PRAIRIE LAKE REAL ESTATE INVESTMENT TRUST – ADDRESSING NUTRIENT POLLUTION IN LAKE WINNIPEG

Sustainable | Scalable | Superior Risk-Adjusted Returns

Challenge: Humans need to produce more food in the **next 40 years**, than they did in the previous **10,000 years** put together[1]

- Modern agriculture requires a significant amount of nutrients (Nitrogen and Phosphorus) from fertilizers to maximize yields in order to remain commercially competitive
- Studies have shown that only around 20% of applied nutrients are absorbed by crops with the remaining nutrients usually leaching into ground water. This nutrient runoff from agriculture is a major contributor of nutrient pollution.
- Nutrient pollution in fresh water lakes cause large algae blooms and oxygen depletion. The negative environmental and social effects are felt directly by aquaculture, as well as the fishery- and tourism industries
- Lake Winnipeg, the 10th largest fresh water lake in the world, is an example of a water resource severely affected by nutrient pollution, also referred to as a dead zone.
- It is estimated that agriculture has contributed to roughly 400 of these dead zones in our lakes and oceans worldwide
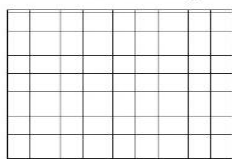
Solution: Using Precision Agriculture to reduce row-crop farming inputs – fertilizer and pesticides

**Traditional Mgt.** → **Precision Mgt.**

40-160+ Acres → 1/10-1/100 Acre

Precision Agriculture simply defined as "farming by the square foot". While traditional agriculture methods apply the same amount of water, fertilizer and pesticides uniformly throughout the farm, using precision agriculture methods, each square foot of the farm is given the precise amount of fertilizers, pesticides and water needed.

(1) **Mapping**: with sensors (i) Visual; (ii) Multispectral; (iii) Thermal; and (iv) LIDAR.
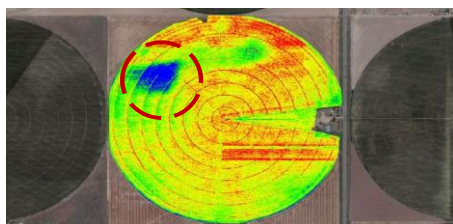
(2) **Analytics**: E.g. Blue areas show low vegetable health and a problem in the field. Red areas show highest vegetation index values, indicating healthy, vigorous growing crops.

(3) **Application**: using the data gathered, apply fertilizer/pesticide/water with precision using the "square foot farming" techniques. Gathered data can be used with 1 cm/pixel precision.

Small Scale Adoption Challenges:

- Demographics: The average age of farmers are increasing. Older farmers are generally not open to new technologies and techniques – threats to traditional ways
- Cost/Time: Farmers are apprehensive about the possible costs and time commitment without a guarantee of success.
- Analytics: Individual farmers feel overwhelmed by the data being generated and are unsure of how to interpret and utilize it.

Fund Size	$100mm
Total Acreage	60,000
Targeted ROE	10 - 13%
Average Cost	$1,500/acre
Lease Rates	$70-100/acre
Management Fees	1%
Cash Return	3 - 6%

**Prairie Lake Real Estate Investment Trust**

The Fund will aim to mitigate environmental damage in Lake Winnipeg caused by excessive fertilizer use in Manitoban row-crop farming.

- The REIT will purchase fertilizer intensive farmland and incentivize farm operators to implement precision agriculture techniques by charging reduced lease rates when farmers decrease their fertilizer use on a per acre basis.
- Our goal is to have these lease rate reductions subsidized under the Growing Forward Agri Innovation program from the Canadian Government.
- By forming close relationships with Precision Agriculture companies, the portfolio farms will also act as an incubator and Beta-testing facility for companies testing new technologies and equipment.

This structure aligns a wide array of stakeholders to focus on one problem – nutrient pollution in our water sources. Every owner, operator, Precision Agriculture expert, and government official will act as drivers behind the technology, accelerating its adoption and overcoming the small scale adoption challenges.

Case Study – Lake Winnipeg Watershed
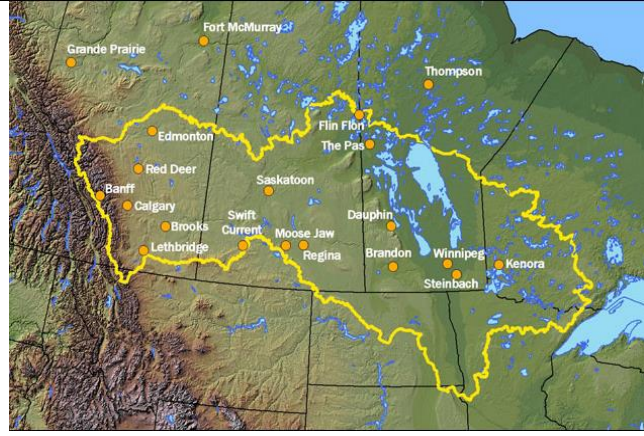
The Lake Winnipeg watershed in the province of Manitoba, Canada, drains 90% of the prairie agricultural land and spans 1 million square kilometres. It is the second largest watershed in Canada and the tenth biggest fresh water lake in the world. In the last 30 years the lake has experienced high levels of phosphorus and nitrogen run off. As a result, there has been excessive algae bloom in the lake impacting 5.5 million people, businesses, and wildlife that rely on it. In 2013, Lake Winnipeg was voted the world's most threatened lake.[2]

Social and Economic Impact: The lake will continue to be able to support a $100 million annual tourism industry and $25 million annual fisheries industry. Furthermore, input costs to farmers will decline with lower fertilizer and pesticide use, economically benefitting the farmer.

Environmental Impact: Precision agriculture will ensure exact soil nutrient content, reducing the amount of runoff. As a result, the surrounding ecosystem will continue to provide natural habitats and healthy bacterial levels safe for both animals and humans.

Source: https://www.iisd.org/wic/lake_wpg_basin.asp
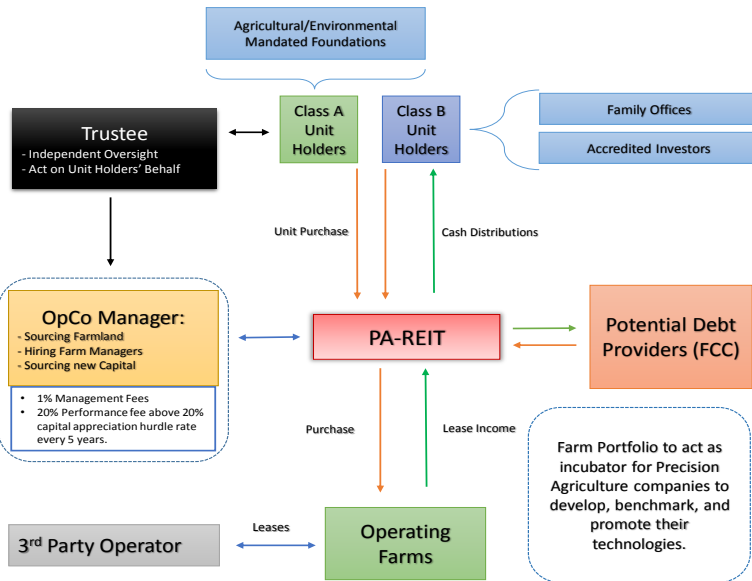
Sources of Return

Prairie Lake Real Estate Investment Trust

Investment Rationale: (i) Multiple sources of returns – returns obtained through farm lease income (decreases when farmers meaningfully reduce fertilizer use) and appreciation in value of land; (ii) Superior risk adjusted returns − since 1994, investment in farmland has *lower volatility* than nearly every other asset class and offers a *higher return* than S&P 500, gold and commodities[5]; (iii) Inflation protection – investment in land protects investor against inflation; (iv) Diversification – historically farmland values show low correlations to stocks and bonds; (v) The REIT will provide smaller investors with exposure to a high-yielding real asset that is usually only available to sophisticated, active investors in the agriculture space; (vi) Potential to increase returns by using leverage provided by Farm Credit Canada

Scalability: Dead zones are caused by a lack of oxygen in water due to nutrient pollution which is a direct effect of fertilizer run-off. These dead zones occur in major waterways and oceans. Lake Eerie and parts of the St Lawrence River are other Canadian examples. However, this is a worldwide problem which is prevalent in most large agriculture societies. Specific cases of nutrient pollution include:

- Iowa, Des Moines region
- Coastal Regions in the Mexican Gulf
- Mississippi Basin
- Murray River, Australia
- Wuxi, China – Lake Taihu ($1.8B cleanup cost, 2007)
- Lake Victoria, Kenya

Our fund model is applicable in most of these regions to provide environmental and economic benefits to all stakeholders. The most important consideration would be to adhere to foreign ownership restrictions and take advantage of tax and environmental incentives.

Targeted investors include:
  (i) Family Offices
  (ii) Accredited Investors
  (iii) Foundations and Endowments who are mandated to invest in agriculture or sustainability focused ventures (Catalytic capital)

Sources: (1) http://www.economist.com/news/finance-and-economics/21637379-hardy-investors-are-seeking-way-grow-their-money-barbarians-farm-gate; (2) http://www.livinglakes.ca/news/lake-winnipeg-named-2013-worlds-most-threatened-lake/; (3) Mission Critical, May 2014 Issue no. 2 at p. 11. (4) http: // www.europarl.europa.eu/RegData/etudes/note/join/2014/529049/IPOL-AGRI_NT%282014%29529049_EN.pdf (5) The Economist (infra)

Risk Management

(i) Maintaining REIT Status – *Risk:* Canadian REITs have to meet specific thresholds to continue claiming REIT status. Private REITS have to be open-ended and capital flight is a major risk. *Mitigation:* Ensure that over 90% of revenues are derived from immovable real assets. Maintain a minimum of 150 unit holders. Introduce a lock-up period for initial investors to avoid capital flight. Continually market the fund to attract new capital to satisfy redemptions after the lock-up.

(ii) Manitoba Farmland Ownership Restrictions – *Risk:* Manitoba has strict ownership restrictions that the fund must adhere to. Be a private, 100% Canadian owned fund. *Mitigation:* Ensure 100% Canadian ownership for the Manitoba fund by marketing only to accredited investors.

(iii) Market Illiquidity/ Price Discovery – *Risk:* Values of farm can be difficult to assess and a market for sale of farms may not develop. *Mitigation:* Assemble and manage a competitive farm portfolio that would attract a premium compared to the surrounding market.

(iv) Legal and Regulatory – *Risk:* UAVs specifically are new technologies and there is risk that government regulations could make operations of UAVs cumbersome or put outright restrictions on the commercial use of UAVs (e.g. U.S.). Some of the Canadian provinces have restrictions on ownership of farms (e.g. restrictions against institutional or foreign ownership) *Mitigation*: Legal and regulatory review of laws related to ownership of farms and operation of UAVs. Funds will be diverted to jurisdictions with favourable legal and regulatory regimes.