Harvested Biomass Buffers on Crop Lands

Charles Lalonde

Jake DeBruyn

March 21, 2023

Background

- **Goal: how do we get more buffers to reduce phosphorous runoff to water? Can we stack revenue from biomass harvest + environmental benefits to drive buffer adoption? And, current funding requires demonstration of GHG benefits.**

- Build on considerable research done on Switchgrass
  - Production
  - Agronomy
  - Ecological Benefits
    - Carbon sequestration & GHG reduction
    - Habitat
    - Nutrient removal
- Environment and Climate Change Canada (ECCC) funded project to investigate and evaluate the opportunity.
  - Preliminary results presented here for discussion – not approved by ECCC.

What's New Here?

Existing approach:

- Mixed grass buffers on marginal land, retire land from productive agriculture, limit use of any harvest; or
- Narrow buffer strips down by the water with little economic incentive to manage.

New approach:

- Establish many similar larger buffers in a watershed to create critical mass with similar crop and environmental conditions
- Grow a dedicated switchgrass crop with marketable value
- Big enough buffer zones that it's worth showing up and harvesting and monetizing environmental benefits
- Pursue multiple revenue streams to replace existing field crops revenue
  - Biomass harvest and sale
  - Grassland bird habitat (since switchgrass field activities occur outside of bird nesting season)
  - Soil carbon sale, and possible N-use reduction GHG credit (compared to grain crops)
  - Phosphorous and top soil loss reductions in targeted watersheds (e.g. Lake Erie)

Parameters of Proposed Pilot Program

- Propose to run a Pilot Program:
  - 10 farms for a 5 year period
  - Pilot is needed to prove the concept and show the costs and revenue
- Target is grain grower lands
  - Fit within farm interests to install buffers, but address the practical challenges that limit grain farmer buffer adoption
- Likely 10 acres per farm
  - Big enough to be worth showing up to harvest, big enough to quantify benefits
- Centralized coordination for switchgrass establishment – seed selection to support mid-Sept –October harvest
- Giving the farmer (or their custom operator) the opportunity to do the activities they want (nutrients, baling, marketing) keeps overhead low
- Centralized coordination of biomass sale through OBPC, or farmer can find their own local market/end use

Environmental Benefits

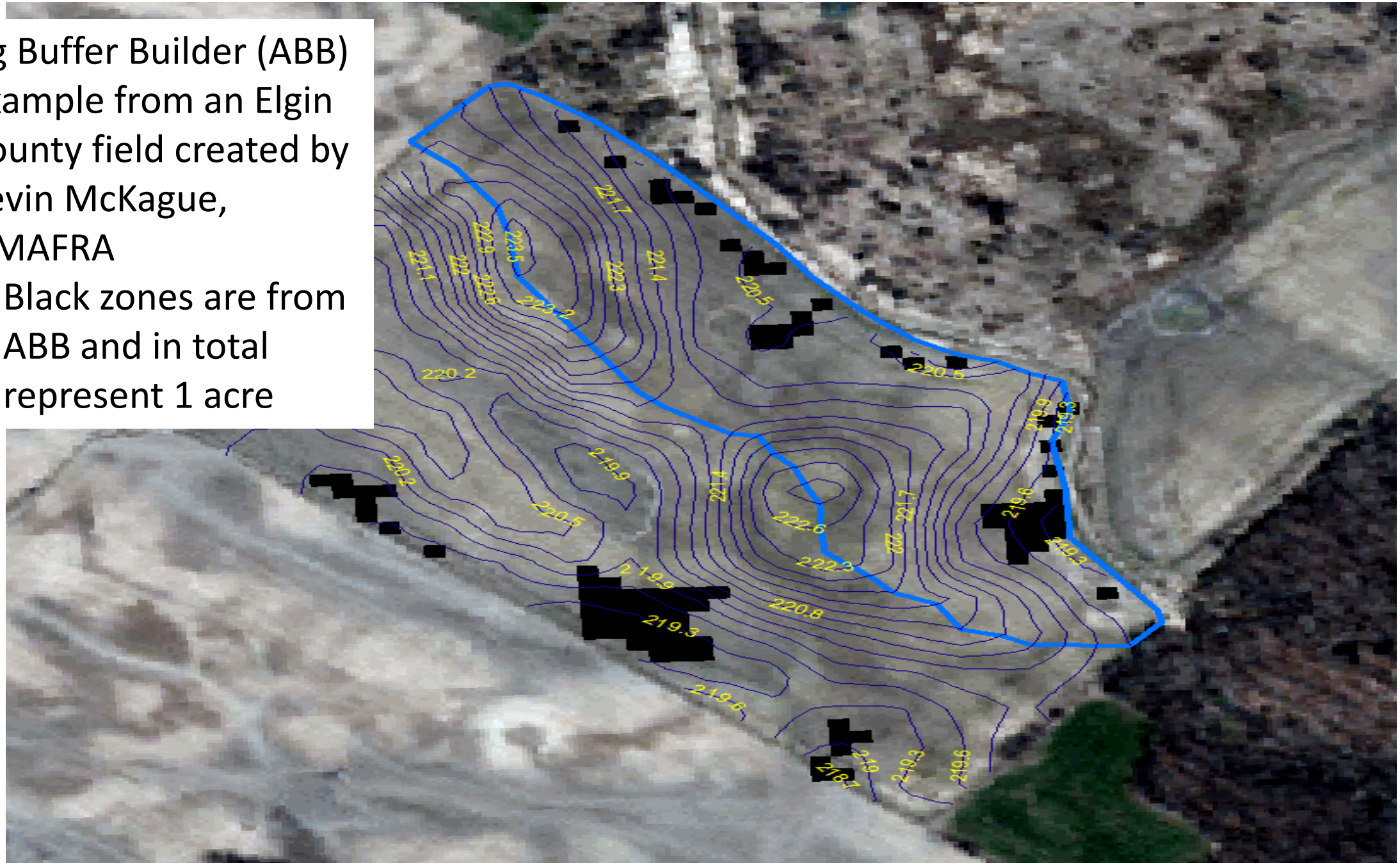
- Soil Carbon Benefit
  - Might be through soil service vendor who provides annual payments for establishment and maintenance of perennial biomass
  - Might be through creating a credit by following a Grassland GHG Protocol
  - Might be through “Scope 3” credits where a big GHG emitter like an ethanol plant seeks GHG reductions in their value chain
  - All of these require soil sampling, documentation, paper trail.
- Sale of carbon credits is possible and tied to landowners
  - Sale of GHG emissions reduction requires more work
- Grassland Bird Benefit
  - Possible payments similar to ‘delayed haying’. If the field is a productive ag field, and the farm might rotate back into grains at the end of the period, then any establishment and maintenance of habitat is an additional benefit.
  - Caution to ensure that, like haying, the on-going agricultural use of that field is not jeopardized.

Buffer Placement for Sediment & Phosphorous Loss Reduction

- The Ag Buffer Builder (ABB) is a GPS tool for locating buffers
  - Identifies parts of the field at highest risk for P loss and top soil loss
  - Complex to use, OMAFRA can assist during pilot program.
  - ABB can be used with other Nutrient Management tools
    - AgMap for dimensions, sediment loss estimate
    - PLATO (Phosphorus Loss Assessment Tool for Ontario) under AgriSuite
  - Buffer design has a 75% efficacy rating

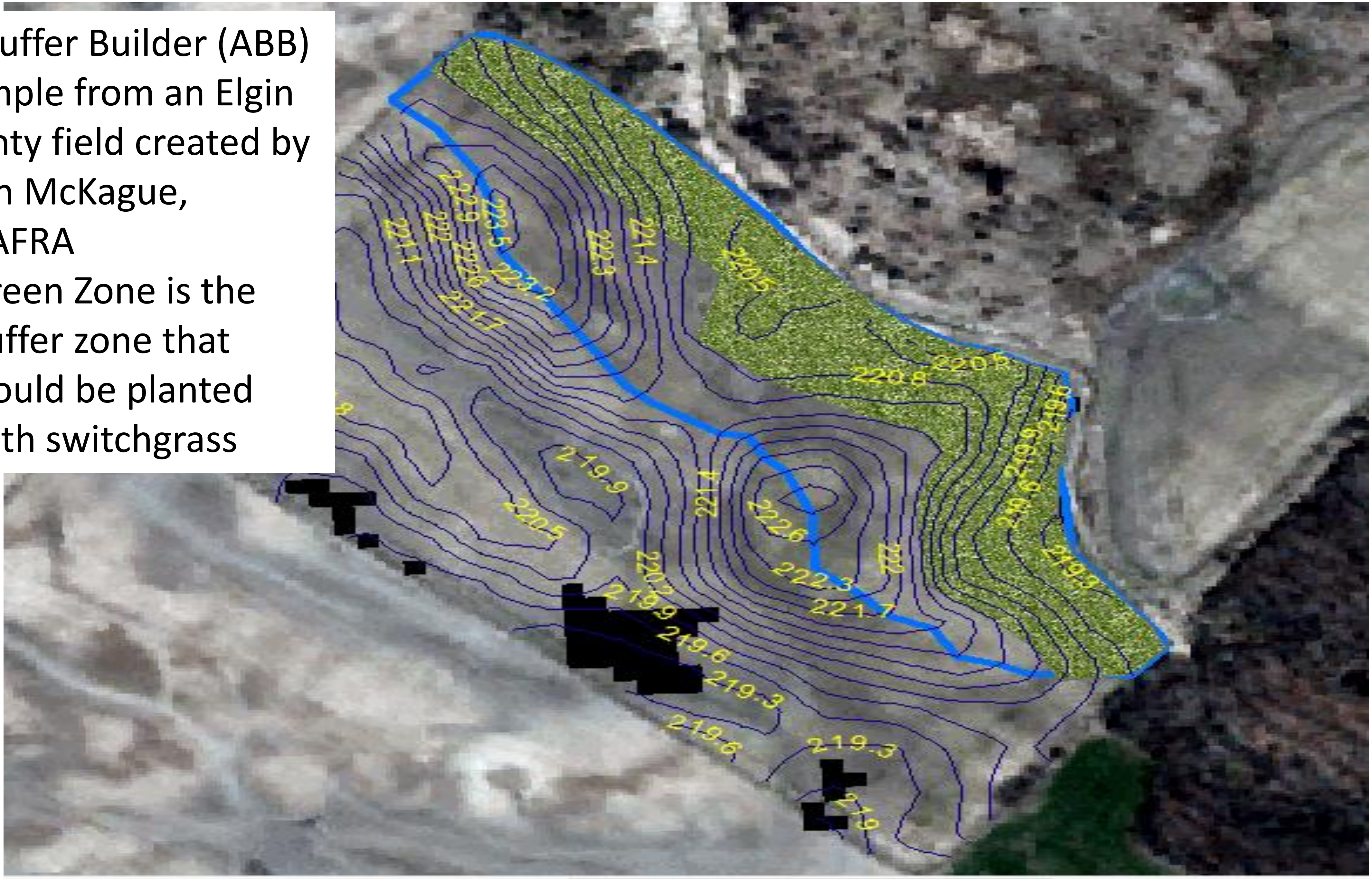
Ag Buffer Builder (ABB) example from an Elgin County field created by Kevin McKague, OMAFRA

- Black zones are from ABB and in total represent 1 acre



Ag Buffer Builder (ABB) example from an Elgin County field created by Kevin McKague, OMAFRA

- Green Zone is the buffer zone that would be planted with switchgrass



Outcomes of Report

- Inform program design for incentives
  - Demonstration of economic value for this approach
  - Can breakeven at 5 tonnes of switchgrass sales per acre and cover land opportunity cost
    - Minimum at $0.07- $0.08/lb? to be competitive with grain markets
  - Incentives
    - Establishment year and 2nd year
    - Replaces net margin shortcomings
- Administrator selection is a question to government
  - Program needs organizational support from set-up to final report (6 years)

Summary:
Harvested Biomass Buffers on Crop Lands

- There is a possible pathway for new revenue-generating buffers.
- Switchgrass's environmental benefits and habitat capacity are well-supported by research.
- Achieving yield at a guaranteed price will be essential to convince grain growers to adopt buffers.
- Getting the right organization in the 'Administrator' role will be important to support the paper trail needed to successfully launch this approach across Ontario.

- Questions and Discussion.