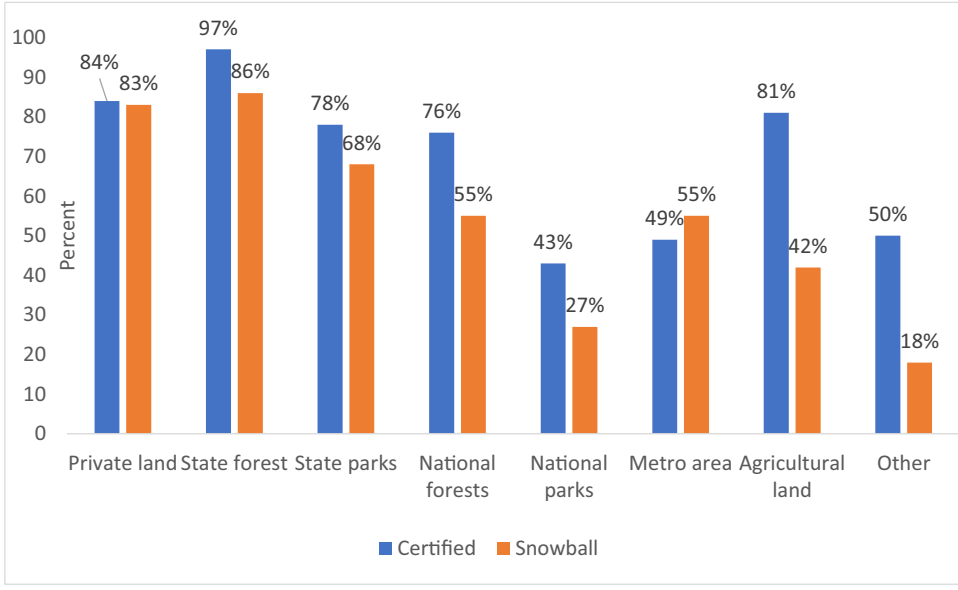

Fig. 2. Type of Land Where Morels are Foraged.

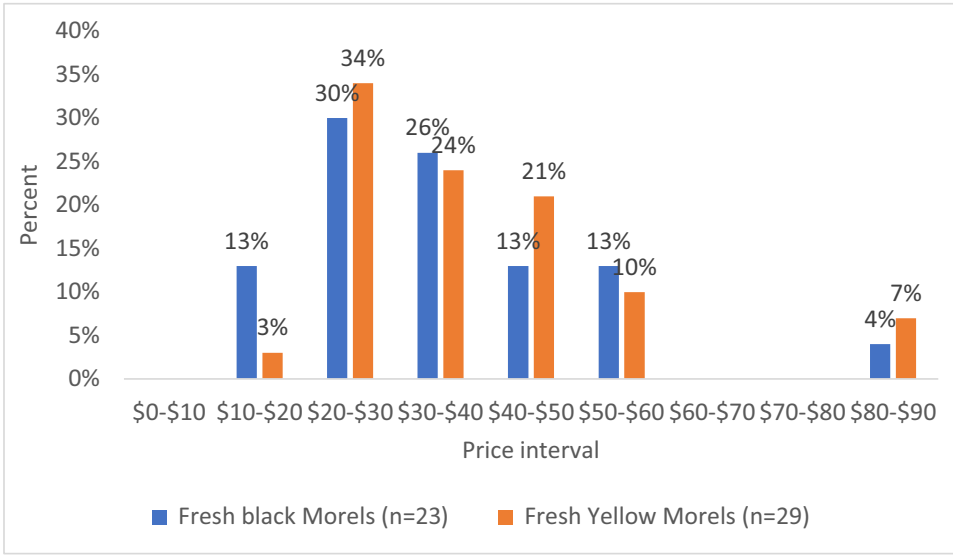

Fig. 3. Income Levels for Certified Morel Sellers and Certified Morel Non–Sellers.

sole exception of metropolitan areas (Fig. 4). State forests and private land are the most popular places to forage for morels, though certified foragers are also very likely to forage on agricultural land. Most respondents prefer to hunt morels on private land and state forests. Certified foragers are also likely to search on agricultural land (81%) while noncertified foragers are less likely to do so (42%). Forested lands are the most popular habitats for morel foraging. For example, among locations where respondents foraged "always," "most of the time," or "sometimes," state forests were the most common, followed by private lands, national forests, and state parks.

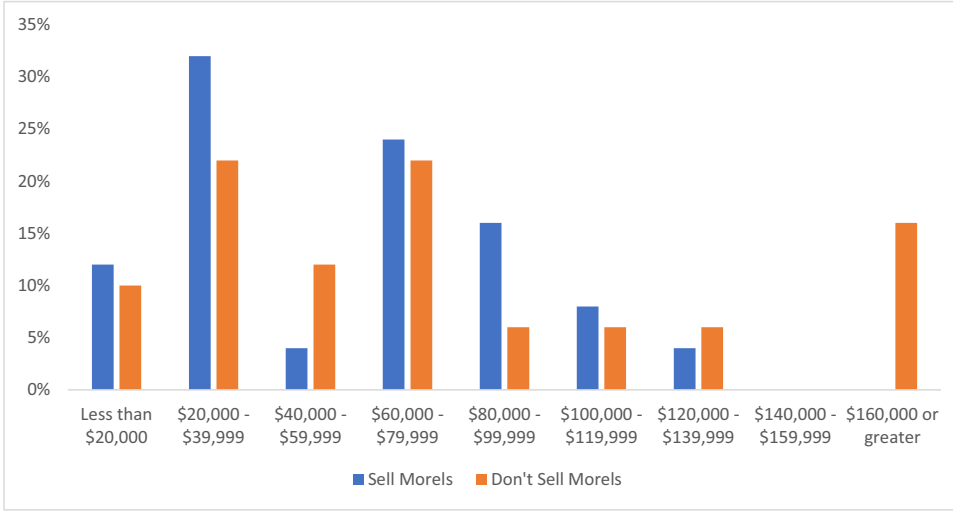

Fig. 4. Education Levels for Certified Morel Sellers and Certified Morel Non–Sellers.

Foraging is less common in national parks, likely because collecting is forbidden there. On unwooded agricultural and metropolitan lands, morel gathering was also less common. Overall, morel foragers utilized both privately and publicly owned land.

Morel Markets and Supply

We collected morel sales data from respondents in the certified sample, who are authorized in Michigan to sell what they gather (Table 3). Just under half of the certified sample foragers sold morels. Of these, the overwhelming majority sold their morels fresh; this was true for both black (23 responses) and yellow (29 responses) morels while only eight of the 78–person sample sold dried morels. Prices for fresh morels averaged $35/lb for black morels and $37/lb for yellow ones, with standard deviations of $16–$17. As shown in Fig. 5, over 80% of fresh morels were sold for $20 to $60 per pound, with the modal interval being $20–$30/lb.

Morel mushrooms can be preserved well by drying the fruiting bodies, and this is a common way of preserving fresh mushrooms before they spoil. Dried morels were sold by about one–third of those who marketed morels. We sampled eight individuals who sold dried black morels and nine individuals who sold dried yellow morels. Sale prices for dried morels averaged $130–$140 per pound. As reflected by the large standard deviations near $90/lb, the prices of dried morels varied substantially. The modal was in the $100–$150 interval and half of the observations fell in the $100–$200 range. But the other half of the observations were equally distributed in the $0–$100 and $200–$300 ranges.

For both yellow and black morels, the mean quantity sold fresh by each forager was 27 pounds. As with sale prices, the standard deviations were large: 39 pounds for yellow and 45 for black. Based on mean sale prices ($35–$37 per pound) and quantities (27 pounds), calculated annual revenue for sellers of morels is roughly $1,000 per year.

On average, state–certified morel hunters spend five days to sell morels but spend anywhere between 1 and 80 days foraging for morels. As indicated in Fig. 6, they sell mostly to local restaurants, pubs and bars, and informally to hunters' friends (62% each). In a typical year, a smaller number of foragers reported selling at farmers' markets (42%), online (19%), and at regional grocery stores (19%).

While the subsample of certified morel foragers who reported complete travel cost information is small, it gives an informative picture of the commercial supply. The 16 respondents reported selling 633 pounds of fresh morels. Costs per pound ranged from $9 to over $1,700. The sample of morel sellers appears to divide between those

Table 3. Sale prices, quantities, days, and outlets, Certified Sample.

Variable	Level	Mean (St. dev.)	Number of Observations
Prices	Fresh black morels ($/pound)	$35 (16)	23
	Fresh yellow morels ($/pound)	$37 (17)	30
	Black dried morels ($/pound)	$140 (90)	8
	Yellow dried morels ($/pound)	$131 (87)	9
Pounds sold	Yellow morels-fresh (pounds)	27 (39)	25
	Black morels-fresh (pounds)	27 (45)	19
Days to sell		5 (17)	30
Outlets sold	Farmers markets	46%[1]	33
	Regional grocery stores	19%	33
	Local restaurants	62%	33
	Pubs and bars	62%	33
	Informally to my friends	62%	33
	Online sales	19%	33

[1]Represents a percent of total observations.

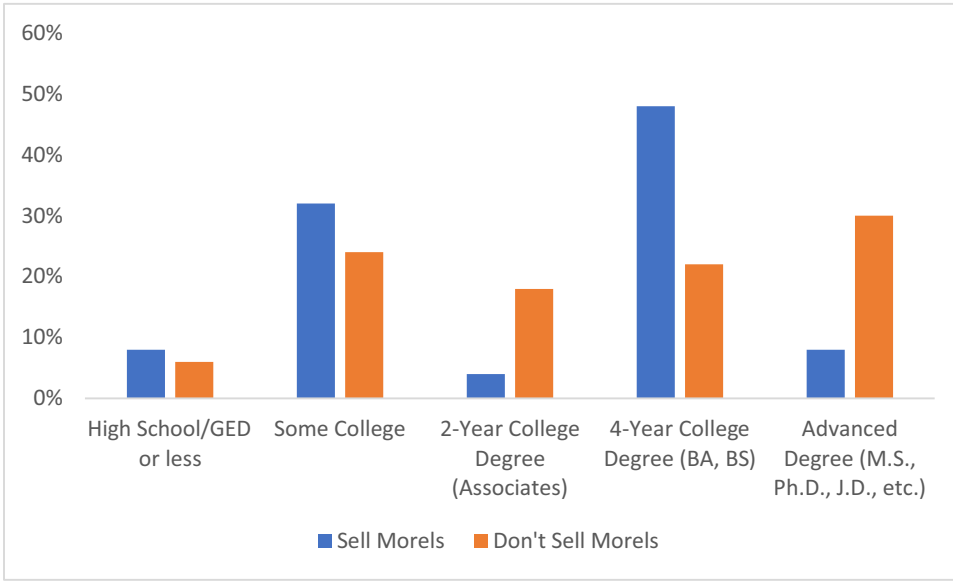

Fig. 5. Price Per Pound of Fresh Morels by Color.

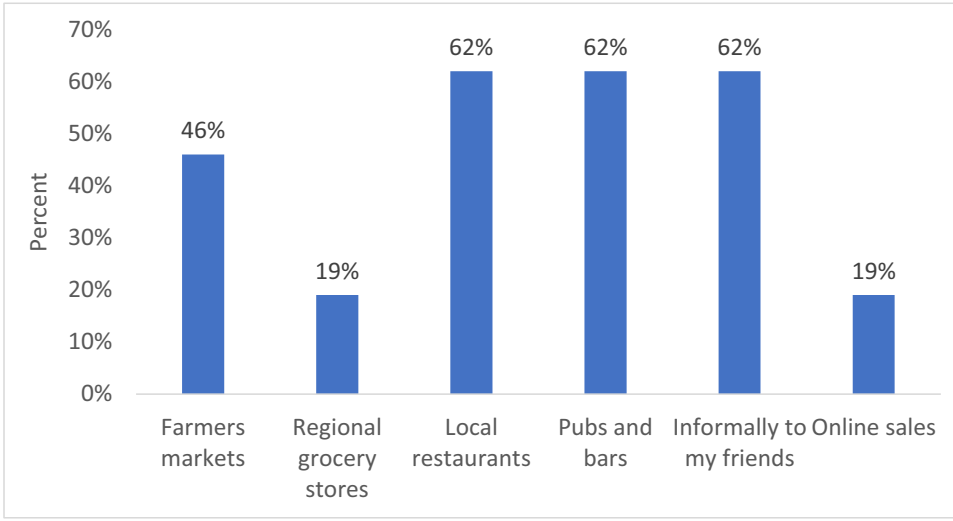

Fig. 6. Common Morel Sale Outlets.

who make a profit on morels, and those who do not—with the latter group incurring some very high costs that probably reflect either a primary orientation toward morel gathering for recreation, or else very bad luck at locating morels in quantity.

The cost–of–supply curve in Fig. 7 divides into three segments. At the base of the supply curve, 450 lbs (71% of the total) were sold by two foragers at costs per pound of $9 and $29, well under the $37 average sale price. Next, another 97 lbs

(15% of the total) was sold at prices in the $50–$65 range. Hence, 86% of the supply was gathered and marketed at costs of less than twice the average sale price. The final segment of the supply curve shows that the costliest 14% of morels sold were gathered at costs per pound of over $120, with two cases over $500/lb. Fig. 7 shows 572 pounds sold by the nine lowest–cost providers (90% of total) that were sold at costs per pound under $180. The median pound of fresh morels cost $29 to supply.

Recreational Demand for Morel Foraging Trips

On the demand side, we focus on the value to recreational morel foragers of the trips that they took, rather than the pounds of morels harvested. The rationale is first that recreation is as much the outdoor activity of morel foraging as it is the consumption of the fungi. As a secondary practical matter, our respondents did not report the quantity of morels foraged, only the quantity sold. In contrast to the use of travel cost data to estimate a morel supply curve, we use travel cost data on the demand side to estimate willingness to pay for morel foraging trips among respondents from the snowball sample.

As with the certified sample, few respondents from the snowball sample reported complete travel costs that allowed calculation of their complete willingness to pay for morel foraging trips. The 18 respondents reported taking 179 trips to gather morels in 2019. Two respondents reported taking 45 trips each, which represented half of all trips taken. Across all respondents, costs per trip ranged from $43 to $335.

The revealed willingness–to–pay demand curve in Fig. 8 divides into three segments. At the high end is a group that paid $150 or more per trip for a total of 22 trips. A middle group paid $114 to $137 per trip for another 24 trips. In the final group are those who paid $43 to $99 per trip for a set of 133 trips. This group included the three most frequent travelers, who logged 20, 45, and 45 trips pursuing their passion. The median trip cost was $93.

Discussion

This study used primary data collected from both state certified commercial morel foragers and morel enthusiasts to determine (1) who

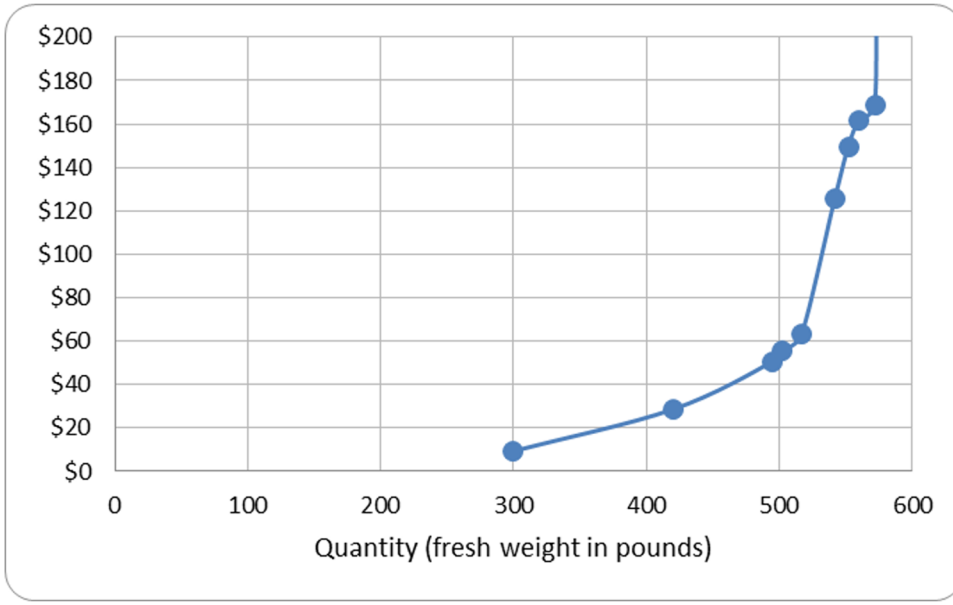

Fig. 7. Commercially Foraged Morel Cost to Supply Curve (Cost Per Pound, Up To $200/lb), Certified Sample for 2019.

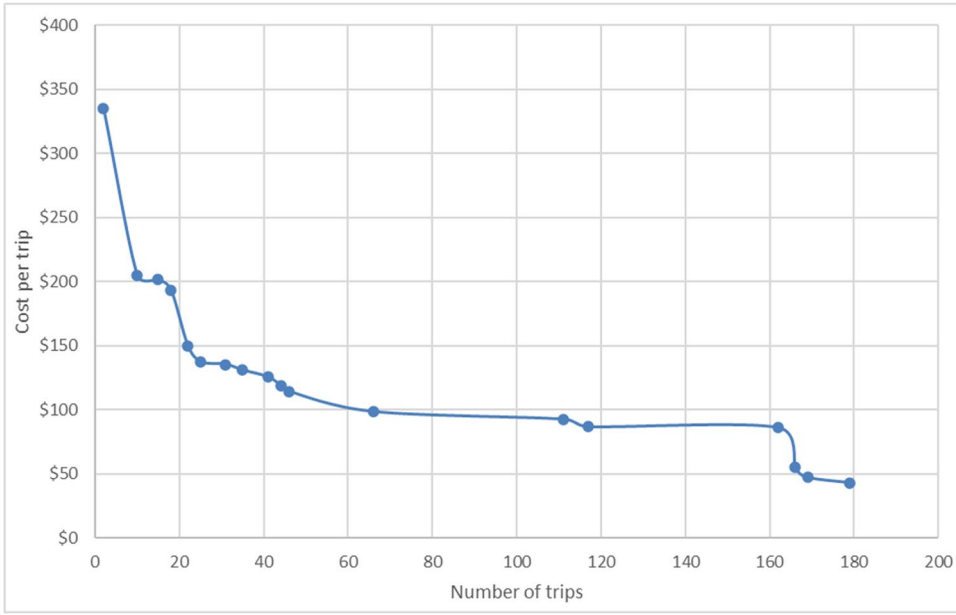

Fig. 8. Demand for Recreational Morel Foraging Trips, Snowball Sample for 2019.

forages for morels in Michigan, (2) where they forage, (3) how much time is spent, (4) the costs and revenues of those who forage commercially, and (5) the value of morel foraging as recreation.

Because the racial composition of our sample is consistent with the Michigan census, our results support the notion that morel foragers tend to mirror the general population. In our study, 10% of foragers identified as non–white and only 1% of respondents identified as Native American. Mushroom foraging and cultivation have been discussed as a revenue generator for indigenous tribes, and certification workshops have been conducted on and around tribal lands (Ministry of Forests, Lands, Natural Resource Operations and Rural Development 2019). As such, future studies might focus specifically on how indigenous people engage with the foraging economy in the Midwest.

Private lands and state forests were the preferred types of land to forage for morels. Although forest habitats were the most common forage habitat, certified morel foragers also collected morels from agricultural lands. This forage frequency on private agricultural lands merits further consideration in future research. The current survey did not ask specific questions about the type of agricultural land these foragers utilize, but future research might address this potential concern.

It is notable that the collecting season was short, with most morel pickers foraging less than 14 days over the season, emphasizing that commercial mushroom foraging is unlikely to be considered more than supplemental income as opposed to a primary source of revenue for most foragers. Those who do sell their morels sell them fresh for prices in the range of $20–$60/lb, with an average of $36/lb, regardless of their color (black or yellow), and an average quantity sold of 27 pounds per season.

These sales data convey one other interesting fact: most certified harvesters do not sell their morels. While selling fresh morels might provide an economic return, it is likely that profitability depends on the availability of a local market. Morels can be dried to be preserved and distributed to more distant markets, but the prior literature suggests that the labor costs associated with this process make these economic returns generally lower (Hamayun et al. 2006; Witta and Wurtz 2004). Thus, morels appear to provide a small economic boost to those certified foragers who sell their product of about $1,000 per person

in the spring months. The certified foragers who choose not to sell their morels likely undertook certification training to reduce the health hazards of misidentifying wild mushrooms.

Morels are not the only mushroom available in Michigan forestland, and research is ongoing to develop a more exhaustive list of available edible mushroom species in the Midwest (Buyck et al. 2016). There are many other foraged mushrooms in Michigan, as listed in Table 4. For example, more than 75% of morel foragers responding that they also collect oyster mushrooms (*Pleurotus* spp.), chicken–of–the–woods (*Laetiporus* spp.), hen–of–the–woods (*Grifola frondosa* spp.), and/or chanterelles (*Cantharellus* and *Craterellus* spp.), and at least a third of respondents foraged for other species such as chaga (*Inonotus obliquus*), honey mushrooms (*Armillaria* spp.), hedgehog mushrooms (*Hydnum* spp), and lion's mane (*Hericium* spp.). The certified mushroom foragers reported gathering higher proportions of all species than the snowball sample respondents, with the sole exception of chicken–of–the–woods mushrooms.

Given the high prices for wild–foraged morels, is there potential for the development of a market for cultivated morels? Future studies would benefit from a heavier focus on the overall size of market demand for morels, especially because an increase in morel production volume is likely to have an impact on morel market prices. Furthermore, morels are typically foraged in specific portions of the United States, suggesting that many U.S. consumers might be unfamiliar with them. This limit in geographic scope might be particularly important given the importance of cultural identity in consumer willingness–to–pay for local foods (Farris et al. 2019; Moreno and Malone 2021). That said, a case can be made for the development of a larger industry (Campbell 2020). In this study, more than 90% of respondents in the certified sample answered yes to the question, "Would you consider growing morels if you were shown how it could be done?" Seasonality is a key consideration for the economic value of many agricultural products. For example, most blueberries grown in the United States are sold between April and September, while U.S. market demand in other months are met by growers from Peru, Chile, and Mexico (Kramer et al. 2020).

Indeed, a key consideration for the development of a future market for cultivated morels is the potential for the industry to meet consumer demand for morels during times when wild foraging is not possible. The relatively short season for morel foraging might indicate an opportunity for indoor and greenhouse production to extend the season to fill a potential gap in the marketplace during the off–season (Benucci et al. 2019; Longley et al. 2019). While a thorough assessment of morel market demand is outside the scope of this article, future studies might be especially useful in assessing out–of–season preferences for morels. Recent research on morel cultivation provides some promise for the future of the nascent industry, though questions remain on its commercial viability in the Midwest of the United States (Liu et al. 2018). For one, developing a commercial industry would require an all–new supply chain. This supply chain development could benefit greatly from collaboration with other related industry partners, such as partners with commercial farming experience. In this sample, however, only 35% of certified hunters had worked for a commercial farm and

Table 4. Other fungi foraged.

Species	Certified	Snowball
	(%)	(%)
Oyster mushrooms (*Pleurotus*)	96	76
Chanterelles (*Cantharellus* and *Craterellus*)	93	74
Hen-of-the-woods (*Grifola frondosa*)	89	85
Chicken-of-the-woods (*Laetiporus*)	84	89
Lion's mane (*Hericium*)	75	55
Chaga (*Inonotus obliquus*)	73	38
Lobster mushrooms (*Hypomyces lactifluorum*)	72	30
Hedgehog mushrooms (*Hydnum*)	69	34
Honey mushrooms (*Armillaria*)	65	36

22% of snowball hunters have worked for a commercial farm. Therefore, the development of a market for cultivated morels will depend not only on increased production through successful morel farming, but also by developing a supply chain to distribute fresh morels to consumers.

To conclude, morel foraging seems to provide seasonal income to a subset of certified mushroom foragers. In addition, we find that relative to the average Michigan population, our sample of morel foragers were more likely to identify as Caucasian and more educated. Most foragers who sell their morels sell them fresh for prices in the range of $20–$60/lb, with an average of $36/lb, regardless of their color (black or yellow). The morel forage season is relatively short, with most morel pickers foraging less than 14 days. Given these high prices and small forage window, our findings suggest that the economic development potential in wild–foraged morels might be substantially larger by focusing on the out–of–season supply chains that might connect local restaurants, pubs, and bars to a larger supply of morels.

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