

Assessing Market Analysis of Saginaw Bay Watershed Crops

A partnership with The Nature Conservancy

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Executive summary

Soil health is an increasing concern in the Saginaw Bay Watershed. Pollution from agricultural runoff poses a great risk to the long-term sustainability of Michigan's water sources and the populations that depend on them. Implementing good soil health practices can greatly reduce the adverse impacts of pollution. While many organizations have partnered with growers directly to improve soil health practices, consumer pressures have led to a rise in corporate sustainability initiatives as well.

The Nature Conservancy (TNC) views this as a ripe opportunity to partner with consumer-packaged goods (CPG) companies that source products from the Saginaw Bay Watershed to accelerate conservation efforts with local growers. To help promote TNC's long-term soil health partnership goals, TNC partnered with the Dow Sustainability Fellows Program at the University of Michigan to design this project. This research aims to support TNC in identifying CPG companies with operations extending to the Saginaw Bay Watershed and focuses on addressing water and climate sustainability challenges.

Given the vast agricultural industry in Michigan, TNC and the Dow Fellows team narrowed this project to four crops: corn, soybeans, potatoes, and dry beans. We then mapped the product flows of each of these crops from where they are grown within the Saginaw Bay Watershed to where they are processed throughout the state, and finally where they are sold to CPG companies for use in foods for human consumption. Using a multi-tier research approach, we sourced data from relevant public domains, identified and relevant stakeholders, including crop interviewed associations and processors, and finally developed a sustainability matrix to evaluate existing CPG companies for partnerships with TNC.

While we were able to gather the names of numerous CPG companies through our interviews, and thus provide several direct partnership recommendations, we also outline in this report the challenges we faced in data collection. Based on our challenges and lessons learned, we also provide numerous process recommendations for TNC to consider when they repeat this research process for other crops in the state.



Due to rising consumer pressure and the rise in corporate sustainability initiatives, the Nature Conservancy believes there may be an opportunity to partner with consumerpackaged goods companies sourcing products from Michigan to accelerate conservation efforts with Michigan growers.

Introduction

Healthy soil is vital to the overall health of a watershed, and particularly beneficial in the retention of water and carbon storage.² However, deploying soil health practices is oftentimes not prioritized or followed. In Michigan, many farmers grow commodity crops that ultimately go into producing ethanol or making feed for livestock. Other farmers grow crops that go directly for human consumption by selling their product to mills, processors and co-ops that create ingredients and products for human consumption (Figure 1). Consumer-facing companies that purchase these ingredients are beholden to consumers and shareholders and in recent decades many have developed commitments to sustainability.



Figure 1 Product Flow from Farmer to Consumer³

Recently, there has been a rise in consumer pressure demanding companies to reassess their sustainability commitments to everything from water, carbon and soil health to farmer wellbeing. Large food companies, such as McDonalds, have announced sustainability goals, especially focused on water, soil health, and carbon capture.⁴ The Nature Conservancy (TNC) believes this is a key turning point and hopes to use this as an opportunity to partner with consumer-packaged goods (CPG) companies who are concerned with sustainability and source products from Michigan.

The ultimate objective of this project is to support Michigan growers in the adoption of healthy soil and water practices, such as cover crops, mulch tillage, no till, filter strips, and nutrient management practices. Previously, TNC has partnered with growers and other non-profits in the Saginaw Bay Watershed region to promote better soil health by assisting growers through government programs, private investments, and collaborations with a few companies. Through this project, TNC seeks to form partnerships with additional CPG companies to approach better soil health practices from higher up in the supply chain.

To support TNC in forming partnerships with CPG companies, the Dow Sustainability Fellow Program developed this project to map agricultural product flows in Michigan and identify potential CPG partners. This project specifically focuses on companies that have existing sustainability goals and already source agricultural commodities from the Saginaw Bay Watershed. Given Michigan's top crop volume and production, our team focused on tracing the product flow of four crops: Soybeans, Corn, Dry Beans, and Potatoes. We relied on publicly available information and conducted multiple informational interviews to successfully identify CPG companies for partnerships. This report describes the methods used for collecting crop data, outlines our crop-specific analyses, and provides recommendations for potential partnerships in the Saginaw Bay Watershed.

Methods and Activities

We conducted an abbreviated supply chain analysis (from grower to processor to end user) to complete this project.

To obtain the necessary data, we employed several different methods, including sourcing public-facing information, meeting with key stakeholders, and interviewing representatives from crop associations and processors.

Sourcing Public Data

We started by sourcing publicly available data using database sites including D&B Hoovers, Reference USA, the USDA Census of Agriculture, and advanced searches within Google's databases for keywords including Michigan agriculture, USDA, Michigan crops, etc. The USDA National Agricultural Statistics Service (NASS) was useful when looking at an overview of agricultural data at the national, state, and county levels. The NASS was a useful tool in determining what areas of the Saginaw Bay Watershed were likely to have the highest production of our focused crops because the data was broken down into various categories including acreage by county (both harvested and yield per harvest), production by year, etc.⁵ Additionally, the USDA's CropScape tool on the NASS website allowed us to prioritize crops based on the overall agricultural presence within the Saginaw Bay Watershed.⁶

Interviews with Crop Associations, Processors, and other Stakeholders

Grower's associations and commodity groups served as the initial point of contact and direction for each of the crops researched. First, we contacted and interviewed all the related crop state commissions including: the Michigan Bean Commission, the Michigan Potato Industry Commission, the Michigan Soybean Association, and the Michigan Corn Growers Association. After talking with each of the grower's associations, we reached out to a multitude of processors for each crop to schedule interviews for further data collection. Our efforts to understand the growth, maturation, processing, and final product forms of our four crops were supported by the staff at Michigan State University (MSU) Extension in Agriculture, as well as other materials that provided a background on the crops.

A primary challenge we faced in our data-collection phase was meeting industry contacts and building relationships with both commission contacts and processors. While we talked to many individuals who were happy to support our project and share information freely, we just as frequently were met with statements of disinterest or hesitation to share sensitive information, and many parties we contacted did not reply at all.

Sustainability Analysis for CPG companies to Determine Final Recommendations

To determine final partnership recommendations, we conducted an analysis of current publicfacing CPG company sustainability goals and initiatives. A current CPG company's sustainability goals provide insight that a CPG company may be more interested in furthering their environmental work as opposed to a company who has taken little action in this realm. While this is a categorical rule, we developed a framework to evaluate each CPG company's existing sustainability commitments and then determined whether a given company would be a good partner for TNC based on this framework. While this framework is described in detail in the Recommendations, a brief description of these analytic factors is listed below.

- 1. Degree of Saginaw Bay Watershed Presence: A main motivator for a CPG company to be more sustainable is that they can provide information to the consumer about the sustainable actions their company has taken. This leads to increased consumer approval based on the rising importance of sustainability and demand for more sustainable practices. It is less likely they will be interested in sustainability initiatives in this area if they cannot directly link those goods to their products, so it is essential to evaluate how much they source from this area.
- 2. Willingness to Collaborate: If a CPG company and their partner processors are interested in the work, show enthusiasm for it, and are responsive, they are more highly recommended as partners. Given that this project consisted of identifying stakeholders without prior connections to TNC, we recommend building relationships with the individuals that were willing to share information.
- 3. Existing Public Facing Sustainability Goals: It is important to prioritize CPG companies with existing sustainability initiatives as these companies are more likely to partner with organizations such as TNC to further their sustainability goals.
- 4. Public Facing Corporate Social Responsibility (CSR) and Environmental, Social, and Governance (ESG) Reporting: We highly valued CPG companies that update or showed periodic progress on reaching their sustainability goals.
- 5. Influence in Region: We also valued CPG companies that had a wide or meaningful impact in Michigan and the Saginaw Bay Watershed based on their number of employees and involvement in the region (volunteering, philanthropy, mentors, etc.).



Data Collection Findings

The section below summarized key findings gathered from publicly available information and stakeholder interviews

Data Collection Findings

Corn

Corn is grown in five main varieties: field corn, popcorn, food-grade corn, sweet corn, and seed corn. Ninety-nine percent of the corn grown in the United States is field corn, or dent corn. Field corn has many uses, from livestock feed to fuel and industrial products.⁸ Statistics on corn production show that farmers grow nearly six times more corn today than they did in the 1930s. Michigan's total corn production for 2020 is given below.⁹

Table 1: Crops - Planted, Harvested, Yield, Production, Price (MYA), Value of Production Sorted by Value of Production in Dollars						
Commodity	Planted All Purpose Acres	Harvested Acres	Yield	Production	Price per Unit	Value of Production in Dollars
Corn Corn, Grain Corn Corn, Sillage	2,350,000	1,990,000 350,000	154 BU/Acre 17.5 Tons/Acre	306,460,000 BU 6,125,000 Tons	4.45 \$/BU	1,363,747,000
Source: USDA/NASS 2020 State Agriculture Overview for Michigan . (n.d.). www.nass.usda.gov.						

Michigan, including the Saginaw Bay Watershed, focuses largely on producing corn for animal feed and ethanol production. The main areas within the watershed region producing corn include Huron, Saginaw, Sanilac, Tuscola, and Gratiot. Although tracking corn at a regional level has proven to be a difficult task, experts in the field believe that corn used from human consumption is under 1% of the total corn production, mainly coming from specialty corn such as blue corn. Michigan uses roughly 2.3 million acres for corn, with the majority being exported out of the state. With an average supply of 370 million bushels annually, Figure 2 shows the 2019 corn production breakdown for the state.¹⁰

In 2013, roughly 137 million bushels of corn was shipped out of state. This trend mimics the overall U.S. corn export activity. Graph 1 shows the breakdown of the U.S. corn export market in 2021, illustrating China, Mexico, and Japan as our top export countries. In Michigan, most corn exports are used to feed livestock, predominantly poultry and pigs, in the southeastern

United States.¹¹ Based on the insights gathered from our interviews, this corn usage trend has not changed much. However, companies are now exploring different byproducts of corn using corn-based polymers, a clear biodegradable chemical compound that can be used to create plastic or plastic alternatives, compostable fibers, and other products (e.g, cups, plates, utensils). TNC could consider exploring this market given that the process is directly connected to the production of corn, creating opportunities with to partner



Michigan Corn Uses

Figure 2 Michigan Corn Uses

packaging companies committed to addressing the environmental challenges stemming from corn production and harvesting.



Graph 1 Top U.S. Corn Export Customers in 2020/2021

Soybeans

Soybeans are a large crop in Michigan's agricultural sector, contributing millions of dollars to the Michigan economy each year, with over 10,000 farms totaling nearly 2 million acres in soybean production.¹² The majority of soybeans grown in the state are consumed by animals, with 98% of soybean meal being sold for livestock feed.¹³ When soybeans are processed, they are generally broken down into two components: soy oil and soy meal.¹⁴ In general, soy oil is used for vegetable oils in human consumption and soy meal is used in livestock feed, though some residual meal can be used in flour for human consumption.¹⁵ As shown in Figure 3, Michigan's trends of soy use (with most soybeans grown in Michigan going to animal feed) is on par with the global trajectory of soy markets.

Worldwide, only about 6% of all soybeans grown are processed for human consumption, most commonly in markets in



Figure 3 Soybean Uses

Asia.¹⁶ The major products for human consumption that ultimately result from soybeans include traditional soy foods like tofu and soymilk, as well as emerging alternatives for plant-based yogurts or faux meats.¹⁷ Soy oils have been used in traditional oils and salad dressing, and soy proteins have also been incorporated in baked or snack goods as well, though in a smaller proportion; other soy isolated proteins can even be used in some beverages.¹⁸ Finally, an emerging way to use soybeans are for bio-diesels or fuel alternatives.¹⁹

Potatoes

In 2019 Michigan was 12th in the nation in terms of potato production, producing 2,804 hundredweight or CWT (1 hundredweight = 100 pounds of mass) of potatoes that year.²⁰ Despite their modest production quantities, Michigan leads the nation in production of potatoes for potato chip processing.²¹ More than 70% of the potato production in the state goes towards potato chip production.²² According to the Michigan Potato Commission, "Nearly 1.82 billion pounds of potatoes are harvested annually in Michigan, generating \$182.4 million in sales."²³ In 2020, the value of potato production in Michigan was \$201,818,000, making it the 8th most valuable crop in Michigan that year in USD.²⁴ Montcalm, a county within the Saginaw Bay Watershed, is the county producing the most amount of potatoes in Michigan.²⁵ Because of the nationwide influence Michigan has over the potato chip industry, using consumer pressure on potato chip companies could provide a means of influencing soil health in the Saginaw Bay Watershed. The Potato industry in Michigan is interconnected and is constantly modifying and advancing potato growing methods with the help of the Michigan State University Extension Program and the Michigan Potato Industry Commission (MPIC). One of the ways that MSU extension supports potato growers is through their Potato Outreach Program. This program is led by Chris Long and supports potato growers by "conducting on-farm research and demonstration trials on all aspects of potato production."²⁶ This includes trying to test superior varieties, identified through both national and local breeding programs, to see which work for processors. While MSU extension focuses primarily on research and development, the MPIC focuses on connecting people involved with Michigan Potatoes. They create a space where breeders, seed developers, processors, and growers can all convene and discuss ways to collaborate.²⁷

Dry Beans

Michigan is known throughout the world as one of the top global producers of dry beans. The Michigan Bean Commission has registered more than 1,100 growers and agri-businesses related to dry bean production and more than 80% of that production resides in the Saginaw Bay Watershed area.²⁸ In the most recent Census of Agriculture released in 2017, Michigan was the second largest dry bean producing state in the U.S. in terms of the number of farms growing dry beans, number of acres harvested, and quantity harvested.²⁹ Historically, dry bean growers were row crop growers and often grew dry beans in addition to



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rotating the fields with corn, soybeans, and small grains. It's important to remember this when developing relationships with growers as many are likely growing corn and soybean in addition to dry bean production.

In 2020, according to the Michigan Department of Agriculture & Rural Development, Michigan's dry bean production broken down by species is as follows from largest to smallest amounts of production: black beans, navy beans, small red beans, other bean classes.³⁰ Dry beans are truly a specialty crop. Corn and soy are both grown worldwide while dry beans require a specific environment for agricultural success. Up until the flood of 1986, four counties within Michigan produced 92% of the world's navy beans. After the flood, companies shifted to diversify their geographic regions that they sourced products from. However, much of the bean production today remains within these same four Michigan counties as before the flood: Huron, Tuscola, Bay, and Sanilac.



Partnership and Process Recommendations

We created and employed a sustainability framework that examined each CPG company's presence in Saginaw Bay Watershed, their willingness to collaborate, their existing sustainability goals, their CSR and ESG Reporting

Partnership Recommendations

Our recommendations center on both CPG companies that will be a good fit for TNC partnerships as well as recommendations for potential changes to the methods of this project if TNC is interested in reproducing this project with other Michigan crops. Finally, we also provide some recommendations into potential data-sharing models or broader initiatives TNC can launch to foster collaboration and datasharing in the agricultural sphere.

To evaluate CPG companies' sustainability goals to generate our recommendations for TNC, we created and employed a sustainability framework that examined each CPG company's presence in Saginaw Bay Watershed, their willingness to collaborate, their existing sustainability goals, their Corporate Sustainability Reporting (CSR) and Environmental Social, and Governance (ESG) Reporting, and finally, their influence in the Region. See Appendix A for more details on the applied sustainability framework.

While we cannot disclose all eleven CPG companies that we discovered and recommended to TNC due to privacy concerns, we highlight two CPG companies in this report to show the type of analysis we used in making final recommendations to TNC.

Corn Partnership Recommendation

Given that most of the corn produced is not towards human consumption, our CPG company recommendation is limited to adjacent industries. As such, we recommend TNC to explore partnership opportunities with Green Cell Foam by KTM Industries. Green Cell Foam is an environmentally sustainable packaging company by KTM Industries. Its packaging product is made from US-grown corn and certified compostable. They are in Holt, Michigan but it is unknown if they source directly from the Saginaw Bay Watershed region. Green

Cell Foam established multiple partnerships with growers and CPGs companies interested in eliminating waste from their supply chain. In 2019, Green Cell Foam became the exclusive shipping material for

Figure 4: Green Cell Evaluation Ratings					
••••0	Degree of Saginaw Bay Watershed Presence				
••000	Willingness to Collaborate				
••••0	Existing Public Facing Sustainability Goals				
•0000	Public Facing CSR and ESG Reporting				
••••0	Influence in Region				

Crowd Cow, an online meat delivery marketplace.³² Similarly, Green Cell Foam also partnered with Jenny Craig, a food delivery company with a focus on sustainable operations and Bently Ranch, a family-owned farm.³³ Given our findings of corn uses, we recommend TNC to consider exploring this partnership further as it has the potential to yield in advancing sustainable corn growing practices. Figure 4 below shows our final partnership evaluation ratings based on our established sustainability rating for Green Cell.

Soybeans Partnership Recommendations

Despite the prevalence of soybeans in Michigan, there are only three processors of soybeans in the state. Ultimately, the soybean processors in Michigan either process soybeans solely for animal consumption or refused to share their clients for human consumption when we interviewed them. Thus, our CPG company recommendations for this sector remain confidential.

Potatoes Partnership Recommendations

Out of all these processors and CPG companies, Better Made Snack Foods (Detroit, MI) was the entity we had the most communication with. They were very open and willing to meet with us and seemed engaged and interested in our project. This high willingness to collaborate played heavily into their high rating as a recommended CPG company. Additionally, we found that Better Made has a relatively high presence in the Saginaw Bay Watershed. Although they do not have any current sustainability goals directly related to soil health, Better Made is involved in various other sustainability initiatives and is heavily engaged in initiatives specifically in the State of Michigan. Similarly, to the other entities, Better Made lacks CSR and ESG reporting. Better Made has a large influence in the State of

Michigan and a good reputation within the Potato Industry. After evaluating a variety of factors for each category (sub-categories can be seen in appendix A) we have evaluated Better Made's potential for a TNC partnership based on their presence in the Saginaw Bay Watershed (both through processing and crop sourcing from the area), their willingness to collaborate, their public facing sustainability goals, their public



facing CSR and ESG reporting, and their influence in the region (Figure 5).

Dry Beans Partnership Recommendations

While there is a significant portion of dry beans grown and processed in the Saginaw Bay Watershed, processors requested information regarding volume of dry beans sourced as well as their CPG company partnerships remain confidential. For this reason, we are not able to disclose any CPG companies in this report. However, these recommendations were provided directly to TNC by the Fellows team.

Process Recommendations

Given that data-sharing and access to information were primary barriers in this project, we recommend several potential changes to the project that might better guide a future Dow team if TNC is interested in pursuing this project in the future.

Begin by talking with agricultural groups and associations: One of the steps that was most helpful in our research was doing research on our respective crop industries and immediately talking with the agricultural associations for that crop. We realized earlier on that each crop will have an entirely different product flow from where they are grown, bought, processed, sold, and ultimately used. Knowing how the specific crop is processed and who the players are in that process within Michigan was paramount to our understanding of the project.

- Talk to CPG Companies before Processors: One major barrier we faced in getting the names of CPG companies was that so much of this information was sensitive and/or proprietary that processors were unwilling to provide it. Processors were at times unwilling to give us a list of their customers regardless of whether we offered to draft and sign a Non-Disclosure Agreement (NDA) or whether we offered to purchase this information. While we clearly explained the nature of the project, companies still seem hesitant to share information even with an experienced research team. Thus, instead of starting from the ground at the farmer level and working our way through the supply chain, we might suggest starting at the top, collecting the names of CPGs in Michigan or some geographic subset of Michigan, and then reaching out to those CPGs directly.
- Consider tracking non-GMO crops: Another potential avenue to obtain granular information on food sourcing and production would be to consider tracking only non-GMO crops or products. Since products that are made with non-GMO crops will be required to list this and then keep specific information about where they source these non-GMO ingredients, targeting a CPG company or crop based on non-GMO status of a particular product or crop could yield better information.
- Leveraging Network: Finally, one of the most important ways to get information is through leveraging TNC's network and reputation in the area. Nearly everyone we talked to was only willing to chat because a personal connection through TNC had reached out to them. The more that TNC can recognize these connections and leverage them to help the project team initiate conversations with a trusted reputation, the better that information will be.
- Building a Cooperative Environment: Additionally, it will be important for future teams and TNC to build a collaborative relationship with processors or CPG companies. Given that so much of this information is sensitive, regardless of whether it comes from a processor or CPG company, it is important to clearly articulate the benefits of sharing this information for TNC. To incentivize data-sharing, TNC and future groups will want to clearly emphasize how other stakeholders in the area will benefit from sharing this information and how working with TNC will be a mutually beneficial relationship.
- Designing Mechanisms for Data-Sharing: Finally, TNC might want to consider partnering with the Michigan extension program or other stakeholders to consider coming up with a data-sharing model for supply chains in Michigan. For example, TNC could consider trying to implement a supply chain transparency campaign with prominent Michigan CPG companies to incentivize data sharing.



Project Impact³⁴

This research aims to support TNC in identifying consumer-packaged goods companies with operations extending to the Saginaw Bay Watershed and focuses on addressing water and climate sustainability challenges. Successful identification of partnerships will allow TNC develop and advance science-based conservation practices within these organizations, resulting in improved water quality in the Saginaw Bay Watershed and broader Great Lakes area. Additionally, the findings from this study can benefit the community at-large as improved water management practices can lead to greater public health benefits and reduced materials consumption. No quantitative impact was determined given the data collection restrictions.

This work was supported by the Dow Sustainability Fellows Program at the University of Michigan. We would like to thank Mary Fales and Benjamin Wickerham of the Nature Conservancy for their continued support and help on this project. We also owe thanks to Ravi Anupindi of the University of Michigan for supervising this work. Finally, we would like to acknowledge countless industry professionals in the Michigan corn, dry bean, potato, and soybean sectors.

Appendix A - Sustainability Criteria Matrix

Table 6: Sustainability Criteria Matrix					
Sustainability Criteria Category	Specific Questions Within Each Category				
Degree of Saginaw Bay Watershed Presence	 (If applicable) Do they get a lot of products from SBW? Do they have a facility in the SBW? Do they have sustainability initiatives focused on the SBW or Michigan? 				
Willingness to collaborate	 Do they have other sustainability partnerships? Do they seem involved in local communities or Michigan? Do they have other partnerships with NGOs (sustainability or non-sustainability)? Do they have partnerships with farmers? Do they have information or initiatives focused on their supply chains? (If we've spoken with them) Are they responsive? 				
Existing sustainability goals	 Do they have sustainability goals broadly? Do they have sustainability goals associated with water conservation or health? Do they have sustainability goals around soil conservation, nutrient reduction or nutrient management or soil health? Do they have sustainability goals relating to their supply chain? Do they have sustainability goals centered on local communities, Michigan, or the Saginaw Bay Watershed? Do they have sustainability goals around carbon neutrality or their carbon footprint? Do their sustainability goals have a specific timeframe? How long is their time frame? How ambitious are their sustainability goals? 				
CSR and ESG Reporting	 Do they publish a periodic sustainability report explaining their CSR or ESG goals and progress? How often do they post updates on their progress towards sustainability goals? Are they transparent about where they need to improve their sustainability? Are they maintaining their accountability? 				
Influence in the Region	 How big is the company based on number of employees? Do they have a wide geographic reach in the country? Do they have a wide geographic reach in Michigan? (If available) Do they have a good reputation in Michigan? 				

Endnotes

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