ECIA PORT EXPANSION STUDY

Technical Memo #2 (Tasks 3-6)

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1 Introduction

1.1 ABOUT THE ECIA PORT EXPANSION STUDY

The East Central Intergovernmental Association (ECIA), in partnership with the states of Illinois and Iowa, local and regional governments, and local marine terminal operators, is conducting a study of the potential to expand and enhance the physical and operational capabilities of marine freight terminals in Dubuque, IA and East Dubuque, IL. The ECIA Port Expansion Study is intended to:

- Provide more multi-modal transportation options for regional shippers to connect them to the international and domestic transportation system and associated worldwide markets;
- Serve as a catalyst for economic development in Iowa, Illinois and the local region;
- Evaluate potential market demand for freight to move via the Mississippi River from existing port facilities;
- Document the primary characteristics required for a successful and sustainable operation, including business logistics, transportation access, infrastructure and other factors;
- Identify port expansion opportunities to capture demand, generate economic benefits and achieve the overall goals of the study and its stakeholders;
- Position improvement projects for grant funding through Benefit-Cost Analysis; and
- Provide input for regional and local plans by the Dubuque Metropolitan Area Transportation Study (DMATS), ECIA and others.

1.2 OVERALL WORKPLAN

The study is being conducted over a 14-month period, and consists of eight primary task areas, summarized below. Work on Task 1 and 2 was completed and documented in the study's Technical Memorandum on Task 2.

<u>Task 1. Stakeholder Engagement</u>

- Objective: Establish and implement a program for two-way communication among and between study managers, stakeholders, and the consultant team, to best inform the study process and support consensus findings.

Task 2a. Data Collection / Inventory

- Task 2a. Data Collection / Inventory – Ports
  - Objective: Identify the most "mission critical" information for the region's port assets, establish the number of port locations to be addressed, collect the relevant data and summarize the key information in a simple and useful framework.
- Task 2b. Data Collection / Inventory – Highway / Rail Access
  - Objective: Identify the most "mission critical" information for the region's highway and rail infrastructure linking port locations and their existing/potential customers.
- Task 2c. Data Collection / Inventory – Land Use and Industry Locations
  - Objective: Identify the most "mission critical" data for regional land use and industry locations, focusing on land uses and development patterns that directly support, or would be supported by, port activity.

Task 3. Market Analysis

- Objective: Document the primary characteristics and components of current market demand by water and the growth potential for commodities that could be served by study area ports in the future, through a 2040 horizon.

Task 4. Capacity Analysis and Program Level Recommendations

- Objective: Match available port, access and service capacity to potential demand, to identify shortfalls which represent opportunities for improved port facilities and services in the year 2025 and 2040 timeframes.

Task 5. Needs Assessment by Port Location

- Objective: Develop location-specific port improvement recommendations.

Task 6. Study Recommendations

- Objective: Evaluate the benefits and costs of the proposed port location-level improvement programs.

Task 7. Final Report and Documentation

1.3 WORKFLOW ADJUSTMENTS

During the course of the study, USDOT announced two major funding opportunities: the 2020 BUILD grants and the 2020 Port Infrastructure Development Program (PIDP) grants. Both grant programs focus on the implementation and completion of projects within (roughly) the next five

years. To assist ECIA, Logistics Park Dubuque, and Gavilon Grain in preparing grant applications (submitted May 18, 2020) under both programs, the WSP team focused on completing Task 3 (market analysis) and advancing the near-term (through 2025) elements of Tasks 4 (capacity and program), Task 5 (needs by port location), and Task 6 (benefit-cost analysis of recommendations).

Under this adjusted work plan, ECIA prepared and submitted grant applications for both funding opportunities, and work was completed under Tasks 4 through 6 with respect to near-term opportunities. Remaining work on the project will focus on developing the corresponding information for long-term opportunities and preparing final documentation.

1.4 ABOUT THIS TECHNICAL MEMO

This Technical Memo documents work completed to date since the delivery of the Technical Memo on Task 2, and covers:

- Fully completed results of Task 3 (market analysis)
- Fully completed results of Task 4 (capacity and program needs, near-term and long-term)
- Near-term results of Task 5 (needs by port location through 2025)
- Near-term results of Task 6 (benefit-cost analysis of improvements through year 2025)

The study workplan anticipated three Technical Memoranda plus final documentation; we anticipate that the long-term elements (through 2045) of Tasks 5 and 6 will be presented in the third Technical Memo, and then all work will be finally documented under Task 7.

2 Near-Term and Long-Term Market Opportunities

2.1 WORK PERFORMED IN THIS TASK

Work performed in the Task 3 Market Analysis encompassed a broad set of activities, leading to the production of a commodity-specific regional market forecast to guide the development of program and project recommendations.

Some of the Task 3 elements were initiated and documented in Task 2, including:

- Summaries of historic and current marine freight traffic from operator information, U.S. Army Corps of Engineers data and other sources as applicable
- Primary market demand drivers and service requirements
- Initial market-focused stakeholder interviews
- Analysis of the changing competitive landscape

The Task 2 work was the launching-off point to:

- Perform detailed (and in some cases confidential) industry market interviews, reaching more deeply into the known/potential customer market and probing specific opportunities
- Estimate the "total landed logistics cost" for commodities and origin-destination service pairs with the potential to support port expansion, including current water commodities as well as truck or rail diversion commodities, where applicable for market estimation
- Develop detailed market volume and demand projections, covering current year through forecast year 2045, by commodity and handling type, including both proven and aspirational commodities

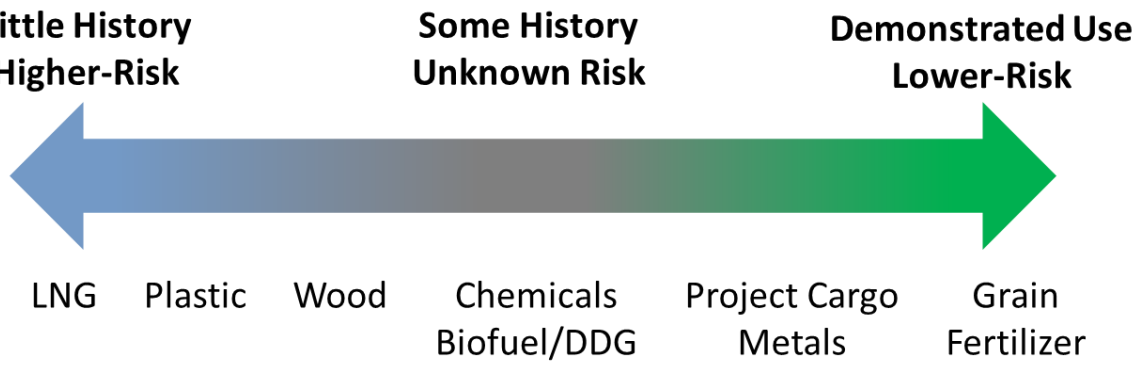
2.2 KEY FINDINGS FROM TASK 2

Task 2 concluded with a synthesis analysis of market opportunities by team member CPCS Transcom. The competitive opportunities for each commodity are varied based on the number and location of competitor terminals, the consumption or demand for materials in the market area, and the previous history of materials' movement on the Mississippi River. Based on these factors, the commodities studied can be arranged on a spectrum of likely competitiveness, shown

in Figure 1. Commodities with little to no history of movement on the Mississippi River are shown on the left and are considered more speculative or "higher risk" for potential barge service. In comparison, commodities regularly moved on the Mississippi River are shown on the right and are considered "lower risk" due to their demonstrated history of shipment on the River.

In general, bulk materials related to agriculture and heavy manufacturing (such as grain, fertilizer, and metals) already move on the river, and therefore are considered low-risk commodities to attract to a terminal. However, lighter, higher-value manufacturing inputs such as wood and plastic do not move on the river right now, and demand may be too small to support barge-sized shipments of these commodities. In the absence of current shipments and potential demand, trying to attract these commodities is considered a "higher-risk" strategy.

Figure 1. Spectrum of Commodity Competitiveness



2.3 EXPANDED TASK 3 MARKET ANALYSIS

The expanded Task 3 market analysis was completed by team member Martin Associates; it substantially confirms the Task 2 platform work, provides additional detail at the commodity/opportunity level, and concludes with detailed commodity-level forecasts for the region's ports at 5-year increments through 2045. Note that the forecasts are "unconstrained" in that they show the amount of freight that would prefer to use ECIA region ports compared to competing facilities, assuming sufficient capacity and handling capability is available at ECIA ports. The market forecast is therefore an indispensable tool in developing program and project recommendations. The Martin Associates findings are presented in slide deck form as Appendix A of this Technical Memo.

3 Port Capacity and Program Needs

3.1 WORK PERFORMED IN THIS TASK

Under Task 4, WSP: reviewed, revised, and finalized estimates of port terminal capacity at Gavilon and Logistics Park Dubuque, adjusting for seasonality effects and considering use of all modes (barge, rail, truck); compared the capacity estimates against the demand forecasts from the Market Analysis to identify shortfalls and opportunities; and identified near-term and long-term area-wide programmatic strategies for facility development.

3.2 CAPACITY ANALYSIS PROCESS

WSP's "PRIME" model was used to estimate the capacity of the region's port facilities, by looking at the various components of cargo throughput – berths, loading/unloading equipment, open and covered storage, truck transfer, and rail transfer – individually and as they are linked to accomplish multi-modal movement of cargo. As inputs, PRIME utilizes physical attribute data (number of berths, acres, etc.) and performance data (dwell time, transfer speed, etc.), to estimate:

- Berth throughput capacity
- Storage yard throughput capacity
- Truck transfer capacity
- Rail transfer capacity
- Pipeline transfer capacity

The resulting capacity estimates are expressed as "Maximum Practical Capacity" or MPC. MPC is the throughput level a terminal can handle at a sustained rate under normal operating practices (work schedules, equipment deployment, number of employees, etc.). Terminals can and do exceed MPC during peak periods but having a high MPC means that peaks are more easily accommodated. When demand is growing and reaches 80% of MPC, physical and/or operational improvements are generally recommended, so that extra capacity comes online when needed to accommodate the added demand. MPC should be taken as a general guideline, not a decimal-point accurate performance measure, and a range of 5-10% around the MPC is sometimes used for planning purposes.

Compared to container terminals, which operate consistently over the entire year, river port operations can be highly variable over a year based on scheduled or unscheduled river closures, shifts of water traffic to rail when necessary, and use of facilities for different commodities at

different times of the year. For this analysis, PRIME was customized for seasonality in different commodities, and available workdays were allocated as follows:

- Fertilizer: 365 days
- Grain: 275 days (March to November)
- Salt: 122 days (June to September)
- Steel: 365 days

3.3 CAPACITY ANALYSIS RESULTS

Logistics Park Dubuque

The PRIME analysis considered the following commodities, directions, and modes:

- Salt: Inbound Barge, Outbound Truck
- Fertilizer: Inbound Barge/Rail, Outbound Truck
- Grain: Inbound Truck, Outbound Barge
- Cottonseed: Inbound Barge, Outbound Truck

Table 1. Logistics Park Dubuque Berth and Storage Capacity Estimates

Dock (See Locations on Figure 5)	Cargo	Unit	MPC Throughput Capacities (Numbers in red represent constraining factor)	
			Berth	Storage
Dock 1	Fertilizer	Tons/Year	400,000	281,000
Dock 1	Cottonseed	Tons/Year	100,000	229,000
Dock 2	Not in use			
Dock 3	Grain	Bushels/ Yr.	17,857,000	13,750,000
Dock 4	Fertilizer	Tons/Year	840,000	115,000
Dock 4	Salt	Tons/Year	560,000	71,000

Note that except for cottonseed, storage is more of a constraint than berthing.

Next, the equivalent loaded trips associated with the calculated MPCs were estimated, assuming:

- Barge = 1,500 tons
- Truck = 25 tons
- Railcar = 100 tons

Table 2. Logistics Park Dubuque Trip Generation at MPC

Dock	Cargo	Barges/ Year	Trucks/ Year	Railcars/ Year
Dock 1	Fertilizer	187	8,430	703
Dock 1	Cottonseed	67	3,000	-
Dock 3	Grain	257	15,400	-
Dock 4	Fertilizer	77	3,450	288
Dock 4	Salt	47	2,130	-

Gavilon

The PRIME analysis considered the following commodities, directions, and modes:

- 7th Street Terminal (Docks 1 and 2)
  - Fertilizer: Inbound Barge, Outbound Rail and Truck
  - Steel Rebars: Inbound Barge, Outbound Truck
  - Grain: Inbound Rail and Truck, Outbound Barge
- Dove Harbor Terminal (Docks 3 and 4)
  - Fertilizer: Inbound Barge, Outbound Truck
  - Steel Rebars Inbound Barge, Outbound Truck
- Dove Harbor Terminal (Docks 5 and 6):
  - Salt: Inbound Barge, Outbound Truck
  - Dry Corn: Inbound Truck, Outbound Barge
  - Liquid Fertilizer: Inbound Barge, Outbound Truck

Table 3. Gavilon Berth and Storage Capacity Estimates

Dock	Cargo	Unit	Throughput Capacities	
			Berth	Storage Yard
Dock 1	Fertilizer	Tons/Year	485,000	285,000
Dock 1	Steel Rebar	Tons/Year	62,550	4,000
Dock 2	Grain	Bushels/Year	21,473,000	14,927,000
Dock 3	Fertilizer	Tons/Year	625,500	218,000
Dock 3	Steel Rebar	Tons/Year	104,250	18,000
Dock 4	Grain	Bushels/Year	11,170,000	4,535,000
Dock 5	Salt	Tons/Year	293,250	85,000
Dock 5	Dry Corn	Bushels/Year	6,982,000	7,488,000
Dock 6	Fertilizer	Tons/Year	488,750	104,000

A dock location map is presented in Section 4 (see Figure 3). Note that except for dry corn, storage is more of a constraint than berthing.

Next, the equivalent loaded trips associated with the calculated MPCs were estimated, assuming:

- Barge = 1,500 tons
- Truck = 25 tons
- Railcar = 100 tons

Table 4. Gavilon Trip Generation at MPC

Dock	Cargo	Barges/ Year	Trucks/ Year	Railcars/ Year
Dock 1	Fertilizer	190	8,550	713
Dock 1	Steel Rebar	3	120	-
Dock 2	Grain	279	10,031	1,672
Dock 3	Fertilizer	145	7,270	-
Dock 3	Steel Rebar	12	600	-
Dock 4	Grain	85	5,080	-
Dock 5	Salt	57	2,833	-
Dock 5	Dry Corn	130	7,800	-
Dock 6	Fertilizer	69	3,470	-

3.4 PROGRAM RECOMMENDATIONS

Program recommendations were developed based on the following considerations:

- **Future shortfalls in capacity compared to demand**. Based on existing capacity and projected demand, Gavilon and LPD combined will reach their maximum capacity for fertilizers in 2030 and are essentially at capacity for salt and steel today. Without improvements, by 2045 these ports will be able to handle only 71% of fertilizer demand, 27% of salt demand, and 32% of steel demand for the region. Berth capacity is adequate – the constraint is storage, and just over 400,000 square feet of additional storage would be required to fully capture demand. Other commodities such as grain, corn and cottonseed are not projected to experience shortfalls.

Table 5. Long-Range Capacity Shortfalls

Commodity	Year Capacity Reached	Capacity/Demand in 2045 Without Improvements	Additional Storage Needed
Fertilizers	2030	71%	25,400 SF
Salt	2020	27%	227,000 SF
Steel	2020	32%	160,000 SF

- **Imminent loss of existing capacity to handle critical commodities.** Today, both Gavilon and Logistics Park Dubuque face the prospect of losing existing fertilizer capacity in antiquated buildings that need replacement. Instead of running out of fertilizer capacity by 2030 as shown in Table 5, the region would face an immediate shortfall of fertilizer capacity. Additionally, Logistics Park Dubuque faces the potential loss of salt handling capacity, as state regulatory pressures lead to the elimination of open storage piles for salt. The region's ports are already at capacity for salt, so the loss of LPD capacity would create an immediate deficit.
- **"Opportunity commodities" from the market analysis.** Among the many new commodity market opportunities considered in the study market analysis, probably the most achievable and attractive is agricultural by-products (dried distiller grain, soybean meal, corn gluten meal and pellets). There are known regional shippers who are using more distant ports because of a lack of facilities in the ECIA region, and these would be likely candidates to anchor this business at local ports.
- **Access improvement opportunities.** There are significant existing rail access deficiencies at Gavilon, significant highway access issues at Logistics Park Dubuque, and opportunities for improvements to highway and rail at both ports to meet the trip generation needs calculated in Table 2 and Table 4.
- **Imbalances between berth and storage capacity**. For fertilizer, salt, and grain, berth capacity is substantially higher than storage capacity. Fertilizer and salt storage improvements could bring these capacities more into balance, taking better advantage of the available marine infrastructure. Grain storage improvements would also lead to improved balance, although the current market forecast does not suggest that existing storage is inadequate to serve current and future market demands.

This suggests the following programmatic development direction:

- **Near-term**: ensure the preservation of existing fertilizer and salt-handling capacity; work to capture identified opportunities in agricultural by-products; and remedy the most pressing regional rail deficiencies. Section 4 lays out a specific development plan and program to accomplish this.
- **Long-term:** look to substantially expand capacity for fertilizer, salt, and steel rebars; address highway (and potentially rail) access to Logistics Park Dubuque; accommodate further expansion of agricultural by-products handling if market demand warrants. Future phase work will refine this initial direction and lay out plan and program options in detail.

3.5 PROJECTS NOT RECOMMENDED

Two potential types of near-term projects were specifically considered and not advanced.

- Container-on-Barge (COB) service. As noted in the study Market Analysis, the market feasibility and identifiable demand for container-on-barge services in the ECIA region appears very limited. The WSP team performed an additional test by looking at the physical requirements, costs, and impacts to other commodity handling operations associated with COB service development. As it turns out, the required facilities would be very expensive to develop and would lead to loss of capacity for existing commodity lines. These facts, combined with the low identified market potential, led to a clear recommendation not to advance COB concepts further.
- Rail intermodal service. The potential to provide intermodal rail transfer capabilities at ECIA regional ports was also considered, and rejected for similar reasons – low identifiable demand, high development cost, and impact on proven business operations.

A slide presentation summarizing the key findings was developed and presented to the Study Steering Committee and to Dubuque Metropolitan Area Transportation Study (DMATS) members, and is included as Appendix B.

4 Recommended Near-Term Projects at Gavilon and Logistics Park Dubuque

4.1 WORK PERFORMED IN THIS TASK

Under Task 5, WSP: reviewed the strengths and weaknesses of each port location from the data developed in Task 2 (including marine infrastructure, water depth and navigability, highway and rail access and other relevant factors); worked directly with Gavilon and Logistics Park Dubuque to develop an area-wide improvement program and corresponding projects at each port facility; and created plans and layout diagrams for improvements to marine terminals (addressing salt, fertilizer, and agricultural by-products handling) along with rail access improvements.

These projects were included in two discretionary grant applications submitted by ECIA under the BUILD 2020 and PIDP 2020 programs.

4.2 EXISTING CONDITIONS

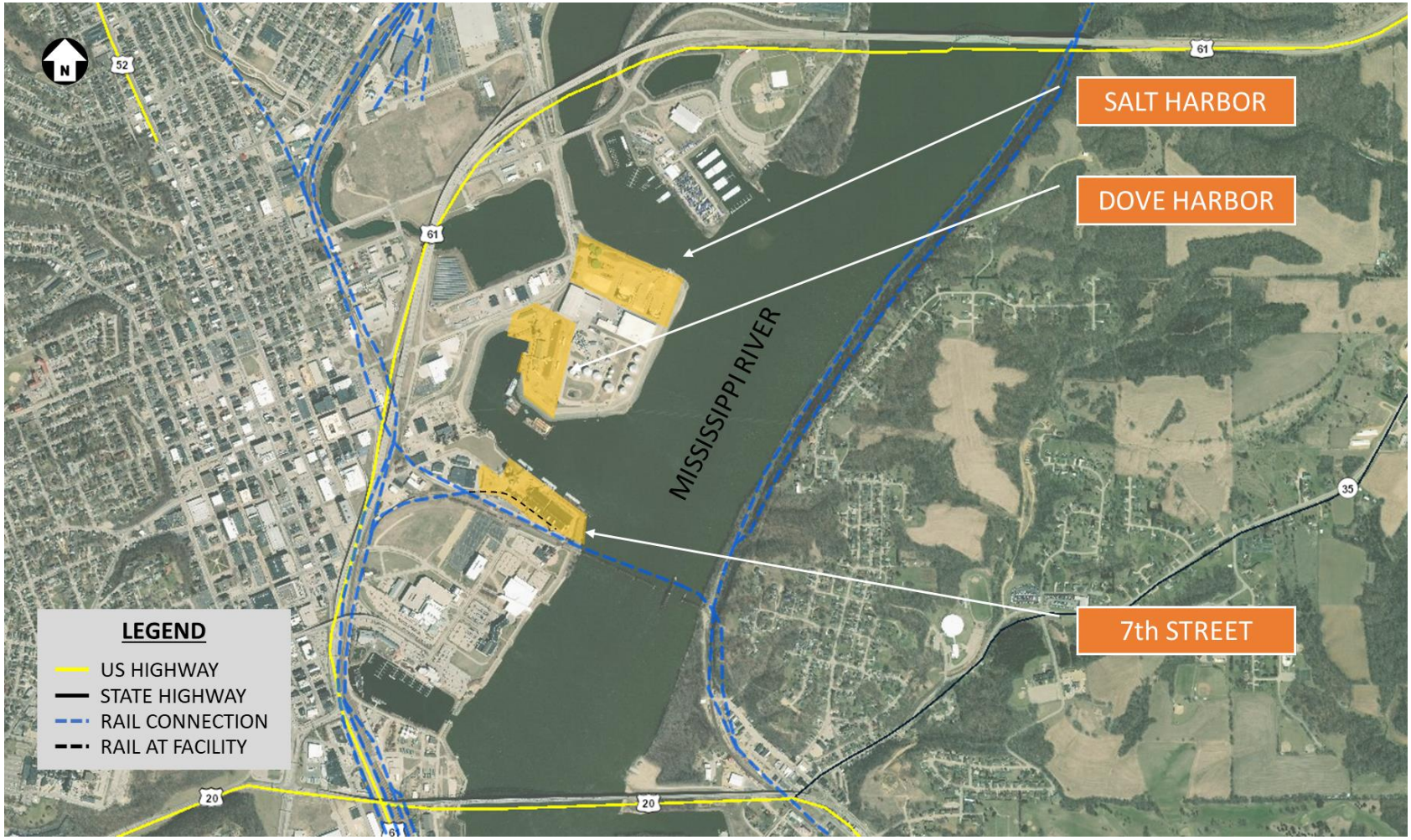
Existing conditions were discussed and presented in the Technical Memo on Task 2, but some of that discussion is reproduced below to assist in explaining the nature of the near-term projects being recommended.

4.2.1 *Gavilon Dubuque*

Gavilon's facility is located at Port of Dubuque in Dubuque, IA and is divided into three separate operating areas -- Salt Harbor (12.3 acres), Dove Harbor, 12.7 acres) and Seventh Street 13.0 acres), for a total operating area of around 38 acres. Each operating area is leased from the City of Dubuque, which owns the underlying property; Gavilon owns the fixed and mobile assets (structures, cargo handling equipment, etc.) on the operating areas.

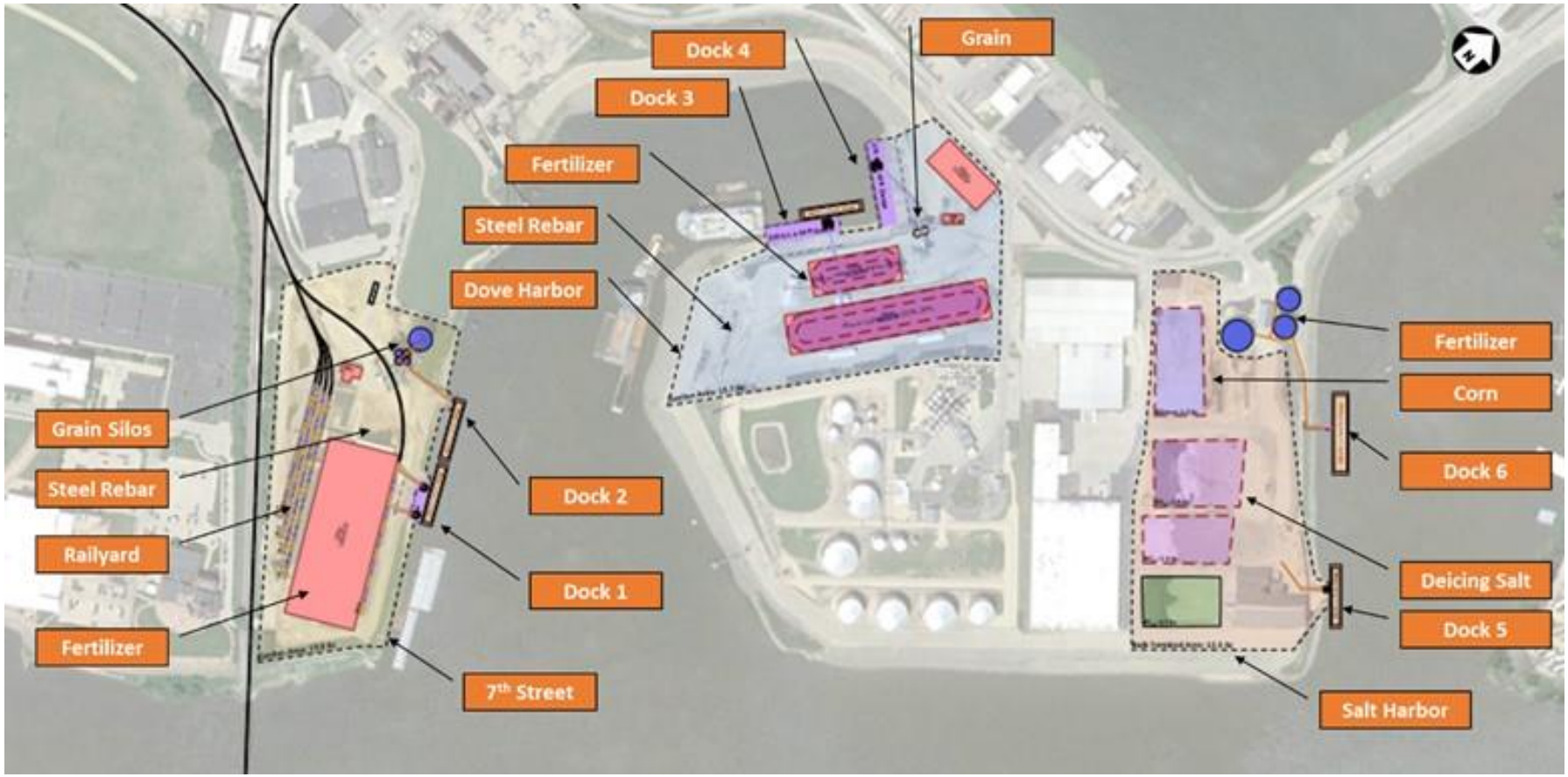
Gavilon provides transfer to and from barges on the Upper Mississippi River, with connections to all points reachable by barge. The facilities are connected to US 20, US 52 and US 61 via Kerper Blvd. US 20 provides East-West connectivity. Similarly, US 52 and US 61 provides North-South connectivity to the terminal. The Seventh Street facility is served by Canadian National (CN) Class I railroad with a direct move to the south, and an indirect move to the north. Figure 2 following shows the location and connectivity for Gavilon Terminal.

Figure 2. Gavilon Terminal Location and Connectivity



Source: Google Earth and WSP

Figure 3. Gavilon Facilites (Showing Previous Leashold Boundaries)



Source: Gavilon and WSP

4.2.2 *Logistics Park Dubuque*

Logistics Park Dubuque (LPD) is located at East Dubuque, IL. LPD was formerly known as IEI Barge Services. LPD is situated about 4 miles downriver from the Gavilon facility. LPD is a single contiguous operating area of approximately 90 acres. LPD's parent company, Alliant Energy, owns the underlying property as well as the fixed and mobile assets (structures, cargo handling equipment, etc.).

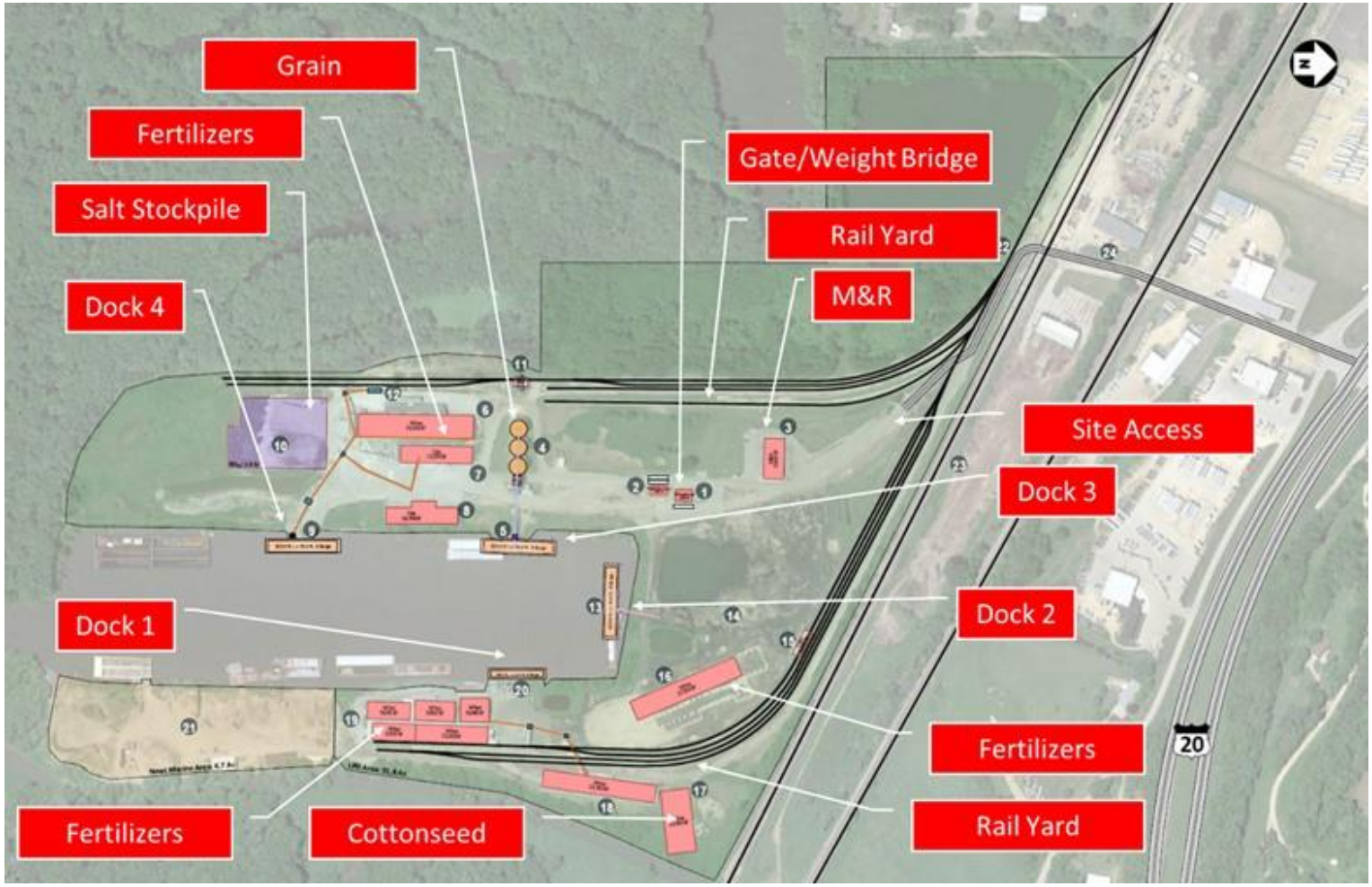
LPD provides transfer to and from barges on the Upper Mississippi River, with connections to all points reachable by barge. The facility is connected to US 20 via Barge Terminal Road. US 20 provides East-West connectivity. The facility is served by Canadian National (CN) Class I railroad and has space for approximately 185 railcar spots. There is also BNSF main line passing near the terminal. Figure 4 following shows the location and connectivity for LPD Terminal.

LPD handles the following commodities: grains (corn and soybeans); fertilizers (dry only); cottonseed; and de-icing salt. These commodities are either US export or US imports, and are highly seasonal depending on crop harvesting, weather condition, and river access.

Figure 4. LPD Terminal Connectivity

Source: Google Earth and WSP

Figure 5. LPD Facilites



Source: LPD and WSP

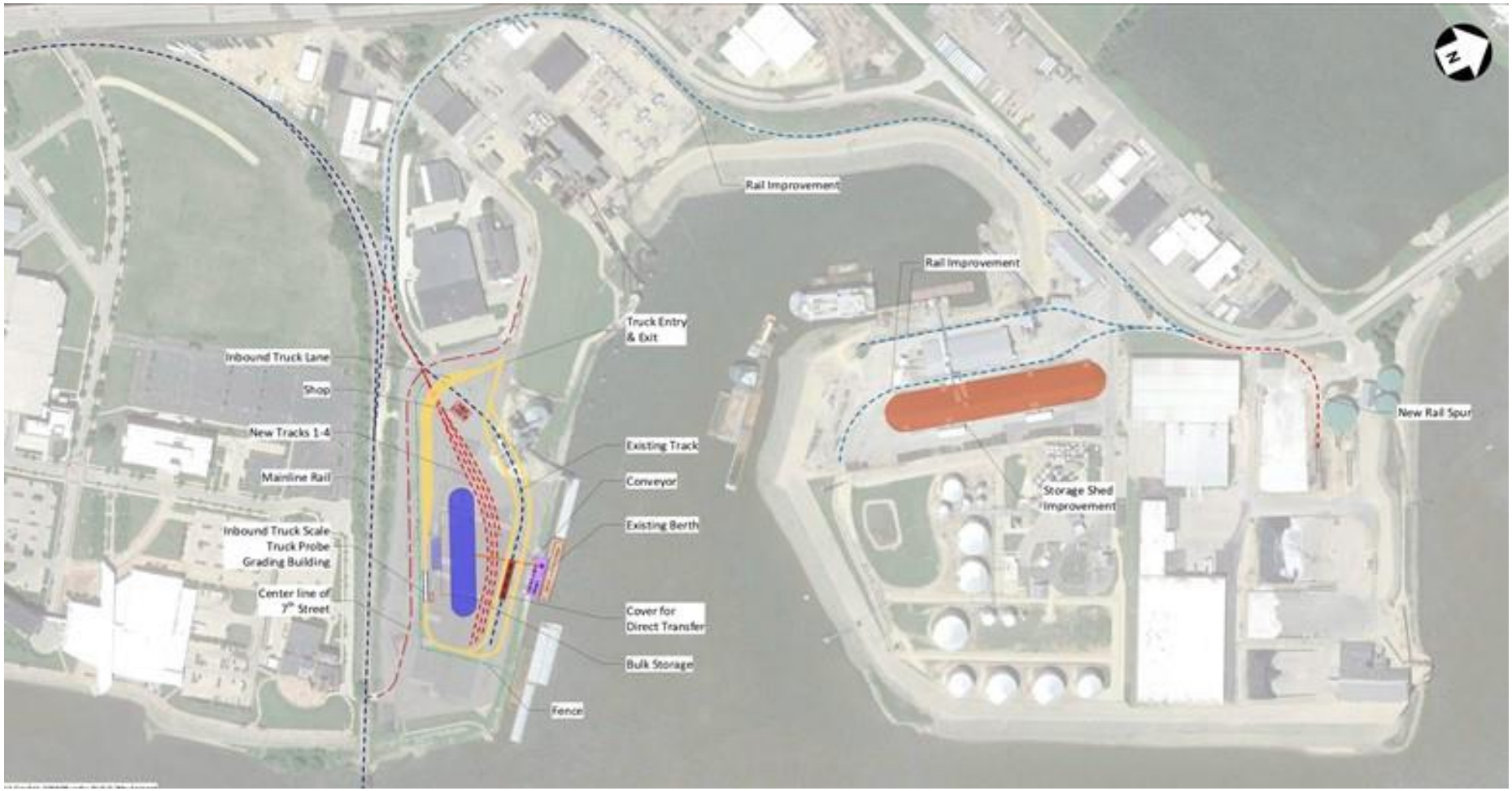
4.3 RECOMMENDED NEAR-TERM PROJECTS

The recommended program of projects at Gavilon and Logistics Park Dubuque will: repurpose idle coal handling systems to store processed grain by-products; install new covers on existing salt piles; replace obsolete fertilizer storage buildings; and add/upgrade track and railcar loading equipment.

Gavilon Projects

- *Replace an older fertilizer storage building with a 20,000-ton capacity shed* – Gavilon is a leading wholesaler of bulk blending fertilizers. Through its seventy-five bulk terminals located on the Mississippi River and in key agriculture growing areas, Gavilon provides crop nutrients to agricultural retailers across the region. A fertilizer storage structure at the 7th Street site in Dubuque is at the end of its useable life. Gavilon would replace this fertilizer warehouse with a 20,000-ton capacity building to enable ongoing operations at the facility.
- *Renovate an existing fertilizer storage shed to increase its capacity by 12,000 tons* – Before wholesale purchase, dry fertilizer is stored at the Dove Harbor site. A fertilizer storage warehouse at Dove Harbor would be expanded by 12,000 tons to accommodate more product on site. This increased capacity will enable Gavilon to handle more commodity shipments.
- *Replace/upgrade inoperable rail track* – The CN railroad connects directly with the Gavilon facility. However, a portion of rail track at the Dove Harbor site is inoperable in its current condition. Replacing and upgrading this track will enable rail service that has been curtailed at the Dove Harbor site, providing multimodal shipment of grain, fertilizer, and steel rebar. CN has provided a letter of support for the project and is working with study partners on design and operating details.
- *Relocate rail track to support direct transfer/transloading of fertilizer and other bulk products from river barge to rail* – Rail track at the 7th Street site will be relocated to accommodate a smaller footprint and maintain the current business structure. This improvement will aid Gavilon in moving product more efficiently from barge to rail.
- *Install new rail equipment, including main line switch, loadout system, and shed* – New rail equipment at the Dove Harbor site is necessary to repair and utilize existing rail infrastructure and expand Gavilon's multimodal transportation capabilities at the port. The project will support a main line switch from the CN track, a loadout system to enable the loading of fertilizer into rail cars, and a new shed to cover the loadout and reduce emissions.

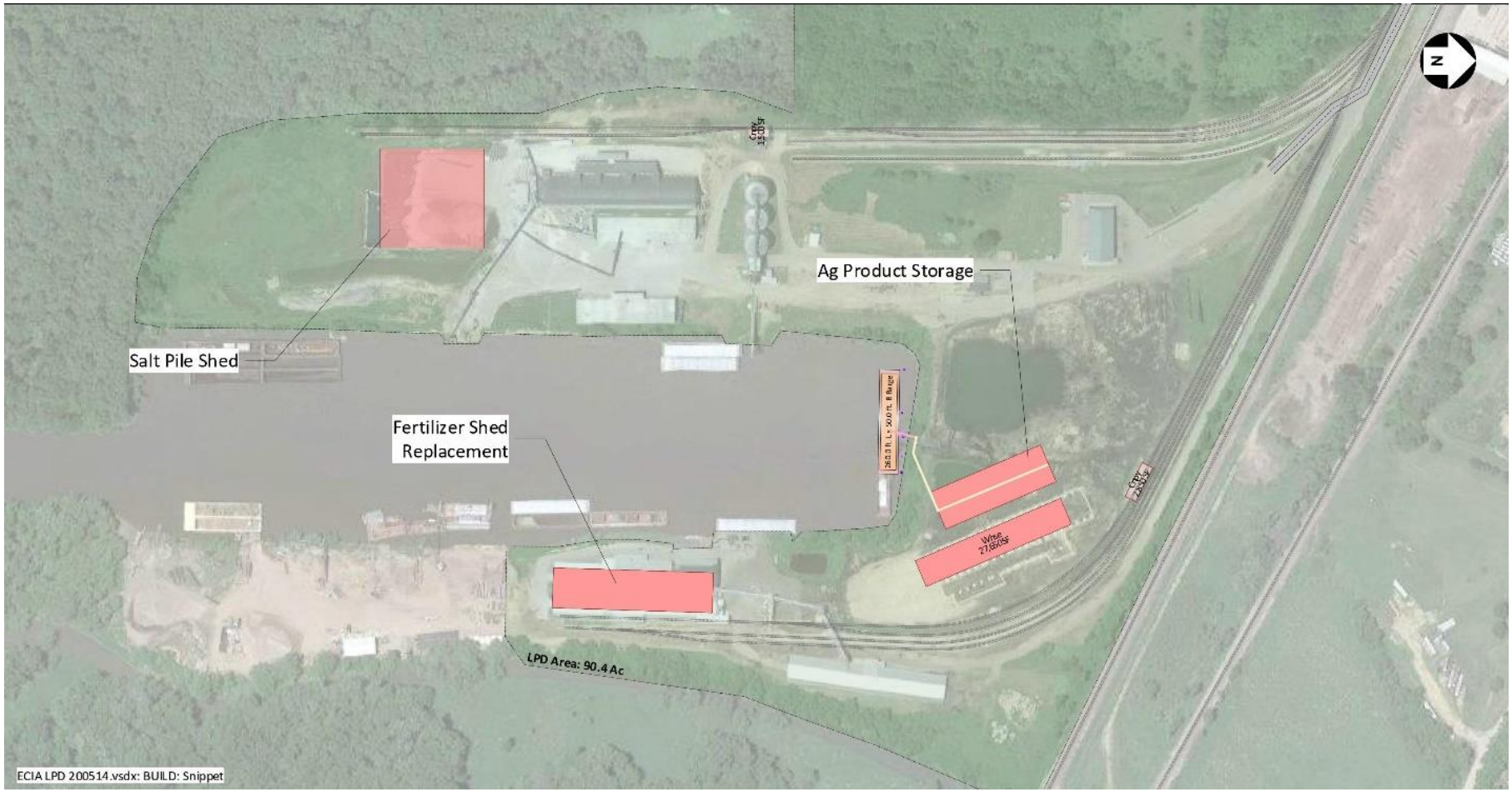
Figure 6. Recommended Near-Term Improvements, Gavilon (Showing Updated Leasehold Boundaries)



Logistics Park Dubuque Projects

- *Repurpose the coal handling system to transfer "hard to handle" processed grain by-products from rail (and truck) to barge* – The last shipment of coal to the facility occurred in 2015, leaving a sizeable portion of the port idle. The "ECIA Port Expansion Study" identified an opportunity for the Dubuque region to transfer up to 300,00 tons of processed grain by-products (dried distiller grain, soybean meal, corn gluten meal and pellets) from rail to barge annually. Logistics Park Dubuque will make incremental changes and additions to its existing coal system and barge loading infrastructure to capture this market, including weighing improvements, road upgrades, and a storage structure to amass barge load quantities for shipment. When operational, the facility will be able to transfer product to barge at up to 300 tons per hour.
- *Replace 15,100 tons of fertilizer storage buildings that are at the end of their usable life and were built with inefficient handling systems* – Storage sheds built almost 40 years ago were designed to be filled using front-end loaders rather than with conveyors. Carrying product takes significantly longer (14-16 hours versus less than 6 hours). This inefficiency is especially problematic given the seasonal nature of fertilizer. The existing low-profile buildings (16' tall) also take up a larger footprint than modern storage sheds (30' or higher). Logistics Park Dubuque will increase storage capacity with larger buildings, enabling the facility to handle more and/or new products. U.S. DOT resources will be leveraged by conveying structures that the port already has in place for other buildings, requiring Logistics Park Dubuque only to make an incremental investment to feed the modern storage structure.
- *Install a new, fixed 250' x 260' fabric-covered structure for the facility's 70,000-ton salt pile* – Every year, approximately 70,000 tons of road salt is sourced to customers including the Iowa and Illinois transportation departments, regional municipalities, counties, and other stakeholders. As required by law, suppliers pay to cover (tarp) the pile at a cost of up to $70,000 annually. In addition, Logistics Park Dubuque must maintain a stormwater runoff pond to capture salt brine. Not only is the annual tarping an on-going expense, the pond occupies ~1.25 acres of prime waterfront property that could be used to store or transfer other products. Logistics Park Dubuque seeks to cover the salt pile with an economical ClearSpan salt storage structure. This covered, waterproof building will keep rain and snow off piles, eliminating the possibility of salt leaching out and contaminating the surrounding area. Trucks, loaders, and plows can drive inside and easily maneuver throughout, due to the high clearance and lack of internal support columns. Natural ventilation and abundant light that the fabric covers provide also create an atmosphere that keeps moisture and condensation from affecting the quality of the salt.

Figure 7. Recommended Near-Term Improvements, Logistics Park Dubuque



5 Benefit-Cost Analysis of Recommended Near-Term Projects

5.1 WORK PERFORMED IN THIS TASK

Under Task 6, the WSP team prepared a "grant grade" benefit-cost analysis (BCA) consistent with Federal guidance for a program of near-term improvements at Gavilon and Logistics Park Dubuque.

5.2 FORMAL DOCUMENTATION OF RESULTS

Formal documentation of results is contained in the Benefit-Cost Analysis Model (BCA) spreadsheet and companion BCA Appendix. These documents were provided to ECIA, Gavilon, and Logistics Park Dubuque and were submitted with the BUILD 2020 and PIDP 2020 discretionary grant applications. The model and appendix are considered and labeled as "Confidential Business Information" (CBI), and are not for distribution apart from the USDOT grant review team(s). Non-confidential summary information is presented below.

5.3 SUMMARY OF KEY FINDINGS

Without discounting, the total program has a capital cost of $29.29 million and monetized benefits of $147.22 million over 30 years of accrued benefits. With 7% per year discounting, the program has a capital cost of $20.81 million and monetized benefits of $40.97 million, producing a net benefit of $20.16 million and a Benefit-Cost Ratio of 1.97.

5.4 DETAILS OF METHODOLOGY

5.4.1 *Project Improvements*

The Gavilon facility (located at the Port of Dubuque) and Logistics Park Dubuque (located in East Dubuque) provide transfer to and from barges on the Upper Mississippi River. Served by road and rail, these terminals handle grains (primarily corn and soybeans), fertilizers (in both dry and liquid forms), cottonseed and other feed products, steel reinforcing bars, steel coils, various project-type cargoes, and de-icing salt. The proposed project will: repurpose idle coal handling systems to

store and transfer processed grain by-products; install new covering on an existing salt pile; replace obsolete fertilizer storage buildings with new modern structures; and add/upgrade track and railcar loading equipment. The program includes the following improvements:

Gavilon

- Replace an older fertilizer storage building with a 20,000-ton capacity shed;
- Renovate an existing fertilizer storage shed to increase its capacity by 12,000 tons;
- Replace/upgrade inoperable rail track;
- Relocate rail track to support direct transfer/transloading of fertilizer and other bulk products from river barge to rail to connect to other ports providing commodities throughout the country; and
- Install new rail equipment, including a main line switch, loadout system, and shed.

Logistics Park Dubuque

- Repurpose the coal handling system to transfer "hard to handle" processed grain by-products from rail (and truck) to barge via storage if needed;
- Replace 15,100 tons of fertilizer storage buildings that are at the end of their usable life and were built with inefficient handling systems; and
- Install a new, fixed 250' x 260' fabric-covered structure for a 70,000-ton salt pile.

The direct effects of these projects will be to: preserve existing capacity and support future growth in fertilizer and salt destined for regional consumers, who would otherwise have to be served through more distant and less convenient alternative ports; and provide a new marine service option for regional producers of agricultural by-products, who must currently rely on out-of-region ports for these services. From a transportation perspective, the provision of coordinated marine terminal and rail improvements will reduce truck vehicle miles of travel as well as rail ton-mileage over the nation's surface transportation system, allowing customers in Iowa, Illinois and Wisconsin to be served by ports 50 to 250 miles closer to their facilities.

5.4.2 *Without Project and With Project Conditions*

The key challenge – and the critical difference between the Without Project and With Project conditions – is that without the project, the loss of marine terminal capacity and operability will force the proven base of regional freight customers to rely on out-of-region ports. This in turn would lead to increased transportation costs, increased transportation system wear and tear, increased crashes, and increased emissions.

The project meets these pressing transportation challenges head on, by preserving and increasing marine cargo capacity and access efficiency within the region, serving regional demand at regional

ports, and thereby reducing transportation costs, operations and maintenance costs, crashes, and emissions compared to the without project condition.

Each set of improvements within this Project contributes to an integrated, coordination solution to these transportation challenges:

- Fertilizer Projects: Approximately half the fertilizer storage at the two ECIA region ports is provided by buildings that are near the end of their functional lifespan. Without the fertilizer storage project at Logistics Park Dubuque and the integrated fertilizer storage/rail projects at Gavilon, the region will lose this commodity handling capacity. It will not only lose existing business, but also the opportunity for substantial future growth in a long-established, well-proven market: the ECIA Port Expansion Study projects the region would handle at least 1 million tons of fertilizer by 2029 with the project, but only 500,000 tons without the project. This tonnage is real, proven, existing demand associated with customers located generally within a 50-mile radius of the region's ports; if they cannot be served by Gavilon and Logistics Park Dubuque, they will need to be served through more distant ports (Prairie du Chien WI, Camanche IA, Clinton IA for truck users, and as far as St. Paul and St. Louis for rail users.
- Salt Project: All of the salt capacity at the two ECIA region ports is currently uncovered. Due to regulatory pressures, salt handling capability at Logistics Park Dubuque would be lost, unless the project to cover its salt storage is implemented. If Logistics Park Dubuque loses this capacity, existing regional customers within a 100-mile market shed would be forced to rely on alternative, more distant ports: LaCrosse WI; Muscatine IA; St. Paul; and St. Louis. Like fertilizer, this tonnage is real, proven, existing demand. Future salt demand is forecast to be stable, and the project will ensure the region preserves its current ability to serve the market.
- Agricultural By-Products Project: The market for handling of agricultural by-products, especially for export, is growing rapidly. These commodities include dried distiller grain (DDG), soybean meal, corn gluten meal, and pellets. The ECIA Port Expansion Study has identified these commodities as an important opportunity for regional ports: exporters of these products exist within a 150-mile radius of the region, and are known to have interest in using the region's ports to barge their exports to the ports of South Louisiana, where they can be transferred to deep-draft ocean-going vessels. Today, these users must use alternative ports, reaching ports in (for example) Quad Cities IA and Clinton IA by truck, or Peoria IL or St. Louis via rail. Not only is this a missed business opportunity for the region's ports, it also requires longer truck and rail trips for the region's freight shippers – leading (again) to higher transportation costs, higher system operations and maintenance costs, increased crashes, and increased emissions.

To sum up:

- In the Without Project condition, existing fertilizer and salt capacity and tonnage is lost and regional customers must instead utilize more distant ports; and new opportunities for agricultural by-products handling are not realized, meaning that regional customers must continue to utilize more distant ports.
- In the With Project condition, obsolete fertilizer buildings are replaced, allowing existing tonnage to be retained and increased until their capacity is reached (around year 2029); salt storage in Illinois is modernized, allowing current volume to be retained; and ag by-products handling is introduced, providing regional exporters with a closer and more convenient river gateway to international markets.

Importantly, it should be emphasized that the project does not involve any assumptions regarding modal diversion: for purposes of this project, barge traffic is assumed to remain on barge, rail on rail, and truck on truck. The key difference is whether proven barge customers have access to convenient nearby river port facilities or are forced to rely on more distant facilities.

5.4.3 *BCA Approach*

To support ECIA discretionary grant applications, WSP Inc. prepared a formal Benefit-Cost Analysis (BCA) consistent with the most recent (2020) USDOT Benefit-Cost Analysis Guidance. The analysis approach can be summarized as follows:

- Benefits were evaluated over a period of 30 years of operation, corresponding to a reasonable life-cycle for the improvements before significant reinvestment could be required. Benefits begin accruing in year 2024 and are calculated through 2053, and residual value is not included.
- Cost inputs were provided by Gavilon and Logistics Park Dubuque.
- Benefit-generating effects were generated from several sources. Current and forecast demand generated by regional freight customers – which is the same without or with the project – was estimated by WSP, using detailed market forecasts recently developed by its partner Martin Associates for the ECIA Port Expansion Study. Gavilon and Logistics Park Dubuque identified their market shed distances, key customer origins and destinations, and out-of-region ports that would be best positioned to serve this demand in the Without Project scenario. WSP then calculated the travel distances associated with serving these customers under the Without Project and With Project scenarios. The combination of market demand and travel distance produced estimates for changes in truck Vehicle Miles of Travel and rail Ton-Miles of travel. Additionally, Gavilon and Logistics Park Dubuque provided estimates of current and future Operations and Maintenance cost effects, both without and with project. These three metrics – change in truck VMT, rail ton-mileage, and O&M cost changes – drive all the benefits calculated

in the analysis. Factors to convert changes in truck VMT and rail ton-mileage into avoided crashes and avoided emissions were developed.

- The monetized values of benefit-generating effects were calculated using factors are derived from current Federal BCA guidance. No 'external' valuation factors were applied.
- Non-monetized and monetized benefits were calculated for the criteria benefit categories of: Safety (from avoided crashes); State of Good Repair (a benefit from reduced O&M costs); Economic Competitiveness (from avoided truck VMT and rail ton-mileage, based solely on miles of travel and not including driver/operator time savings); and Environmental Protection (from reduced emissions). No benefits were calculated for Quality of Life, or for the economic development-supporting nature of the project, although such effects are anticipated.
- Benefits are calculated for 30 years of operations, beginning in 2024 and ending in 2053. No credit is taken for residual value after 2053.
- All monetized benefits were expressed in 2018 dollars and future year benefits were discounted to present value using a 7% discount rate.
- The project Benefit-Cost Analysis was calculated as discounted benefits divided by discounted costs.

5.4.4 *Project Costs*

Gavilon and Logistics Park Dubuque provided estimates of project capital cost expenditures in Year of Expenditure dollars, and WSP discounted these expenditures to 2018 dollars at 7%. The project has a non-discounted cost of $29,291,250 and a discounted cost of $20,812,964.

5.4.5 *Project Effects and Benefit Drivers*

Project effects and benefit drivers were estimated separately for the Salt project, Fertilizer projects, and Agricultural By-Products project.

<u>Salt Project</u>

- The ECIA Port Expansion Study market analysis reports current salt volume of 156,000 tons for the region's ports, which represents at-capacity operations. (Total projected future demand could reach as high as 565,000 tons by year 2045, but capacity limitations impose an upside limit on tonnage handled.) In the With Project scenario, providing covered storage at Logistics Park Dubuque allows this existing level of tonnage to be maintained. Without the project, half the region's capacity (the portion at Logistics Park Dubuque) is lost, and annual tonnage is

reduced to 50% of current levels. A total of 2.3 million tons of salt would be shifted to alternative ports without the project.

- De-icing salt received at Logistics Park Dubuque is generally trucked to customers within a 100-mile radius; it is not moved inland by rail. An average travel distance of 50 miles was assumed, and points 50 miles west and 50 miles east of the terminal along the US 20 corridor were selected as representative market centroids for the With Project condition. Without the project, salt would need to be trucked to these centroids from the small ports of LaCrosse WI and Muscatine IA (uncovered storage), and/or the large ports of St. Paul MN and St. Louis MO (covered storage). The average truck distance from each of the alternative ports to each of the centroids is 214 miles (from Google Maps least time routings); the mileage savings per loaded truck is 164 miles (214 minus 50); and the total round-trip savings per truckload move is 328 miles (2 x 164 miles). Each loaded truck was assumed to carry 25 tons of salt. Avoided truck vehicle miles of travel (VMT) under the With Project scenario was calculated as the number of avoided loaded truck trips times 328 miles. An estimated 29.7 million salt truck VMT would be avoided with the project.
- Covering a salt pile with a tarp involves a customer cost of $1.00 per ton for a tarp cover, plus an annual cost of $10,000 per terminal (current dollars with 3% annual escalation), based on terminal and customer cost data provided by Logistics Park Dubuque. O&M costs in the Without Project scenario are based on current Gavilon costs plus the costs of handling 78,000 tons of salt at other ports (assuming 50% goes to ports with uncovered storage where tarp costs are incurred and 50% to ports with covered storage where these costs are not incurred). O&M costs in the With Project scenario are based on current Gavilon costs (there is no change for Gavilon), the elimination of tarp costs at Logistics Park Dubuque, and the addition of an annual building maintenance allowance ($20,000) for the salt cover. An estimated $1.1 million in O&M savings (not discounted) would be realized with the project.

<u>Fertilizer Projects</u>

- Fertilizer is currently received at ECIA region ports via barge, stored on site until needed, and then trucked to users generally within 50 miles or railed to more distant customers. This is an existing, well-established market with proven historic demand and strong future growth projections, established through the ECIA Port Expansion Study market analysis. Total upside regional demand for fertilizer is estimated at 677,000 tons per year (2020), growing to 1,400,000 tons per year (2045). Current regional storage capacity is estimated at 1,003,000 tons per year. With current capacity, demand would reach the limit of capacity by the year 2030. Without the project to replace aging shed storage and rail access, the region will lose approximately half its fertilizer storage capacity, down to 504,000 tons per year. Note that without the project, the region will not be able to handle even its most recent year volume

(644,542 tons), meaning the region would lose existing business and grow no new business. With the project to replace/modernize shed storage and upgrade rail access, the region will retain capacity for 1,003,000 tons per year, sufficient to accommodate 100% of growth through year 2029. Over the analysis period, the project would prevent an estimated 14.4 million tons of fertilizer from relocating to alternative ports.

- The analysis assumes all tonnage lost in the Without Project scenario would instead be handled through the nearest viable ports, with inland distribution via rail and truck.
- Avoided rail tons were calculated from the total avoided loss and the rail share. Avoided loaded truck trips were calculated from the total avoided loss, the truck share, and a payload factor of 25 tons per truck.
- The identification of alternative ports under the Without Project scenario was performed carefully, based on a detailed competitive market assessment from the ECIA Port Expansion Study and on detailed business information provided by Gavilon and Logistics Park Dubuque regarding the locations of their primary customers as well as their primary competitor ports.
- The truck service market is generally within a 50-mile radius; the average truck dray from ECIA region is assumed at 25 miles, with representative destinations 25 miles west and 25 miles east along US 20. The closest alternative ports are Prairie du Chien WI, Camanche IA, and Clinton IA. Reaching the representative ECIA market destinations from these three ports, the required least-time truck mileages are: 86, 85, 46, and 40 (average = 64 miles, via Google Maps fastest routes). The truck distance savings via ECIA ports is 39 miles (64 minus 25) per loaded truck trip; round-trip savings is 39 x 2 = 78 miles. Note that the alternative ports are both upriver and downriver of the ECIA region, so shifting traffic to those ports neither increases nor reduces marine transportation impacts. The truck cost differential is small enough that total market demand is not likely to be impacted.
- Representative rail destinations are Aurelia IA and Fond du Lac WI. Estimating rail distances can be challenging, since they depend not only on the network configuration, but also on railroad ownership, trackage rights, and interchange ability. WSP utilized PC Miler Rail software, which generates routings reflecting these factors, to estimate 'most practical' rail routes and associated mileages. From possible alternatives identified through PC Miler Rail, WSP selected routes that involved (a) not more than one Class I railroad, and (b) where necessary for local business access, not more than one non-Class I railroad. In some cases, shorter distances were available from routes combining two or three Class I's or shortlines, but these were considered unlikely due to business objectives (Class I's prefer to serve as many miles as possible over their own networks) and performance issues (each handoff incurs time, cost, and reliability penalties).

- Reaching the two market centroids (Aurelia and Fond du Lac) by rail from Dubuque requires an average of 274 miles via the Canadian National (CN). Reaching the two centroids from alternative ports (St. Louis and St. Paul) requires an average of 615 miles via the CN network. The rail mileage savings via ECIA ports is 341 miles (615 minus 274). Recognizing that the additional rail mileage might de-incentivize the use of river port/rail combination services, the assumed rail mileage savings is reduced by 50% (to 170 miles) for analysis purposes, and the avoided rail miles are counted in the loaded direction only. As with trucking, note that the alternative ports are both upriver and downriver of the ECIA region, so the net waterway ton-mileage is generally similar.
- Avoided rail ton-mileage was calculated by multiplying avoided rail tons by the avoided miles per trip. Avoided truck VMT was calculated by multiplying avoided loaded truck trip by the avoided round-trip mileage per loaded trip. The fertilizer project is projected to result in over 642 million avoided rail ton-miles and over 33 million avoided truck VMT.
- Current O&M cost for handling fertilizer through the aging structures is estimated at $3.59 per ton (current $). Future O&M cost through modernized facilities are estimated at $1.69 per ton (current $) with costs escalating at 3% per year (source: business operations analysis by Logistics Park Dubuque). For the Without Project volume (504,000 tons), the O&M cost is $3.59 per ton, and for tonnage that must relocate to other ports, half is values at the 'older structure' rate and half is valued at the 'newer structure' rate. For the With Project Scenario, the first 504,000 tons is valued at the 'older structure' rate, and the additional tonnage accommodated with the project is valued at the 'newer structure' rate. Over 30 years, the avoided O&M cost with project is estimated at $24.8 million, not discounted.

<u>Agricultural By-Products Project</u>

- A variety of grain by-products -- dried distiller grain, soybean meal, corn gluten meal and wood pellets -- are produced in the region for export. These are currently moved via rail to river ports such as Peoria IL and Alton IL/St. Louis, and then barged to Louisiana deep-water ports for transfer to ocean-going vessels. The ECIA Port Expansion Study identified a strong potential demand to handle these commodities through ECIA ports, but also noted uncertainty and risk. This project includes the development of capacity for 300,000 tons annually of grain by-products, to be received by truck and rail, and then shipped via barge. The provision of more direct and less expensive truck and rail services should incentivize use of the ECIA region ports. However, the estimate of benefit is taken on only 50% of this forecast tonnage (just over 4.1 million tons cumulatively over the analysis period), reflecting risk and uncertainty in capturing new business.

- 33% of inbound tonnage is expected to arrive by truck and 67% by rail. These commodities are currently moving to river ports that are relatively distant, which accounts for the high rail share. These shares are assumed to continue, since the logistics facilities and services for rail are already established.
- Avoided rail tons were calculated from the benefit volume and rail share. Avoided loaded truck trips were calculated from the benefit volume, truck share, and a payload factor of 25 tons per truck.
- The truck-in market shed covers a radius of around 150 miles. Representative origins include Cedar Rapids IA, Pine Lake IA, and Dyersville IA, with an average distance of 78 miles. Alternative ports to serve these markets are Clinton IA and Quad Cities IA, with an average distance of 118 miles from these origin cities. The truck distance savings via ECIA ports is 40 miles (118 minus 78) per loaded truck trip; round-trip savings is 40 x 2 = 80 miles. Note that both alternative ports are downriver of the ECIA region, but are close in river miles, so shifting traffic to those ports does not significantly increase marine transportation impacts.
- Representative rail origins are Fairbank IA, Iowa Falls IA, and Shell Rock IA, an average of 124 miles from East Dubuque via CN; Peoria IL is the closest alternative port, with average rail distance of 590 miles to the target market areas, also via CN. The rail mileage advantage for ECIA is a significant, 466 miles (590 minus 124), and since the benefit volume already includes a 50% discount, this mileage was not further discounted for risk and uncertainty. Note that while barging from Peoria saves roughly 150 river miles, the per-mile cost of barging is extremely low, and other alternative ports both north and south of Dubuque may be used by freight shippers; thus, any differences in marine transportation impacts should be marginal, especially in the context of the long barge trip to Louisiana and export voyage.
- Avoided rail ton-mileage was calculated by multiplying avoided rail tons by the avoided miles per trip. Avoided truck VMT was calculated by multiplying avoided loaded truck trip by the avoided round-trip mileage per loaded trip. The ag by-products project is projected to result in nearly 1.3 billion avoided rail ton-miles and 4.4 million avoided truck VMT.
- Current O&M cost for handling ag by-products at Logistics Park Dubuque is zero since the business does not exist. Adding this line of business would incur annual O&M costs estimated at $1.32 per ton, escalating at 3% per year, according to Logistics Park Dubuque operational analysis. Given this is a new market capture opportunity, the avoided O&M cost calculation is based on the new cost incurred at Logistics Park Dubuque without any offset assumptions about avoided cost at alternative ports; the result is a negative avoided O&M cost of $10.0 million for ag by-products, cumulative over the analysis period, not discounted.

Table 6. Summary of Benefit Drivers (From Salt, Fertilizer, and Ag By-Products) by Year

A	B	AN	AO	AP
Benefit Year	**Calendar Year**	**Total Avoided Rail Ton-Mileage With Project**	**Total Avoided Truck VMT With Project**	**Total Avoided O&M Costs With Project**
1	2024	22,663,692	796,295	$ 320,309
2	2025	31,564,108	1,904,895	$ 344,894
3	2026	40,498,933	1,991,913	$ 345,574
4	2027	49,469,212	2,080,762	$ 346,913
5	2028	58,476,021	2,171,498	$ 349,009
6	2029	68,836,000	2,332,144	$ 388,559
7	2030	68,836,000	2,332,144	$ 400,215
8	2031	68,836,000	2,332,144	$ 412,222
9	2032	68,836,000	2,332,144	$ 424,588
10	2033	68,836,000	2,332,144	$ 437,326
11	2034	68,836,000	2,332,144	$ 450,446
12	2035	68,836,000	2,332,144	$ 463,959
13	2036	68,836,000	2,332,144	$ 477,878
14	2037	68,836,000	2,332,144	$ 492,214
15	2038	68,836,000	2,332,144	$ 506,981
16	2039	68,836,000	2,332,144	$ 522,190
17	2040	68,836,000	2,332,144	$ 537,856
18	2041	68,836,000	2,332,144	$ 553,992
19	2042	68,836,000	2,332,144	$ 570,611
20	2043	68,836,000	2,332,144	$ 587,730
21	2044	68,836,000	2,332,144	$ 605,362
22	2045	68,836,000	2,332,144	$ 623,523
23	2046	68,836,000	2,332,144	$ 642,228
24	2047	68,836,000	2,332,144	$ 661,495
25	2048	68,836,000	2,332,144	$ 681,340
26	2049	68,836,000	2,332,144	$ 701,780
27	2050	68,836,000	2,332,144	$ 722,833
28	2051	68,836,000	2,332,144	$ 744,518
29	2052	68,836,000	2,332,144	$ 766,854
30	2053	68,836,000	2,332,144	$ 789,860
Total		**1,923,571,967**	**67,248,964**	**$ 15,873,260**

5.4.6 *Calculated Effects*

The combined effects of the salt, fertilizer, and ag by-products projects – reduced truck VMT, reduced rail ton-mileage, and reduced operations and maintenance costs – in turn generate both non-monetized and monetized benefits in the areas of safety, state of good repair, economic competitiveness, and environmental sustainability. These represent four of the five allowable benefit areas (the fifth being Quality of Life) specified in Federal BCA Guidance), and the effects in each were calculated as follows.

Safety

- Rail ton-mileage and truck VMT avoided are carried forward from the benefit calculations.
- WSP estimated year 2017 crash rates for Class I rail at the national network level by combining three sources for crash statistics (www.bts.gov/injuries-freight-transportation-mode; www.bts.gov/content/transportation-fatalities-mode; and www.bts.gov/content/transportation-accidents-mode) with another source for rail ton-mileage data (www.bts.gov/us-ton-miles-freight). The factors are: 0.3045 fatal crashes per billion ton-miles; 3.159 injury crashes per billion ton-miles; and 6.173 property damage crashes per billion ton-miles.
- The most recent available fatality, injury and crash rates per 100 million large truck VMT were sourced from www.fmcsa.dot.gov/ safety/data-and-statistics/large-truck-and-bus-crash-facts-2017. The factors are: 0.016 fatal crashes per million VMT; 0.497 injury crashes per million VMT; and 1.221 property damage crashes per million VMT.
- Crashes avoided from rail were calculated as avoided rail ton-mileage multiplied by the applicable per ton-mile rail crash rates.
- Crashes avoided from truck were calculated as avoided truck VMT multiplied by the applicable per VMT truck crash rates.
- Total avoided crashes were calculated as the sum of avoided rail and truck crashes. The project would result in the avoidance of 1.66 fatal crashes, 39.50 injury crashes, and 93.99 property damage crashes.
- The applicable values for avoided fatal, injury, and property damage crashes were entered from Federal BCA Guidance for fatalities, injuries, and property damage only crashes: $10,636,600 per fatal crash; $250,600 per injury crash; and $4,000 per PDO crash.
- The total non-discounted value of avoided crashes was calculated by: (1) multiplying, in each year, the number of avoided crashes by type and the corresponding value of crashes by type;

(2) summing the results for all crash types in a given year; and then (3) summing the results over all years. Non-discounted safety benefit sums to $27,987,114.

- The discounted value of avoided crashes was calculated by multiplying the non-discounted value by the applicable discounting factor. Discounted safety benefit sums to $7,801,500.

State of Good Repair

The State of Good Repair benefit was calculated with two components: avoided O&M cost (the primary source of benefit) and avoided pavement damage from avoided truck VMT (a very minor contributor to total benefit).

- Avoided O&M cost was carried forward from the Tab 3 calculations. The avoided cost is positive (since the cost decreases) and sums to $15,873,260, not discounted.

- Avoided truck VMT was carried forward from the benefit calculations. The value of avoided pavement damage per VMT based on the FHWA Highway Cost Allocation Study 2000 Update. The average pavement cost per mile for urban 80,000 lb. trucks was $0.409 per vehicle mile (urban interstate) and $0.127 per vehicle mile (rural interstate). Conservatively assuming a 100% rural share of avoided truck miles, the blended value is $0.127 per mile. For this class of vehicle, the equity ratio (federal charges to costs) is 0.8. The unrecovered share of cost is estimated as (0.2 x $0.127) = $0.0254 in 2000 dollars. Inflated to 2018 dollars, the pavement damage cost factor is estimated at $0.048 per vehicle mile (from the BLS inflation calculator). Additionally, recognizing that most of the avoided miles will not be from interstate highways, as well as the age of the source study, the factor was further reduced by 50% to reflect risk and uncertainty. With 67,248,964 avoided truck VMT and a valuation of $0.0240 per VMT, the total value of avoided pavement damage is estimated at $1,613,975, not discounted.

- Non-discounted State of Good Repair value is the sum of avoided O&M cost and avoided pavement damage value, totaling $17,487,235.

- The discounted benefit was calculated by multiplying the non-discounted value by the applicable discounting factor. Discounted State of Good Repair benefit sums to $4,482,813.

Economic Competitiveness

- Avoided rail ton-mileage and truck VMT was carried forward from the benefit calculations.

- For the value of avoided rail operating cost, to develop a factor comparable to the USDOT figure for per-mile truck equipment operating cost, WSP used Federal and industry data sources to develop a conservative estimate for use in this analysis. The Association of American Railroads cites an estimated 2017 average freight rail rate (customer price) of $0.04 per

revenue ton-mile (see www.aar.org/data/average-u-s-freight-rail-rates-since-deregulation/). To isolate the transportation cost component of price, we note that Stifel Inc. reported (in April 2020) an average 2019 operating ratio (share of revenues required to cover operating costs) of 61.6% for US Class I railroads. Additionally, to isolate the non-labor share of operating cost, we note that BNSF financial reports for FY 2018 and FY 2019 indicate that labor compensation represents approximately 1/3 of rail operating costs. This means the average freight rail transport cost excluding the value of labor time can be estimated as $0.04 x 0.616 x 0.67 = $0.0165. (For comparison, the per ton-mile figure for trucking would be $0.96 per mile/25 tons = $0.0384).

- The per-mile operating cost value of avoided truck VMT ($0.96) was entered from 2020 BCA Guidance. Note that the BCA takes a conservative approach in not claiming credit for avoided truck operating hours.

- The estimates of avoided rail ton-mileage and VMT were multiplied by their corresponding monetization factors in each year and summed. Avoided rail ton-mileage results in transportation cost savings of $31.7 million and avoided truck VMT results in transportation cost savings of $64.6 million, for a total savings of $96,297,943 (not discounted).

- The discounted benefit was calculated by multiplying the non-discounted value by the applicable discounting factor. Discounted Economic Competitiveness benefit sums to $26,796,032.

Environmental Protection

- Avoided rail ton-mileage and truck VMT were carried forward from the benefit calculations.

- A factor for rail ton-miles per gallon (479 per gallon in 2017 with assumed improvement of 1% per year) was developed based on www.aar.org/wp-content/uploads/2018/05/AAR-Railroad-Environment-Issue.pdf. A corresponding factor for truck VMT per gallon (6.0 in 2018 with 1% per year improvement) was developed based on www.fhwa.dot.gov/policyinformation/statistics/2018/vm1.cfm. Avoided rail ton-mileage and truck VMT figures were multiplied by the corresponding factors and the resulting fuel savings was summed for the two modes. The project is estimated to reduce fuel consumption by 12,343,869 gallons. There is no price credit or direct benefit taken on fuel consumption; this calculation is performed only to support the estimate for avoided carbon emissions.

- The fuel savings calculation was used to estimate the associated carbon production at a rate of 0.01015 metric tons per gallon, based on 22.38 lbs. per gallon from www.eia.gov/tools/faqs/faq.cfm?id=307&t=11 and conversion from gallons to metric tons.

- Grams per gallon factors for particulate matter (PM), nitrogen oxides (NOx), and volatile organic compounds (VOC) were sourced from www.epa.gov/nonroad/locomotv/420f09025.pdf.
- Emissions production factors for truck (grams per VMT) for PM, NOx, and VOC were sourced from the US EPA MOVES model.
- Carbon emissions avoided was calculated as fuel consumption avoided (truck plus rail) times the per-gallon carbon production factor.
- Other emissions avoided were calculated as avoided fuel consumption by rail times the applicable per-gallon factors, plus avoided truck VMT times the applicable per-VMT factors, converted to metric tons.
- Values for avoided carbon, PM, NOx and VOC emissions were sourced from the BCA Resource Guide 2020 and inflated from tons to metric tons. The Social Cost of Carbon value in each year was discounted back to net present value at 7%, resulting in values between $0.67 per MT and $0.19 per MT over the analysis period.
- The quantities of avoided emissions were multiplied by the valuation factors and summed. The total value of all avoided emissions is calculated as $5,446,669, not discounted.
- The discounted benefit was calculated by multiplying the non-discounted value by the applicable discounting factor. Discounted Environmental Protection benefit sums to $1,891,478.

5.4.7 *Summary of Benefit*

The project Benefit Cost Analysis finds that:

- Without discounting, the project has a capital cost of $29.29 million and monetized benefits of $147.22 million. With discounting, the project has a capital cost of $20.81 million and monetized benefits of $40.97 million, producing a net benefit of $20.16 million and a Benefit-Cost Ratio of 1.97.
- More than half the benefit is derived from Economic Competitiveness, but benefits from Safety and State of Good Repair also make substantial contributions to total project benefit. The calculated Environmental Protection benefits are modest, and Quality of Life benefits were not calculated.
- This analysis – which was very conservative in being limited purely to transportation system effects with 50% reductions to inputs and factors which were less certain or well-established --

finds the project has a positive net present value and a positive Benefit-Cost Ratio, and therefore furthers the objectives of the BUILD and PIDP program.

Table 7. Summary of BCA Results

Benefit Summary (30 years)	Not Discounted	Discounted @ 7%
Safety	$ 27,987,114	$ 7,801,500
State of Good Repair	$ 17,487,235	$ 4,482,813
Economic Competitiveness	$ 96,297,943	$ 26,796,032
Environmental Protection	$ 5,446,669	$ 1,891,478
Quality of Life	$ -	$ -
Benefit	**$ 147,218,960**	**$ 40,971,823**
Capital Cost	**$ 29,291,250**	**$ 20,812,964**
Net Present Value		**$ 20,158,859**
Benefit-Cost Ratio		**1.97**

Table 8. Summary of Monetized Benefits by Year, Discounted at 7%

Benefit Year	Calendar Year	Safety	Good Repair	Economic Competitiveness	Envirnmental Protection	Total
1	2024	$ 220,516	$ 226,170	$ 758,560	$ 110,619	$ 1,315,865
2	2025	$ 435,768	$ 243,253	$ 1,463,155	$ 187,347	$ 2,329,523
3	2026	$ 443,560	$ 228,950	$ 1,501,856	$ 175,390	$ 2,349,757
4	2027	$ 448,844	$ 215,861	$ 1,530,506	$ 161,759	$ 2,356,970
5	2028	$ 451,901	$ 203,912	$ 1,550,208	$ 152,699	$ 2,358,720
6	2029	$ 465,214	$ 211,193	$ 1,603,273	$ 143,261	$ 2,422,941
7	2030	$ 434,780	$ 202,552	$ 1,498,386	$ 121,349	$ 2,257,067
8	2031	$ 406,336	$ 194,284	$ 1,400,361	$ 103,987	$ 2,104,968
9	2032	$ 379,753	$ 186,369	$ 1,308,748	$ 86,830	$ 1,961,701
10	2033	$ 354,910	$ 178,794	$ 1,223,129	$ 76,325	$ 1,833,158
11	2034	$ 331,691	$ 171,541	$ 1,143,111	$ 66,879	$ 1,713,223
12	2035	$ 309,992	$ 164,597	$ 1,068,328	$ 60,481	$ 1,603,398
13	2036	$ 289,712	$ 157,947	$ 998,438	$ 53,033	$ 1,499,130
14	2037	$ 270,759	$ 151,578	$ 933,119	$ 43,701	$ 1,399,157
15	2038	$ 253,046	$ 145,478	$ 872,074	$ 38,505	$ 1,309,103
16	2039	$ 236,491	$ 139,634	$ 815,023	$ 35,026	$ 1,226,173
17	2040	$ 221,020	$ 134,035	$ 761,703	$ 31,000	$ 1,147,758
18	2041	$ 206,561	$ 128,670	$ 711,872	$ 28,625	$ 1,075,728
19	2042	$ 193,047	$ 123,529	$ 665,301	$ 26,431	$ 1,008,308
20	2043	$ 180,418	$ 118,601	$ 621,777	$ 24,407	$ 945,204
21	2044	$ 168,615	$ 113,879	$ 581,100	$ 22,540	$ 886,134
22	2045	$ 157,584	$ 109,351	$ 543,084	$ 20,817	$ 830,837
23	2046	$ 147,275	$ 105,011	$ 507,555	$ 19,227	$ 779,068
24	2047	$ 137,640	$ 100,849	$ 474,351	$ 17,760	$ 730,600
25	2048	$ 128,636	$ 96,858	$ 443,318	$ 16,526	$ 685,338
26	2049	$ 120,220	$ 93,031	$ 414,316	$ 15,379	$ 642,947
27	2050	$ 112,355	$ 89,361	$ 387,211	$ 14,313	$ 603,240
28	2051	$ 105,005	$ 85,840	$ 361,880	$ 13,321	$ 566,046
29	2052	$ 98,135	$ 82,463	$ 338,205	$ 12,399	$ 531,202
30	2053	$ 91,715	$ 79,223	$ 316,080	$ 11,541	$ 498,559
Total		**$ 7,801,500**	**$ 4,482,813**	**$ 26,796,032**	**$ 1,891,478**	**$ 40,971,823**

Table 9. Summary of BCA Benefit Drivers (1 of 3)

		Benefit Drivers		Safety		
Benefit Year	Calendar Year	Total Avoided Rail Ton-Mileage With Project	Total Avoided Truck VMT With Project	Fatal Crashes Avoided, Total	Injury Crashes Avoided, Total	Non-Injury Crashes Avoided, Total
1	2024	22,663,692	796,295	0.0	0.5	1.1
2	2025	31,564,108	1,904,895	0.0	1.0	2.5
3	2026	40,498,933	1,991,913	0.0	1.1	2.7
4	2027	49,469,212	2,080,762	0.0	1.2	2.8
5	2028	58,476,021	2,171,498	0.1	1.3	3.0
6	2029	68,836,000	2,332,144	0.1	1.4	3.3
7	2030	68,836,000	2,332,144	0.1	1.4	3.3
8	2031	68,836,000	2,332,144	0.1	1.4	3.3
9	2032	68,836,000	2,332,144	0.1	1.4	3.3
10	2033	68,836,000	2,332,144	0.1	1.4	3.3
11	2034	68,836,000	2,332,144	0.1	1.4	3.3
12	2035	68,836,000	2,332,144	0.1	1.4	3.3
13	2036	68,836,000	2,332,144	0.1	1.4	3.3
14	2037	68,836,000	2,332,144	0.1	1.4	3.3
15	2038	68,836,000	2,332,144	0.1	1.4	3.3
16	2039	68,836,000	2,332,144	0.1	1.4	3.3
17	2040	68,836,000	2,332,144	0.1	1.4	3.3
18	2041	68,836,000	2,332,144	0.1	1.4	3.3
19	2042	68,836,000	2,332,144	0.1	1.4	3.3
20	2043	68,836,000	2,332,144	0.1	1.4	3.3
21	2044	68,836,000	2,332,144	0.1	1.4	3.3
22	2045	68,836,000	2,332,144	0.1	1.4	3.3
23	2046	68,836,000	2,332,144	0.1	1.4	3.3
24	2047	68,836,000	2,332,144	0.1	1.4	3.3
25	2048	68,836,000	2,332,144	0.1	1.4	3.3
26	2049	68,836,000	2,332,144	0.1	1.4	3.3
27	2050	68,836,000	2,332,144	0.1	1.4	3.3
28	2051	68,836,000	2,332,144	0.1	1.4	3.3
29	2052	68,836,000	2,332,144	0.1	1.4	3.3
30	2053	68,836,000	2,332,144	0.1	1.4	3.3
Total		**1,923,571,967**	**67,248,964**	**1.7**	**39.5**	**94.0**

Table 10. Summary of BCA Benefit Drivers (2 of 3)

		State of Good Repair		Economic Competitiveness	
Benefit Year	Calendar Year	Total Avoided O&M Costs, With Project	Value of Avoided Truck VMT	Value of Avoided Rail Operating Costs	Value of Avoided Truck Operating Costs
1	2024	$ 320,309	$ 19,111	$ 373,951	$ 764,444
2	2025	$ 344,894	$ 45,717	$ 520,808	$ 1,828,699
3	2026	$ 345,574	$ 47,806	$ 668,232	$ 1,912,236
4	2027	$ 346,913	$ 49,938	$ 816,242	$ 1,997,531
5	2028	$ 349,009	$ 52,116	$ 964,854	$ 2,084,638
6	2029	$ 388,559	$ 55,971	$ 1,135,794	$ 2,238,858
7	2030	$ 400,215	$ 55,971	$ 1,135,794	$ 2,238,858
8	2031	$ 412,222	$ 55,971	$ 1,135,794	$ 2,238,858
9	2032	$ 424,588	$ 55,971	$ 1,135,794	$ 2,238,858
10	2033	$ 437,326	$ 55,971	$ 1,135,794	$ 2,238,858
11	2034	$ 450,446	$ 55,971	$ 1,135,794	$ 2,238,858
12	2035	$ 463,959	$ 55,971	$ 1,135,794	$ 2,238,858
13	2036	$ 477,878	$ 55,971	$ 1,135,794	$ 2,238,858
14	2037	$ 492,214	$ 55,971	$ 1,135,794	$ 2,238,858
15	2038	$ 506,981	$ 55,971	$ 1,135,794	$ 2,238,858
16	2039	$ 522,190	$ 55,971	$ 1,135,794	$ 2,238,858
17	2040	$ 537,856	$ 55,971	$ 1,135,794	$ 2,238,858
18	2041	$ 553,992	$ 55,971	$ 1,135,794	$ 2,238,858
19	2042	$ 570,611	$ 55,971	$ 1,135,794	$ 2,238,858
20	2043	$ 587,730	$ 55,971	$ 1,135,794	$ 2,238,858
21	2044	$ 605,362	$ 55,971	$ 1,135,794	$ 2,238,858
22	2045	$ 623,523	$ 55,971	$ 1,135,794	$ 2,238,858
23	2046	$ 642,228	$ 55,971	$ 1,135,794	$ 2,238,858
24	2047	$ 661,495	$ 55,971	$ 1,135,794	$ 2,238,858
25	2048	$ 681,340	$ 55,971	$ 1,135,794	$ 2,238,858
26	2049	$ 701,780	$ 55,971	$ 1,135,794	$ 2,238,858
27	2050	$ 722,833	$ 55,971	$ 1,135,794	$ 2,238,858
28	2051	$ 744,518	$ 55,971	$ 1,135,794	$ 2,238,858
29	2052	$ 766,854	$ 55,971	$ 1,135,794	$ 2,238,858
30	2053	$ 789,860	$ 55,971	$ 1,135,794	$ 2,238,858
Total		**$ 15,873,260**	**$ 1,613,975**	**$ 31,738,937**	**$ 64,559,005**

Table 11. Summary of BCA Benefit Drivers (3 of 3)

		Environmental Protection				
Benefit Year	Calendar Year	Avoided Fuel Consumption, Total (gallons)	Carbon Emissions Avoided (MT)	PM Emissions Avoided (MT)	NOX Emisions Avoided (MT)	VOC Emissions Avoided (MT)
1	2024	169,156	1,718	0.2	7.7	0.6
2	2025	356,975	3,625	0.4	13.8	1.3
3	2026	383,889	3,898	0.4	14.2	1.3
4	2027	410,582	4,169	0.4	14.4	1.3
5	2028	437,061	4,438	0.4	14.9	1.4
6	2029	475,926	4,833	0.3	15.5	1.4
7	2030	471,214	4,785	0.3	14.4	1.4
8	2031	466,548	4,737	0.3	13.3	1.3
9	2032	461,929	4,691	0.2	12.3	1.2
10	2033	457,356	4,644	0.2	11.7	1.2
11	2034	452,827	4,598	0.2	11.1	1.2
12	2035	448,344	4,553	0.2	10.5	1.1
13	2036	443,905	4,508	0.2	10.0	1.1
14	2037	439,510	4,463	0.1	9.5	1.1
15	2038	435,158	4,419	0.1	9.2	1.1
16	2039	430,850	4,375	0.1	8.9	1.0
17	2040	426,584	4,332	0.1	8.7	1.0
18	2041	422,360	4,289	0.1	8.6	1.0
19	2042	418,178	4,246	0.1	8.5	1.0
20	2043	414,038	4,204	0.1	8.5	1.0
21	2044	409,939	4,163	0.1	8.4	1.0
22	2045	405,880	4,121	0.1	8.3	1.0
23	2046	401,861	4,081	0.1	8.3	1.0
24	2047	397,882	4,040	0.1	8.2	1.0
25	2048	393,943	4,000	0.1	8.2	1.0
26	2049	390,042	3,961	0.1	8.1	1.0
27	2050	386,181	3,921	0.1	8.1	1.0
28	2051	382,357	3,883	0.1	8.1	1.0
29	2052	378,571	3,844	0.1	8.0	1.0
30	2053	374,823	3,806	0.1	8.0	1.0
Total		**12,343,869**	**125,343**	**5.6**	**307.4**	**33.4**

Appendix A – Market Analysis

ECIA BARGE FACILITY
CARGO MARKET ANALYSIS

Prepared for: ECIA

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January 31, 2020

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Defining Types of Waterborne Cargo Markets

- **At the outset it is necessary to define the types of waterborne cargo markets in which the ECIA Region currently competes:**
  - **Captive cargo markets**
    - Tied to a single user/producer
    - Proximity to plant, mine or farm
    - Typically dry and liquid bulks
    - Staple of Great Lakes and Inland Waterway System
    - Not dynamic
  - **Discretionary cargo markets**
    - Hinterland reach - competition
    - Containerized and breakbulk cargo
    - Competitive vessel, port and inland transportation services
    - More dynamic (influenced by cost and transit time)

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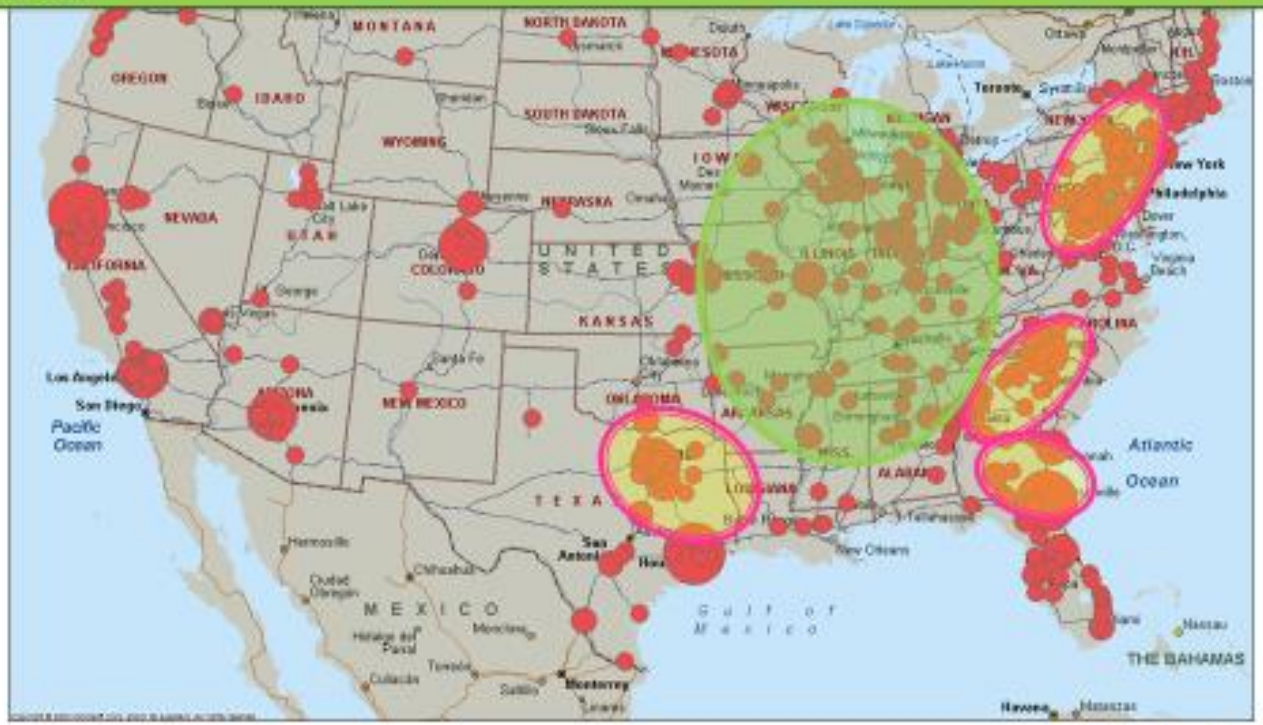
Example of Discretionary Market: Midwest Hinterland

Coastal ports have advantage to serve their respective immediate hinterland markets as highlighted in yellow. However, the Battleground highlighted in green demonstrates further inland hinterland reach that is competitive to two or more port ranges.



Source: Chain Store Guide, National Retail Federation

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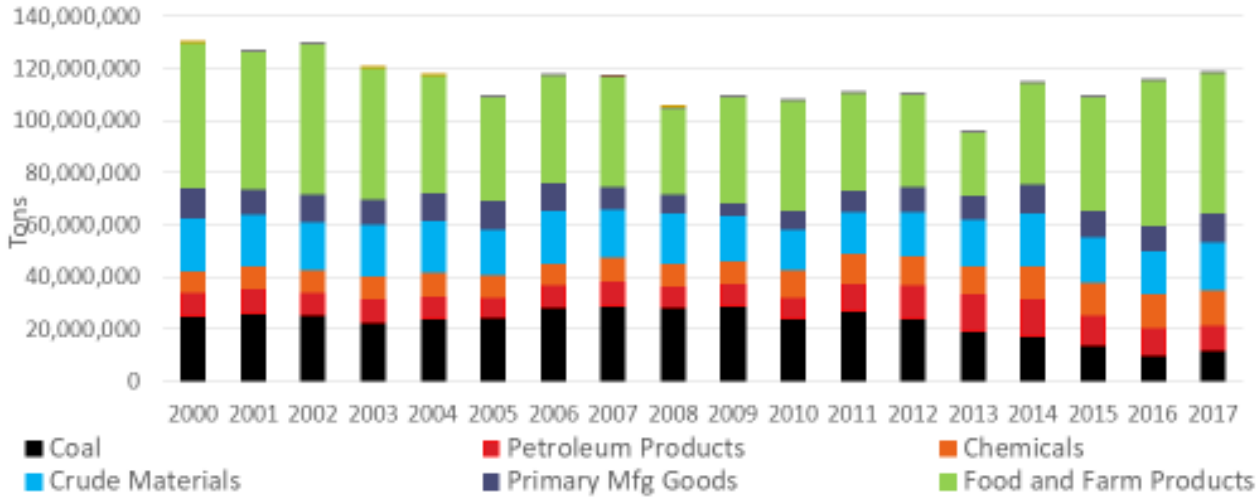
3

Macro View: Waterborne Tonnage – Mississippi River (Minneapolis to Mouth of Ohio River)
Overall tonnage has declined by -8.7% since 2000, led by loss of coal and crude materials; Food/farm has been sporadic while chemicals (fertilizers) have shown growth



Commodity Group	2000	2005	2010	2015	2017	18-Year CAGR	2000-2017 Change	10-Year CAGR	5-Year CAGR
Coal	24,981,180	24,568,619	23,995,132	13,946,850	11,932,844	-4.25%	-52.2%	-9.16%	-11.43%
Petroleum Products	8,939,939	7,869,748	8,420,429	11,445,202	9,413,433	0.30%	5.3%	1.21%	-9.92%
Chemicals	8,623,947	8,414,690	10,637,437	12,458,382	13,880,715	2.84%	61.0%	5.26%	6.92%
Crude Materials	20,364,842	17,550,650	15,304,588	17,533,717	18,173,627	-0.67%	-10.8%	-0.58%	0.66%
Primary Manufactured Goods	11,593,428	11,051,210	7,352,169	10,048,362	11,105,521	-0.25%	-4.2%	5.21%	4.28%
Food and Farm Products	55,563,042	39,799,457	42,284,247	43,833,121	54,151,018	-0.15%	-2.5%	5.54%	22.42%
All Manufactured Equip & Mi	37,487	101,429	253,330	90,601	96,942	5.75%	158.6%	-11.95%	29.66%
Waste and Scrap	4,600	0	0	0	0	-100.00%	-100.0%	-100.00%	NA
Unknown or NEC	0	0	0	0	0				
Total	**130,108,465**	**109,355,803**	**108,247,332**	**109,356,235**	**118,754,100**	**-0.54%**	**-8.7%**	**1.34%**	**5.59%**

Source: USACE

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Waterborne Cargo Market Assessment – Traditional & Discretionary Cargoes and Opportunities

- **Examine both current and non-traditional markets in which ECIA Regional ports compete:**
  - Agribusiness
  - Specialty bulk products
  - Grain transload
  - Steel/Scrap/Lumber
- **Review data flow analysis/Market Snapshots (CPCS)**
- **Conduct interviews with regional stakeholders**
- **Review published statistical data**
- **Identify key issues influencing market competitiveness**
- **Determine feasibility of potential market opportunities**
  - Opportunities
  - Issues/Constraints

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Competing for Traditional, Non-Discretionary Cargoes

- **Staple of Inland Waterway: non-discretionary bulk cargoes**
  - Raw materials and feedstocks, typically captive to producer or user
- **Key waterborne markets and demand drivers:**
  - Grain
    - Bulk shipment to Gulf transloading/mid-streaming
  - Fertilizer
    - Demand driven by planted acreage
  - Coal
    - Utility plant usage, competition from alternative fuels
  - Salt
    - Road salt, sporadic depending on previous year's winter
  - Sand/Gravel and Stone/Cement
    - Tied to construction activity, health of economy
  - Specialty frac sand used in fracking (TX, OH, PA, NM)
  - Scrap - Used in electric arc furnace utilities

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Competing for Discretionary Cargoes

- **Discretionary cargoes open to competition from other river terminals as well as Great Lakes ports and East & West Coast ports**
- **Port selection decisions driven by logistics costs, transit time, reliability of service and frequency of service**
- **Key markets include**
  - Steel
  - Lumber
  - Breakbulk/project cargo
  - Container on barge
  - Grain transloading
  - Resins

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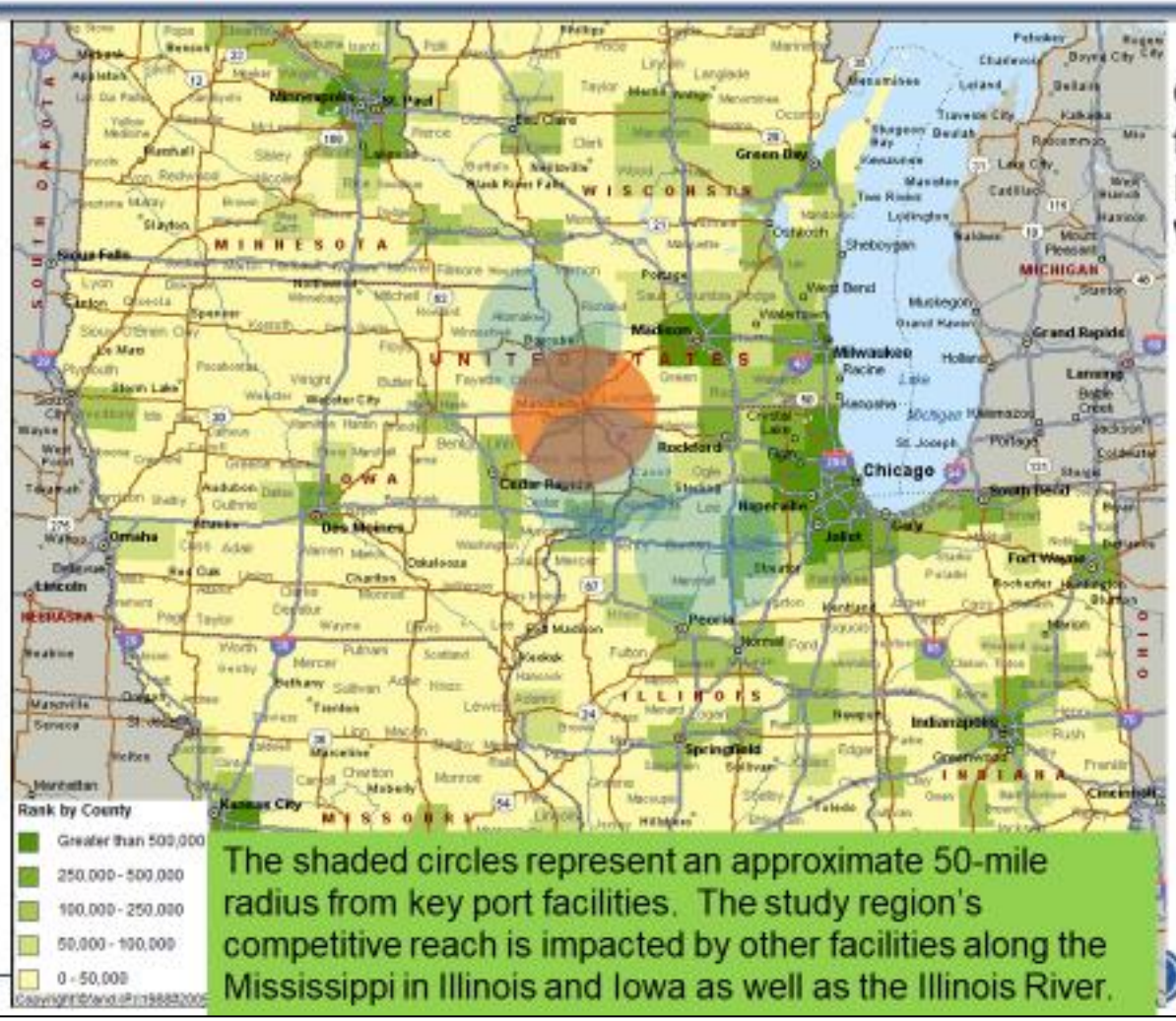
Dubuque/East Dubuque Competing Port Facilities
50-mile Hinterland



Competing facilities in Illinois Iowa and Wisconsin:

- Prarie du Chien
- Savanna
- Clinton
- Albany
- Davenport
- Hennepin
- Peoria

The shaded circles represent an approximate 50-mile radius from key port facilities. The study region's competitive reach is impacted by other facilities along the Mississippi in Illinois and Iowa as well as the Illinois River.

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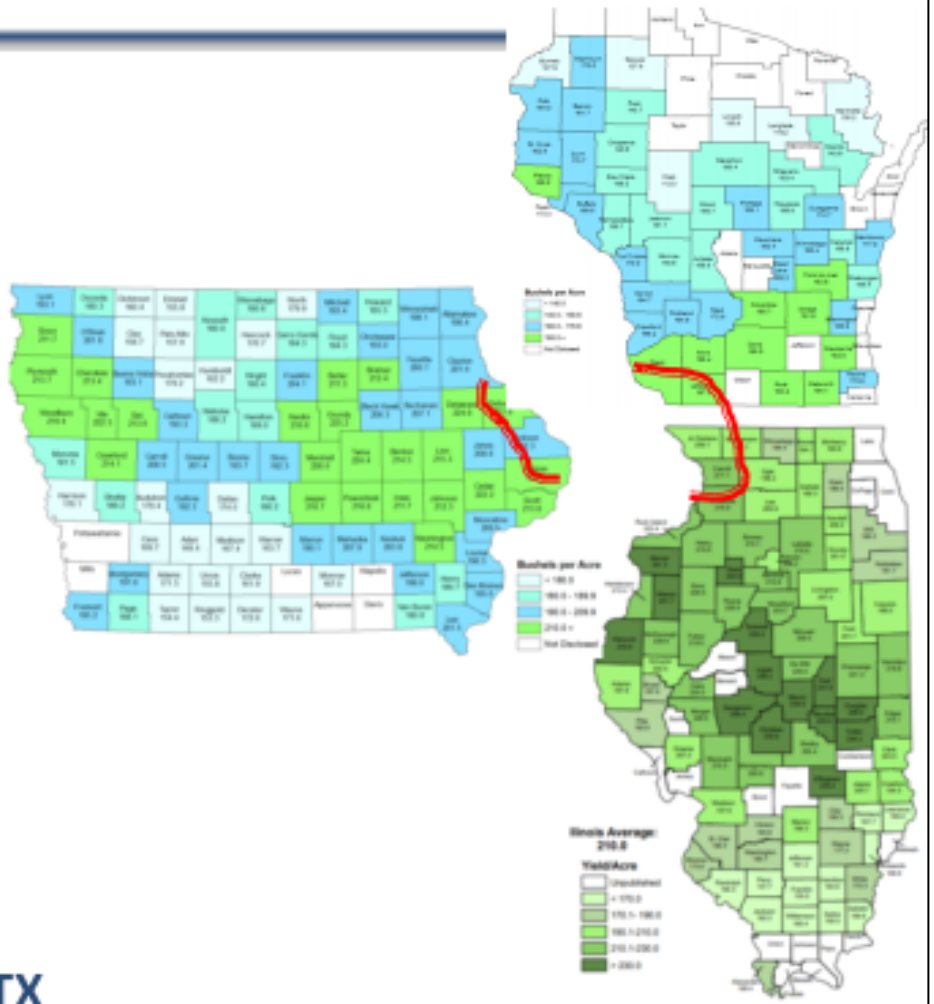
Grain and Agribusiness Market

- **Northwestern IL, north Central IA, Southwest WI is key in grain production**
  - Corn
  - Soybean
- **Proximity to source is ideal for grain terminal/barge operations in ECIA Region**
- **Rail-served facilities**
  - Capability of handling unit trains is an advantage
- **Containerized exports flow through West/East Coast**
- **Bulk Exports via Gulf – LA, TX**



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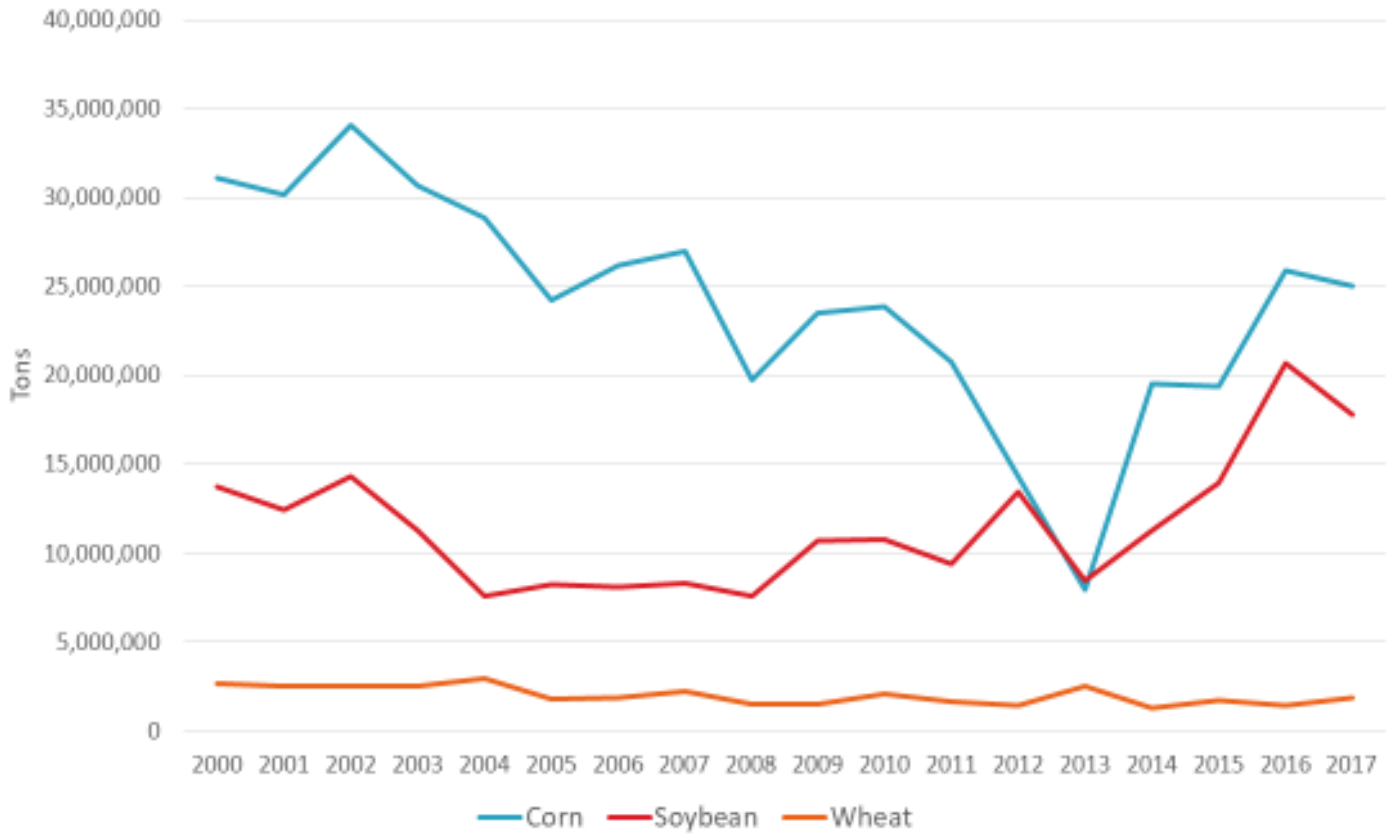
Historical Waterborne Grain Tonnage
Mississippi River - Minneapolis to Ohio River
Corn has been trending downward while soybeans have exhibited growth



USACE Waterborne Commerce Statistics

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Grain and Agribusiness Market
ECIA Regional Competitive Position

- **Currently handle about 40-45 million bushels annually**
  - 1.2 million tons
- **Key competition:**
  - Other River facilities – Clinton, Prairie du Chien
  - Cedar Rapids
  - Illinois River
    - 35-40 miles hinterland reach
    - Barge transportation rates typically less expensive from Illinois River (Hennepin/Peoria), fewer locks as well
- **Estimated truck rate differential:**
  - 25-50 miles = .10/bu
  - 50 miles = .16-.20/bu
- **Cedar Rapids – Availability of soybean meal backhaul**
  - Investment in rail operations
  - Can draw from 100+ miles
  - No soybean processing near River to fill demand
  - United Co-op looking to build in Boscobel, WI???

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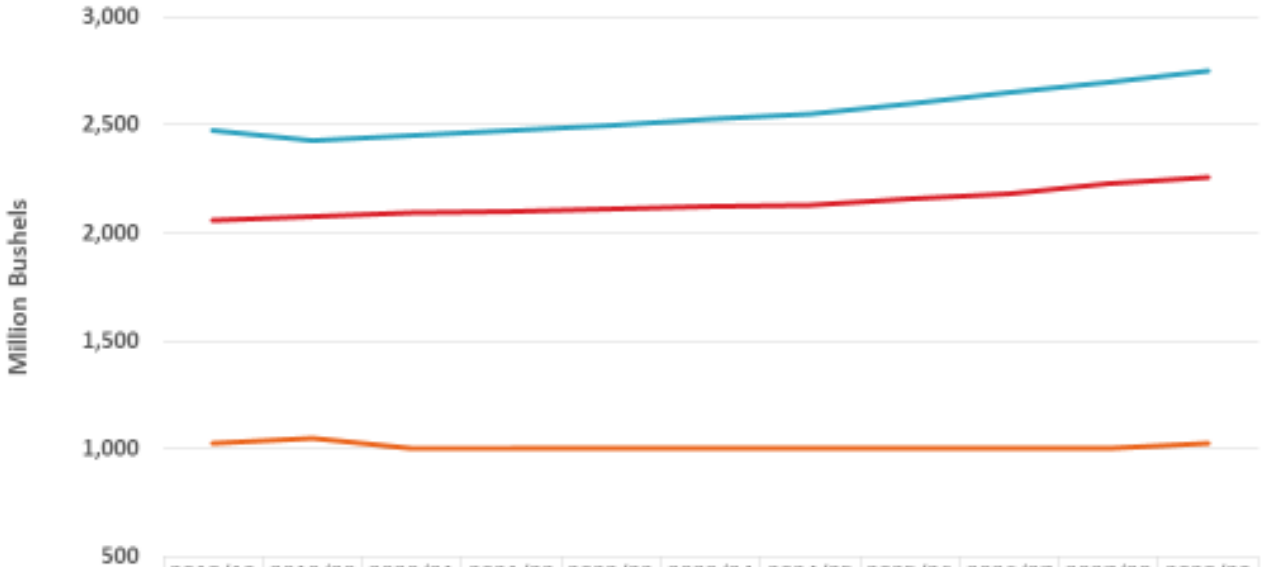
Grain Outlook:
U.S. Grain Export Projections



	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Corn	2,475	2,425	2,450	2,475	2,500	2,525	2,550	2,600	2,650	2,700	2,750
Soybeans	2,060	2,075	2,090	2,100	2,110	2,120	2,130	2,155	2,180	2,225	2,255
Wheat	1,025	1,050	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,025

USDA Long-term Projections Report OCE-2019-1, March 2019; Projections completed Oct 2018

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U.S. Feed Export Outlook

- **Corn:**
  - U.S. corn exports are expected to be more than double those of Brazil, the next largest exporter
  - U.S. market share of global corn trade will slowly fall to under 36 percent by the end of the decade
- **Sorghum:**
  - No change – 150 million bushels per year for next 10 years
- **Barley:**
  - No change - 5 million bushels per year for next 10 years
- **Oats:**
  - No change - 2 million bushels per year for next 10 years

USDA Long-term Projections Report OCE-2019-1, March 2019; Projections completed Oct 2018

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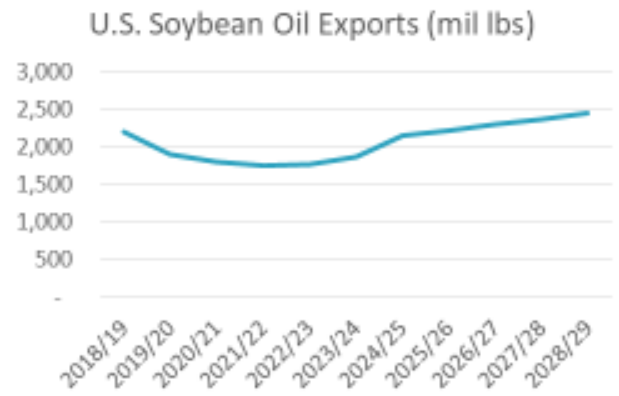
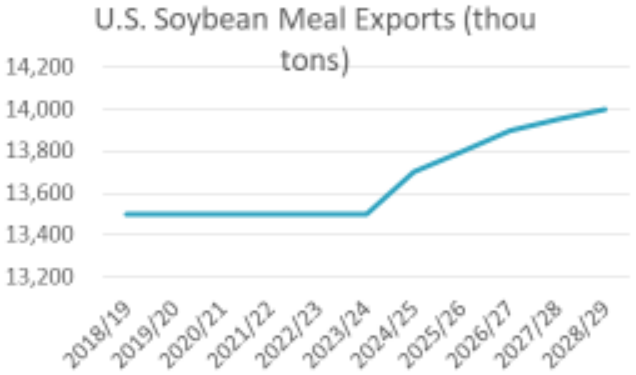
U.S. Oil Crops Export Outlook

- **Soybean exports dropped from 2,129 million bushels to 2,060 this year:**
  - Not expected to recover until the middle of the projection period as producers adjust to the new trade environment
  - Export growth is expected to slow without access to China
- **U.S. exports of soybean oil and meal will continue to face strong competition from South America**
- **Argentina's share of world soybean meal exports continues to grow to over 45 percent of the global market**
- **Brazil is expected to overtake the U.S. by the middle of the projection period as the second largest exporter of soybean meal**
- **U.S. global share expected to drop to just over 16 percent of the global market by the end of the decade**





USDA Long-term Projections Report OCE-2019-1, March 2019; Projections completed Oct 2018

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U.S. Wheat Export Outlook

- **Exports remain flat as the U.S. share of global wheat trade continues to decline:**
  - Competition from the Black Sea region
- **Stable U.S. export projections result in a reduction of the U.S. share of world exports over time**
- **Japan is the 3rd largest market for U.S. wheat exports:**
  - U.S.-Japan Trade Agreement signed October 7, 2019

USDA Long-term Projections Report OCE-2019-1, March 2019; Projections completed Oct 2018

Soybean Meal Potential Opportunity

- Soybean meal crushing
- Potential to develop another facility in NW Illinois
- 1,000 tons/day initial volume
- 3000 tons/day full capacity
- 10-15 acres needed (rail-served)
- Potential facility in Boscobel,WI???

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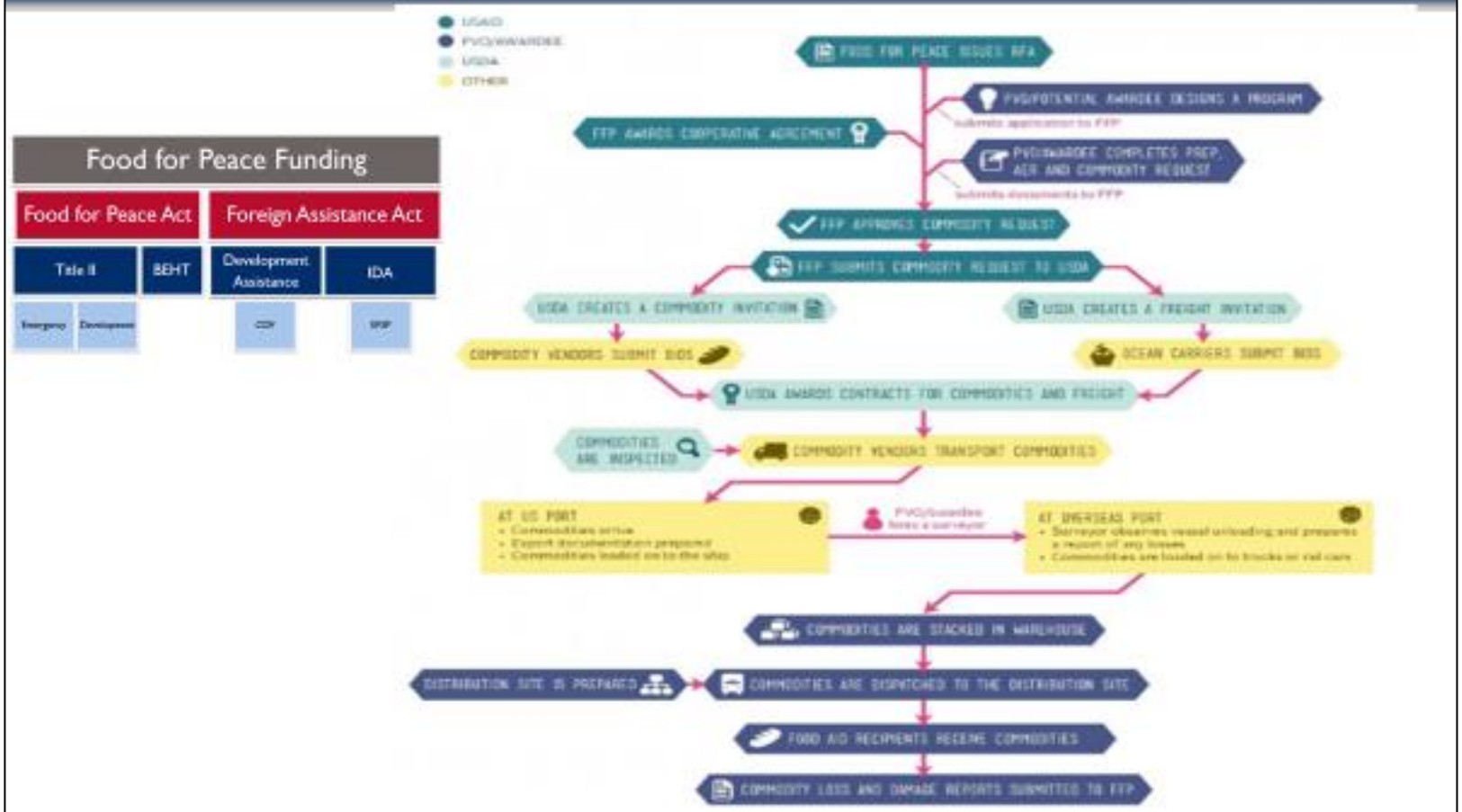
Bagged Cargo: Driven by "Food For Peace (PL480 Cargo)" – Carrier delivered price drives allocations



USAid; U.S. INTERNATIONAL FOOD ASSISTANCE FUNDING FACT SHEET, Sept 2019

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Metric Tons Shipped
Food For Peace Title II Emergency And Non-Emergency – Increased Containerization, bagged market declining

	2018	2017	2016	2015
Wheats	677,250	690,776	773,500	349,770
Grains	489,360	445,727	622,580	474,151
Other (rice)	46,264	29,901	52,528	46,262

USAid; U.S. INTERNATIONAL FOOD ASSISTANCE FUNDING FACT SHEET, Sept 2019

Grain and Agribusiness Market
ECIA Regional Outlook

- **Outlook:**
  - Potential to attract smaller co-op
  - South of Fennimore would be key drawing area
  - North would go out of Prairie du Chien
- **Potential opportunities:**
  - Growth in soybean meal exports
  - New animal waste sterilized and processed to create renewable energy pellets
    - Idea still in infancy, however regional farms are looking to invest
    - Domestic supply as well as potential export as volumes grow
    - Longer-term prospect
- **Bagged cargoes would be more effectively handled at warehousing operation and transloading operation, not waterborne**

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ECIA Regional Competitive Position
Intermodal Grain Transshipment/Transload

- **Inland transload for export is growing – particularly for beans**
  - Grown from 5% to 13% of total since 2009
  - Transload facilities in Omaha, Savannah GA, Kansas City
  - Similar service operated at Port of Milwaukee until CP discontinued service
- **For a service of this nature to be successful, availability of containers in ECIA Region is critical**
  - Currently empties are located at major DC clusters e.g. Joliet
  - Additional drayage cost/repo cost is deterrent
- **Competition**
  - Cedar Rapids – rail infrastructure direct to West Coast
  - Midwest Int'l Port is transloading (ADM and CN)
  - Gavilon rail facility in Warren, IL

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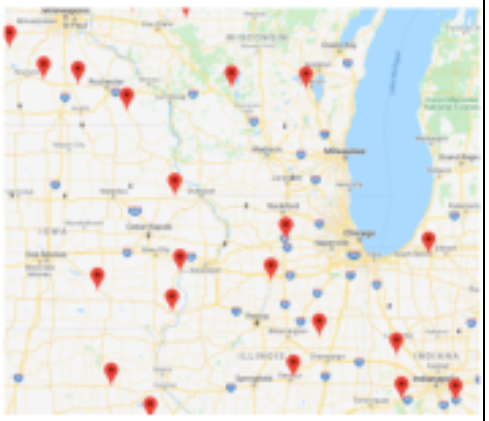
ECIA Regional Competitive Position
Ethanol/Biodiesel

- **Ethanol**
  - Ethanol exports have been increasing, however share of overall production has been declining
  - Approximately 10% moved via barge
  - Few refineries adjacent to River System
- **Biodiesel and Ethanol/DDG Producers in area**
  - Difficult to compete against unit train capability and Class I service offerings

Facility Name	Location	Annual Production (gallons)	Rail Connections
Western Dubuque Biodiesel	Dubuque, IA	30m	CN
REG Madison	DeForest, WI	20m	CP

Facility Name	Location	Annual Ethanol Production (gallons)	Annual DDG Production (tons)	Rail Connections
Big River Resources	Dyersville, IA	110m	350,000	CP (DM&E)
Flint Hills Resources	Fairbank, IA	120m	350,000	DWRV, IANR
Homeland Energy	Lawler, IA	200m	315,000	CP (DM&E)
Ingredion	Cedar Rapids	45m	N/A	UP, CN
ADM	Cedar Rapids	275m	N/A	UP, CN
Adkins Energy	Lena, IL	60m	100,000	CN
Badger State Ethanol	Monroe, WI	85m	128,000	WSOR



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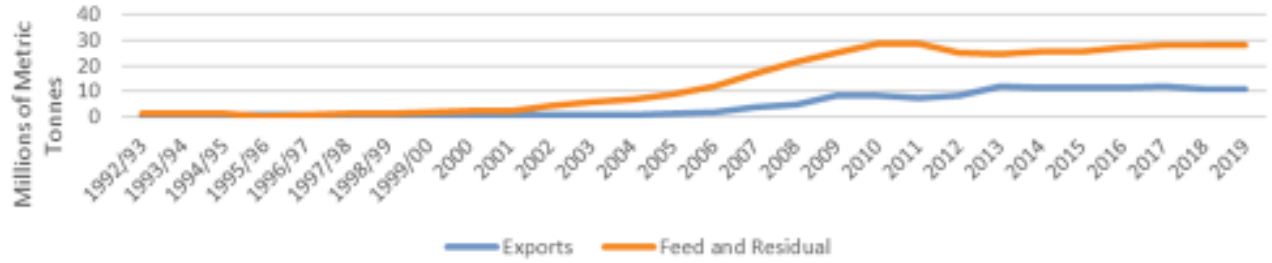
ECIA Regional Competitive Position
DDG

- By-product of ethanol production
- Lower-value product
- Primarily rail and barge for long-haul markets and export
- Regional capacity estimated at 1.4 million tons



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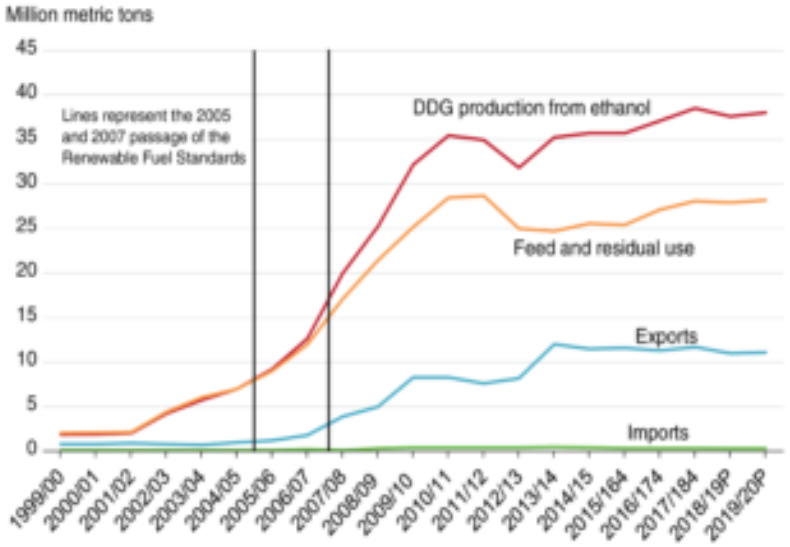
DDG Outlook

- **Despite the fact that DDG Exports have been flat since 2014, ECIA regional terminals can offer reduced shipping costs**
  - Exports currently moving via rail to Gulf
  - Exports moving via other river terminals
  - Discretionary - Must compete on inland cost to terminal for barge to Gulf (Houston)
- **Warehousing operations with options to ship via water, rail and transload rail/container**
  - Value-added services



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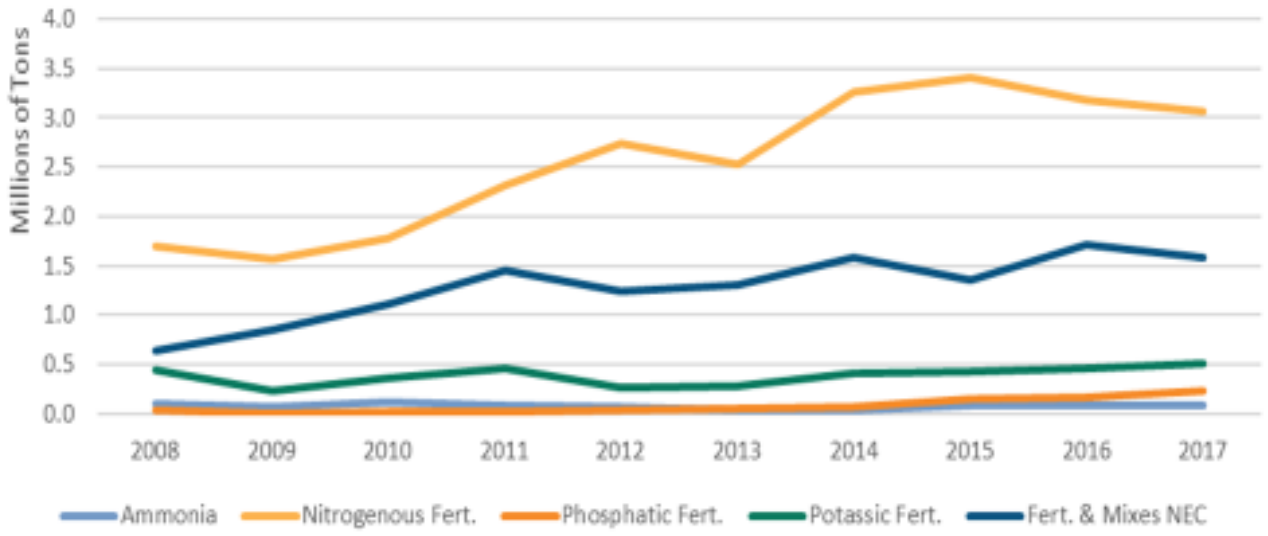
Fertilizer Unloaded at Upper Mississippi River Terminals - 5.5% Annual Growth Past 10 Years



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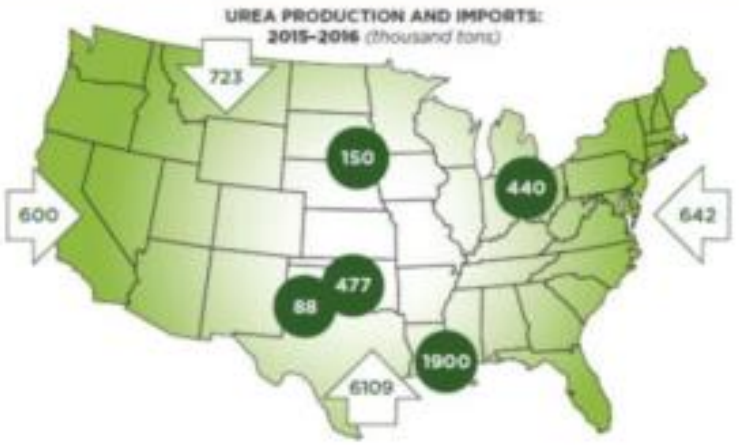
New urea production in the U.S. will negatively impact fertilizer import volume over time

- **Past 10 years imports through the Gulf increased by 5.2% annually**
  - Total U.S. = 2.5%
- **Import market will see increased competition from domestic capacity**
  - Beulah, ND
  - Port Neal, IA
  - Wever, IA
- **Imported product into the region will be adversely affected**
- **CVR Partners/East Dubuque Nitrogen - investing $200-$300 million in plant expansion**



Source: https://www.chsinc.com/our-company/news-and-media/news/2018/02/02/ahead-of-the-curve

Regional Fertilizer Outlook

- **10-year growth in fertilizer activity –**
  - Nitrogenous – 6.7%
  - Potassic – 6.4%
  - Phosphatic – 19%
- **Growth is anticipated to continue**
  - Terminals maintain share
  - Yield-per-acre increases
- **Nitrogenous product may be stifled by increased production at Dubuque Nitrogen**
  - Anticipated 150-mile hinterland reach

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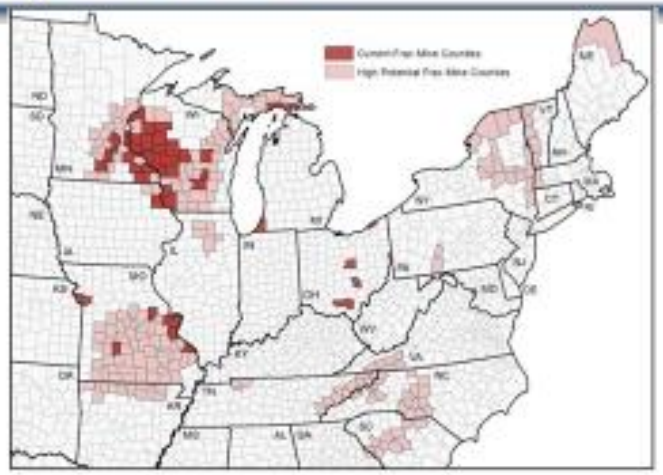
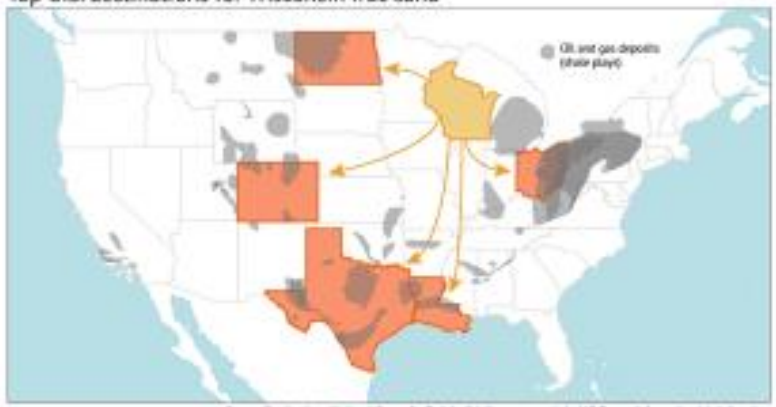
Frac Sand Market
ECIA Regional Competitive Position/Outlook

- **Abundance of frac sand mines located in Wisconsin**
- **Specialty handling necessary**
  - Infrastructure
- **Demand in TX, LA, OH and PA**
  - Industry fluctuates due to competition from lower oil prices
- **Texas is supplying own sand for Eagleford Shale**
- **Northern mines are better served by the Upper Mississippi Ports (Minneapolis region)**
- **Appears low-priority target/non-starter in the near-term**



Top U.S. destinations for Wisconsin frac sand



Source: Destinations, National Center for Freight & Infrastructure; shale, U.S. Energy Information Administration.
Credit: Reporting, Taylor Chase, Wisconsin Center for Investigative Journalism; Map: Kate Golden

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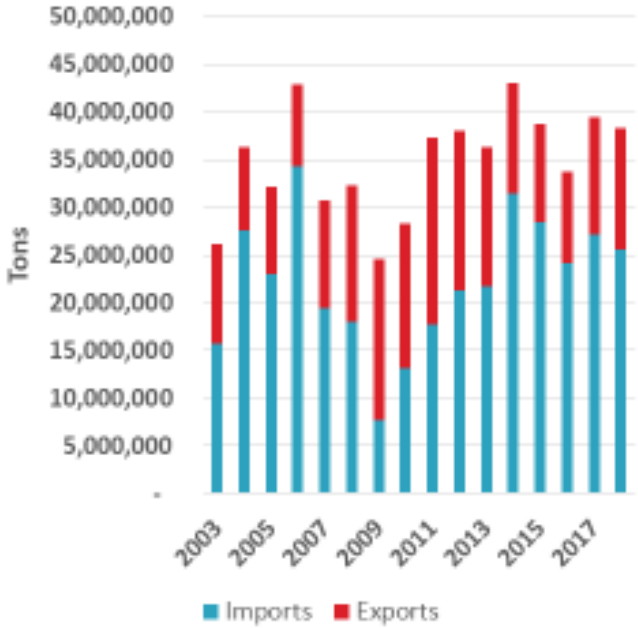
Steel Market – International Iron And Steel Traffic
Extremely volatile commodity tied to health of economy and trade policies

All U.S. Port Traffic



Gulf Coast Port Traffic

Source: USA Trade Online

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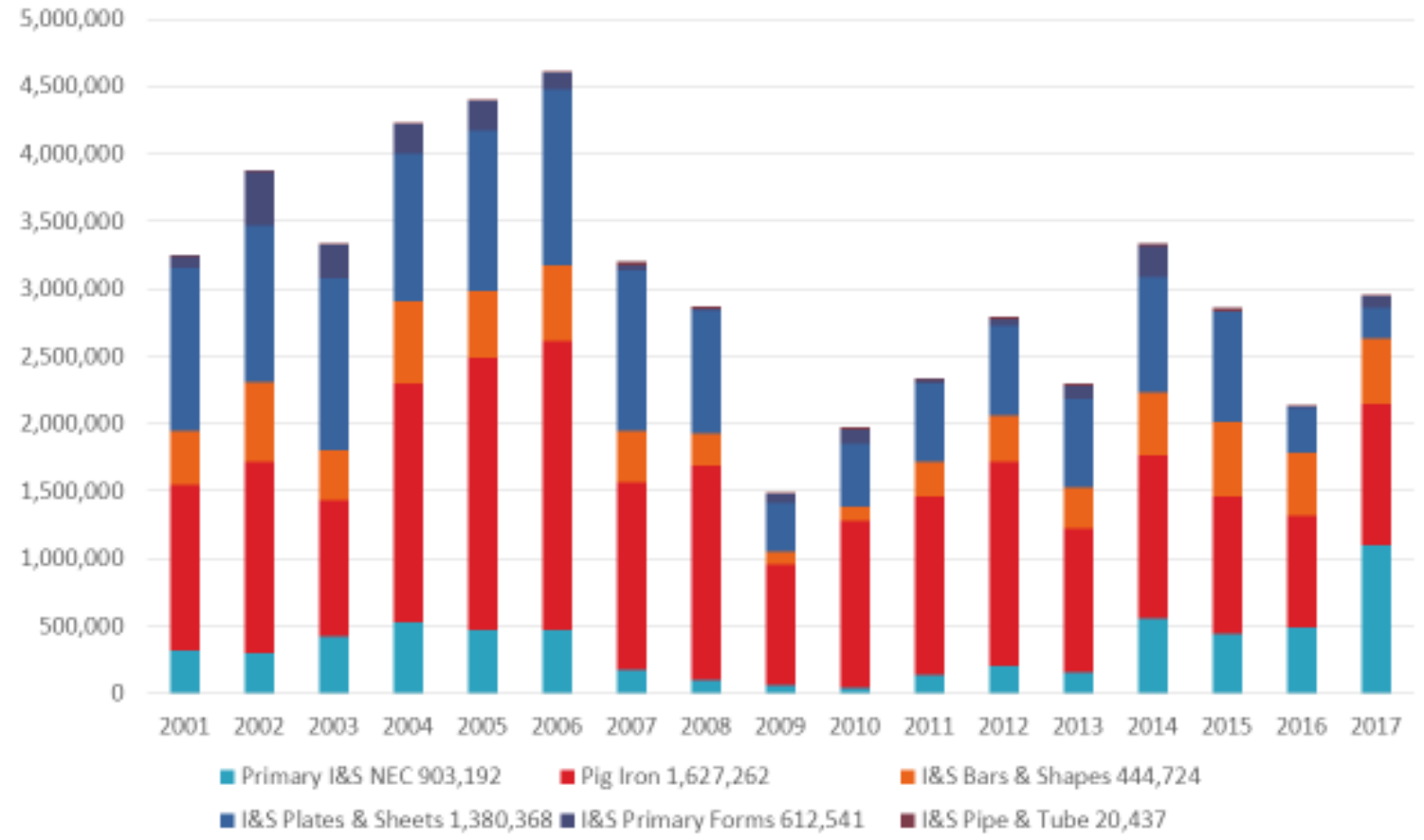
Steel Tonnage Handled on the Mississippi River, Minneapolis to Ohio River – Similar Volatility, has not recovered to pre-recession levels



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Steel Market
ECIA Regional Competitive Position

- **Modest amount of tonnage currently handled**
- **Market fluctuations**
- **Users are concentrated in Chicago area**
- **Inland cost must compete with alternative routings**
- **Primary decision making factors in port selection:**
  - Reliability of service/Frequency of service
    - Large-volume shippers/BCOs hold numerous contracts with forwarders to ensure delivery deadlines are met
  - Total Landed Cost
  - Increasing presence of 3PL activity in these markets

Landed Cost Comparison to Serve Madison and Chicago Steel Processors

- **Landed Cost:**
  - Ocean voyage costs
  - Pilotage/Tugs/Tolls
  - Stevedoring/Terminal Charges
  - Inland truck cost

Landed Cost to Imported European Steel	Madison	Chicago
via Philadelphia/Camden	$136	$122
via Chicago/Burns Harbor	$61	$57
via NOLA and barge	$99	$107

Inland Cost Comparison:
Truck Cost to Serve Key Discretionary Markets

	Inland Destination															
	Chicago, IL				Joliet, IL				Madison, WI				Jefferson, WI			
Port Location	Miles	Time	Est Cost	Per Ton	Miles	Time	Est Cost	Per Ton	Miles	Time	Est Cost	Per Ton	Miles	Time	Est Cost	Per Ton
Dubuque, IA	179	3:56	$425.79	$19.35	211	3:19	$489.62	$22.26	91	1:33	$250.26	$11.38	123	1:57	$314.09	$14.28
Davenport, IA	175	3:34	$417.81	$18.99	141	2:24	$350.00	$15.91	162	2:59	$391.88	$17.81	182	2:51	$431.78	$19.63
Cedar Rapids, IA	228	4:32	$523.53	$23.80	222	3:37	$511.56	$23.25	163	3:01	$393.88	$17.90	194	3:13	$455.71	$20.71
Savanna, IL	148	3:14	$363.96	$16.54	158	2:41	$383.90	$17.45	98	2:12	$264.22	$12.01	125	2:25	$318.08	$14.46
Prairie du Chien, WI	229	4:41	$525.53	$23.89	269	4:22	$605.31	$27.51	100	1:59	$268.21	$12.19	130	2:21	$328.05	$14.91
Clinton, IA	144	3:01	$355.98	$16.18	145	2:26	$357.97	$16.27	115	2:35	$298.13	$13.55	150	2:28	$367.95	$16.72

	Freeport, IL				Davenport, IA				Cedar Rapids, IA			
Port Location	Miles	Time	Est Cost	Per Ton	Miles	Time	Est Cost	Per Ton	Miles	Time	Est Cost	Per Ton
Dubuque, IA	65	1:20	$198.40	$9.02	71	1:19	$210.37	$9.56	73	1:23	$214.36	$9.74
Davenport, IA	102	2:05	$272.20	$12.37	local		$185.00	$8.41	79	1:34	$226.33	$10.29
Cedar Rapids, IA	136	2:42	$340.02	$15.46	79	1:34	$226.33	$10.29	local		$185.00	$8.41
Savanna, IL	43	0:54	$185.00	$8.41	61	1:16	$190.42	$8.66	90	1:53	$248.27	$11.28
Prairie du Chien, WI	116	2:20	$300.13	$13.64	129	2:25	$326.06	$14.82	97	1:53	$262.23	$11.92
Clinton, IA	57	1:12	$182.44	$8.29	41	0:55	$150.53	$6.84	85	1:37	$238.29	$10.83

Competing for Domestic Steel and Other Discretionary Cargoes

- With barge rates to the regional terminals essentially equalized, the inland cost and terminal charges become critical in port choice
- Dubuque holds and advantage over Prairie du Chien to serve the southwest and South Central WI market
  - Madison/Jefferson/Janesville
- In northern Illinois, Savanna holds a slight advantage over Dubuque and Clinton
  - Differentials are minimal
- Clinton and Savanna offer the lowest cost to Chicago
- Davenport is the least cost to Joliet
- The truck per-ton differentials in many of the key markets are slight, the ECIA terminal operators may need to negotiate stevedoring rates and terminal charges with incentives to land potential accounts

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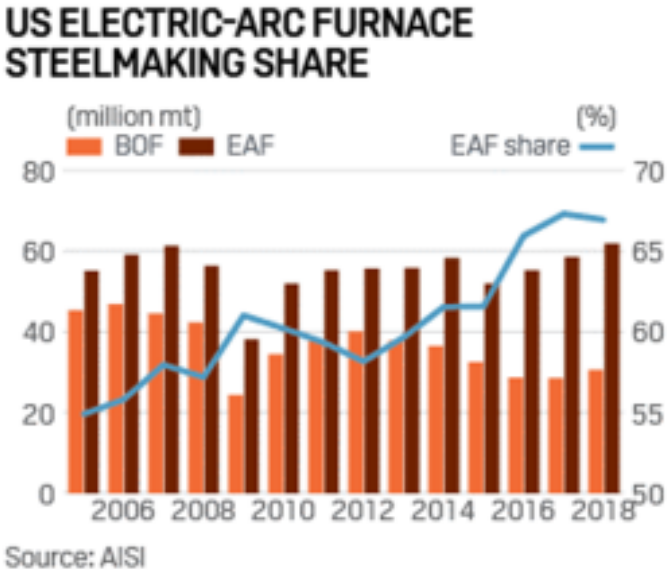
Scrap Market

- **Scrap movements are primarily associated with two markets:**
  - Outbound exports
  - Domestic movements used as a raw feedstock in EAF steel production
- **Scrap export market has been unstable**
  - China closures - environmental
  - Now China exporting to Mid East
- **EAF production is strong**
- **In order to compete in scrap market, attracting a scrap broker and/or consolidator is critical**



Scrap Market Outlook

- **Scrap shipments on the Upper Mississippi have been flat**
  - Less than 1% growth per annum

Commodity Group	2000	2005	2010	2015	2017	18-Year CAGR	2000-2017 Change	10-Year CAGR	5-Year CAGR
Iron & Steel Scrap	1,309,946	1,593,122	1,043,914	900,168	1,483,453	0.73%	13.2%	-0.73%	13.07%

- **BEHR Iron & Metal (Alter Logistics) operates scrap consolidations facilities in the region as well as U.S.**
- **Currently load barges out of St Paul terminal which is in proximity to a key processing yard**
- **Can also use rail – Dubuque yard**
- **Indicated that Dubuque could be used in the future, but economies would have to work**
- **Winter closure is a drawback**
  - South of Davenport or Illinois River would be competition
- **Any future potential would be tied to specific project**
  - Long-term

Lumber

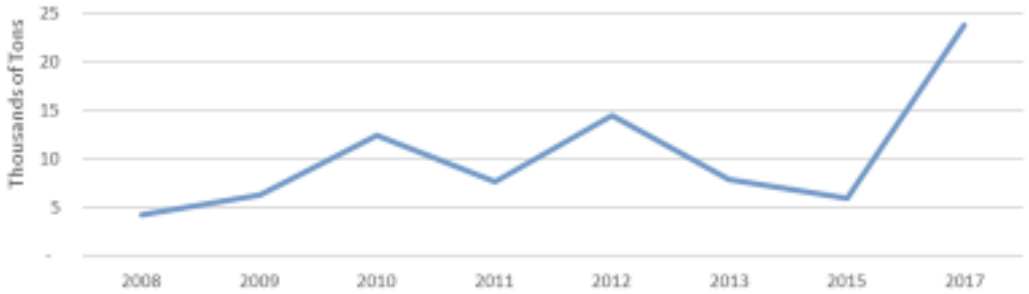
- **Lumber represents an extremely small share of waterborne cargo handled**

Commodity Group	2000	2005	2010	2015	2017	Grand Tota	18-Year CAGR	2000-2017 Change		10-Year CAGR	5-Year CAGR
Forest Products NEC	46,567	23,958	9,608	5,148	2,996	182,448	-14.90%	-93.6%		-5.64%	NA
Fuel Wood			2,850			9,885	NA	NA		-100.00%	-100.00%
Lumber	5,054					7,566	-100.00%	-100.0%		NA	NA
Wood in the Rough		829				6,843	NA	NA		-100.00%	NA
Primary Wood Prod.	9,271					12,468	-100.00%	-100.0%		NA	NA
Manufac. Wood Prod.						3,556	NA	NA		-100.00%	NA
Total	60,892	24,787	12,458	5,148	2,996	222,766	-16.24%	-3	0	-11.59%	20.20%

- **Storage requirements and lead times are critical components**
- **Volume not large enough to support service**
- **Product may be containerized (considered perishable)**
- **Warehousing operation with ability to transload into container/railcar would be ideal play**
  - Smaller volumes would be anticipated

Plastics/Resins

- Increasing market sector
- Developments and expansions occurring in the Gulf
  - Texas and Louisiana
- Originating in the Gulf destined primarily for Madison WI and Chicago
- Need to compete against rail - quicker transit time
- Dray from ECIA Regional terminal must be more cost-effective



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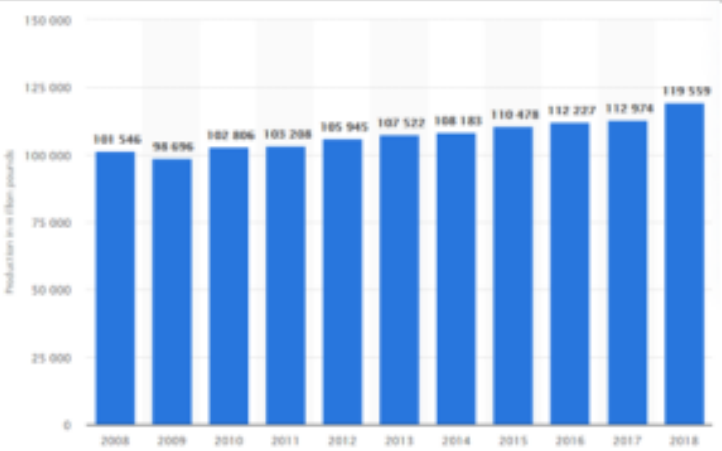
Resin production and sales have been increasing



Resin	Production			Total Sales & Captive Use		
	2018	2017	% Chg 18/17	2018	2017	% Chg 18/17
Total Thermosets [5]	**17,258**	**16,764**	**2.9**	**17,368**	**16,877**	**2.9**
LDPE [2a3]	7,673	6,903	11.2	7,509	7,013	7.1
LLDPE [2a3a7]	18,359	15,185	N/C	17,677	14,883	N/C
HDPE [2a3]	21,161	18,880	12.1	20,785	18,556	12.0
PP [2a4]	16,971	17,364	-2.3	17,196	17,286	-0.5
PS [2a4]	4,135	4,302	-3.9	4,110	4,304	-4.5
EPS [2a5]	1,082	1,090	-0.7	1,055	1,086	-2.9
PVC [3]	16,311	15,870	2.8	16,313	15,835	3.0
Other Thermoplastics [6]	16,609	16,616	0.0	17,791	17,871	-0.4
Total Thermoplastics [7]	**102,301**	**96,210**	**6.3**	**102,436**	**96,834**	**5.8**
GRAND TOTAL PLASTICS [7]	**119,559**	**112,974**	**5.8**	**119,804**	**113,711**	**5.4**

Millions of pounds, dry weight basis [1]

American Chemistry Council

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Container on Barge (COB) Market

- **Containerized import market**
  - Highly discretionary
  - Influenced by total landed cost
  - Influenced by transit time or expected time of delivery
- **Competition from Suez routings**
- **Shift has already occurred**
- **The viability of a COB service is dependent on the ability to compete with current coastal routings:**
  - Total landed cost
  - Expected time of delivery
  - Reliability of service;
  - Agility;
  - Frequency; and
  - Individual logistics chain needs of BCOs

COB Market – ECIA Regional Competitive Position

- **Completing a Landed Cost Analysis**
  - Compare ECIA Regional barge routing versus Coastal Routing
- **When inventory carrying costs are factored in, COB movement for discharge at an ECIA Regional terminal to serve a Joliet DC is at cost disadvantage**
  - Least cost inland routing to Joliet is via the port of New York and Norfolk
  - These ports have upgraded rail service into the Midwest specifically to serve intermodal markets, extremely competitive
  - The cost disadvantage to move a container through ECIA Regional terminal via New Orleans is estimated at $425-$790

COB Market – Implications for COB Service at within ECIA Region

- **Import containers destined for Midwest markets on COB require double handling of the container at the terminal**
  - 1) vessel to barge and
  - 2) barge to terminal dock
  - Currently, stevedoring rate is not established, however the analysis assumes rates of $150-225/container, which are conservative
- **Additional 15-18+ -day sail upriver to ECIA Region compared to a 4-7 intermodal transit to a rail-served DC (1-2-day truck transit to a DC)**
  - Additional transit time translates into inventory carrying cost penalties
  - More severe as the value of the shipment increases.
- **Additional cost of drayage from the region to Joliet, $425-$450 would be incurred as "last mile" transportation to a DC**
- **Currently given the cost, time and lack of warehousing infrastructure and market, a COB service for the ECIA Region is highly unlikely**

Opportunities Summary

- **Soybean meal**
- **Renewable energy pellets**
  - Idea still in infancy, however regional farms are looking to invest
  - Longer-term prospect
- **DDG Exports**
  - Discretionary - Must compete on inland cost to terminal for barge to Gulf (Houston)
  - Warehousing operations with options to ship via water, rail and transload rail/container
  - Value-added services
- **Warehousing operations**
  - DDG
  - Bagged cargoes would be more effectively handled at warehousing operation and transloading operation, not waterborne
  - Lumber housing operation with ability to transload into container/railcar would be ideal play

ECIA Port-wide Forecast

	2019	2020	2025	2030	2035	2040	2045
Corn Low	439,097	443,488	466,111	489,887	514,876	541,140	568,744
Soybeans Low	784,472	711,516	747,811	785,957	826,048	868,185	912,471
DDG Low	21,114	21,536	23,778	26,253	28,985	32,002	35,333
Total Grain Low	1,164,683	1,176,541	1,237,699	1,302,096	1,369,910	1,441,327	1,516,548
Corn High	439,097	458,075	509,218	570,527	629,907	695,469	767,854
Soybean High	784,472	718,561	793,350	875,922	967,089	1,067,744	1,178,876
DDG High	21,114	21,642	368,804	449,089	588,012	574,769	650,299
Total Grain High	1,164,683	1,198,278	1,701,372	1,895,457	2,185,008	2,337,982	2,597,828
Corn Meal Low	21,526	21,741	22,850	24,016	25,241	26,528	27,882
Corn Meal High	21,526	21,741	22,850	24,016	25,241	26,528	27,882
Fertilizer Low	644,542	657,433	725,859	801,487	884,818	976,911	1,078,588
Fertilizer High	644,542	676,769	863,748	1,040,292	1,148,566	1,268,110	1,400,096
Salt Low	564,542	564,542	564,542	564,542	564,542	564,542	564,542
Salt High	564,542	564,542	564,542	564,542	564,542	564,542	564,542
Cotton Low	18,642	18,642	18,642	18,642	18,642	18,642	18,642
Cotton High	18,642	18,642	18,642	18,642	18,642	18,642	18,642
Steel Low	37,500	38,438	43,489	47,774	52,211	52,772	55,464
Steel High	37,500	46,125	53,472	59,684	62,645	65,840	69,199
Scrap Low	0	0	0	0	0	0	0
Scrap High	0	0	0	0	0	0	0
Lumber Low	0	0	0	0	0	0	0
Lumber High	0	0	7,727	8,121	8,536	8,971	9,429
Biofuels Low	0	0	0	0	0	0	0
Biofuels High	0	0	0	0	0	0	0
Resins Low	0	0	0	0	0	0	0
Resins High	0	0	53,845	59,150	62,167	65,339	68,672
Soybean Meal Low	0	0	0	0	0	0	0
Soybean Meal High	0	0	153,750	168,988	177,516	186,571	196,888

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Appendix B – Projects Not Recommended

Test of Intermodal at Gavilon 7th St. and LPD

- Port of Muscatine Planning and Feasibility Study was used as 'unconstrained site' reference
  - 90 acre greenfield site with:
    - Container-on-barge and on-terminal rail transfer
    - Dry bulk cargo, liquid bulk cargo, project cargo
  - Use of Pedestal crane for loading/unloading of barge for
  - Use of Reachstacker for yard operations
- Port of Paducah KY was used as Muscatine Planning and Feasibility Study was used as 'constrained site' reference
  - Less than 4 acres on developed waterfront
  - No rail access
  - Small laydown and covered transload areas
  - Pivot crane

7 ECIA Port Expansion Study

Test of Intermodal at Gavilon 7th Street

9 ECIA Port Expansion Study

Test of Intermodal at Gavilon 7th Street

- Cargo static storage capacity before and after intermodal development

Cargo	Unit	Before	After
Containers	TEUs	-	468
Grain	Bushels	350,000	436,000
Fertilizer	Tons	115,000	-
Rebars	Tons	37,000	-

Test of Intermodal at Gavilon 7th Street

- Buildings and Gate
  - New administration building location
  - Gate complex with one inbound and one outbound lane

- Rough Order of Magnitude Cost (~$20 million)
  - New Dock 1: ~$4.5 to $5.0 million
  - 1 – Mobile Harbor Crane: ~$3.5 - $4.5 million
  - 3 – Reachstackers: ~$1.8 million
  - 4 – Yard Trucks (Hostlers): ~$400,000
  - 8 – Bomb carts: ~$100,000
  - 2 – Spreaders: ~$60,000
  - Grain Silos: ~$2.5 - $3.5 million
  - Rail unloading and conveyor: ~$1.5 - $2.0 million
  - Rail infrastructure (additional track and ladders): ~$1.5 - ~$2.5 million
  - Feasibility studies / Master Planning: ~$150,000 - $200,000
  - Demolition of existing structures: ~$250,000 - $350,000

Test of Intermodal at LPD

- Intermodal Operation at LPD
  - Use of Dock 4 as primary load/unload operations to/from barge
- Container operations:
  - 200 ft barge berth with Mobile Harbor Crane at Dock 4
  - Container storage for about 675 containers using Reachstackers
    - 224 slots x 3-high stacking
  - About 2,280-feet of rail track divided into 2-tracks
    - Can accommodate 40 container rail cars capable of handling 2 containers each (assuming double stack)
    - Use of Reachstackers to load/unload rail cars
- Project Cargo operations:
  - Use of container berth (Dock 4) for project cargo operation
  - About 4.3 acres of laydown area available by utilizing undeveloped land to the south
  - Rail serving container cars can be utilized for rail loading/unloading

Test of Intermodal at LPD

- Grain operations:
  - Use of existing barge berth (Dock 3) for grain operation
  - 3-silo block with 300,000 bushels of static storage capacity
  - 2-truck unloading lanes
  - About 1,800-feet of rail track divided into 2-tracks
    - Can accommodate 30 rail cars capable of handling 100-tons each
  - Rail unloading station connected to silos via conveyer system
- Salt operations:
  - Use of grain berth (Dock 3) for salt unloading operations
  - About 2.3 acres of laydown platform provided north of grain silos
  - Can accommodate about 70,000 tons of salt

Test of Intermodal at LPD

- Fertilizer operations:
  - Shifted to Dock 2 (old coal area)
  - New dock for barge unloading with excavator and hopper
  - Three new warehouses to house fertilizers with static capacity of about 35,000 tons
  - Conveyor system to serve 3-warehouses
  - Truck loading lanes in each warehouse
  - Use of existing 1,700-feet of rail track with rail loading station
    - Can accommodate 28 rail cars capable of handling 100-tons each
  - Rail loading station connected to warehouses via conveyer system

Test of Intermodal at LPD

Test of Intermodal at LPD

- Cargo static storage capacity before and after intermodal development

Cargo	Unit	Before	After
Containers	TEUs	-	672
Grain	Bushels	100,000	100,000
Fertilizer	Tons	23,350	35,000
Salt	Tons	70,000	95,000

Test of Intermodal at LPD

- Buildings and Gate
  - New administration building location
  - Gate complex with two inbound and two outbound lane
- Rough Order of Magnitude Cost

Dock 4

- New Dock 1: ~$4.5 to $5.0 million
- 1 – Mobile Harbor Crane: ~$3.5 - $4.5 million
- 4 – Reachstackers: ~$2.4 million
- 6 – Yard Trucks (Hostlers): ~$600,000
- 8 – Bomb carts: ~$100,000
- 2 – Spreaders: ~$60,000
- Project Cargo area: ~$2.5 - $3.5 million
- Rail infrastructure (additional track and ladders): ~$2.5 - ~$3.5 million
- Feasibility studies / Master Planning: ~$150,000 - $200,000
- Demolition of existing structures: ~$250,000 - $350,000

Dock 3

- Pavement for salt laydown: ~$250,000 - $350,000

Dock 2

- New Dock 1: ~$4.5 to $5.0 million
- 1 – Conveyer system: ~$1 million - $1.5 million
- 3 – Warehouses (117,200 SF): ~$11.5 million - $15 million
- Rail loading station: ~$250,000 - $350,000
- Feasibility studies / Master Planning: ~$150,000 - $200,000

- Total Cost (Dock 2 + Dock 3 + Dock 4): **~$43 million**

Prospects for Container-on-Barge with IMX Rail

- COB services on the Rivers
  - Memphis-New Orleans: empties collecting in Memphis go to Baton Rouge, are filled with plastic resins, then proceed to New Orleans for export -- 200 to 400 container moves per week
  - Paducah KY: built out around 3.5 acres for barge-truck transfer (no rail) with federal grants; service for a local paper mill is planned
  - Muscatine IA: 90-acre barge-rail-truck facility studied, but not currently advancing
- Prospects for the ECIA region
  - No 'anchor tenant' or demand identified
  - Would displace active marine cargo uses at significant cost
    - Most significant impacts at Gavilon – requires 1/3 of acres and $20M investment, plus loss of existing capacity
    - Can accommodate at LPD without loss of existing capacity, and provide 50% more container capacity as at Gavilon, but at a cost of $43M
  - Did advance into Market Analysis

Prospects for Regional Intermodal (IMX) Rail Hub

- Sustainable intermodal rail service requires one or more large, reliable anchor customers (John Deere, Toyota, J.B. Hunt, Maersk, etc.) and sufficient acreage (typically 30 to 150 acres) to accommodate high throughput
- At LPD or Gavilon, intermodal rail would require major redevelopment and displacement; no anchor customers or railroad interest has been identified
- Likely scenario:
  - The region's western RR traffic will take advantage of the new Butler facility; the region's eastern RR traffic will continue to prefer truck drayage to Chicago area
  - LPD/Gavilon could offer limited capability for on/near-site users, but not a major business line – did not advance into market analysis
  - Savanna may be a long-range opportunity if regional demand grows, given its acreage, existing rail, and anchor user potential

20 ECIA Port Expansion Study