Public Meeting
Lake Champlain Science Advisory Group

Saint Albans Historical Society

Saint Albans, Vermont, November 21 2019

700-900 PM

Objectives of the meeting

- Share information about the study
- Seek your input on the draft study report
- Allow you to talk with technical experts
- Allow you to ask questions and share your views
- Written comments to:

https://ijc.org/en/lclm/

Or by e-mail to : lclm@ottawa.ijc.org

until Saturday December 14, 2019

Agenda for Tonight's Meeting

- First Hour – Presentation of the Study and Recommendations
- Second Hour – Public Comment
  - We listen to your comments and points of view
  - Record Comments
  - Answer Questions

Please hold questions until the end
Your question may be answered during the presentation!

Acknowledgements

Advisory Group (CSAG)

Sébastien Bourget – MELCC
Gerardo Gollo Gil - MAPAQ
Simon Lajeunesse – MRC Br.-Miss.
Aubert Michaud – IRDA
Nathalie Provost – MELCC
Pierre Leduc – OBVBM - Président
Ryan Davies – Clinton Cty.
Laura DiPietro – VT AAFM
Fred Dunlap – NY DEC
Neil Kamman – VT DEC
Andrew Schroth - UVM
Angela Shambaugh – VT DEC
Eric Perkins – EPA - Chair

Research and Writing

OBVBM
Johanne Bérubé
Frédéric Chouinard
Martin Mimeault

COLLABORATORS
Stéfanos Bitzakidis
Sébastien Bourget
Mikael Guillou
Simon Lajeunesse
Aubert Michaud
Claire Michaud

LCBP
Eric Howe
Ellen Kujawa

NEIWPCC
Jane Ceraso
James Plummer
Christina Stringer

Other Collaborators

Marc Simoneau

Lauren Jenness
Meg Modley
Matthew Vaughan
Elizabeth Lee
+24 TAC members

Lori Fisher
Kent Henderson
Marty Illick
Carrie Johnson

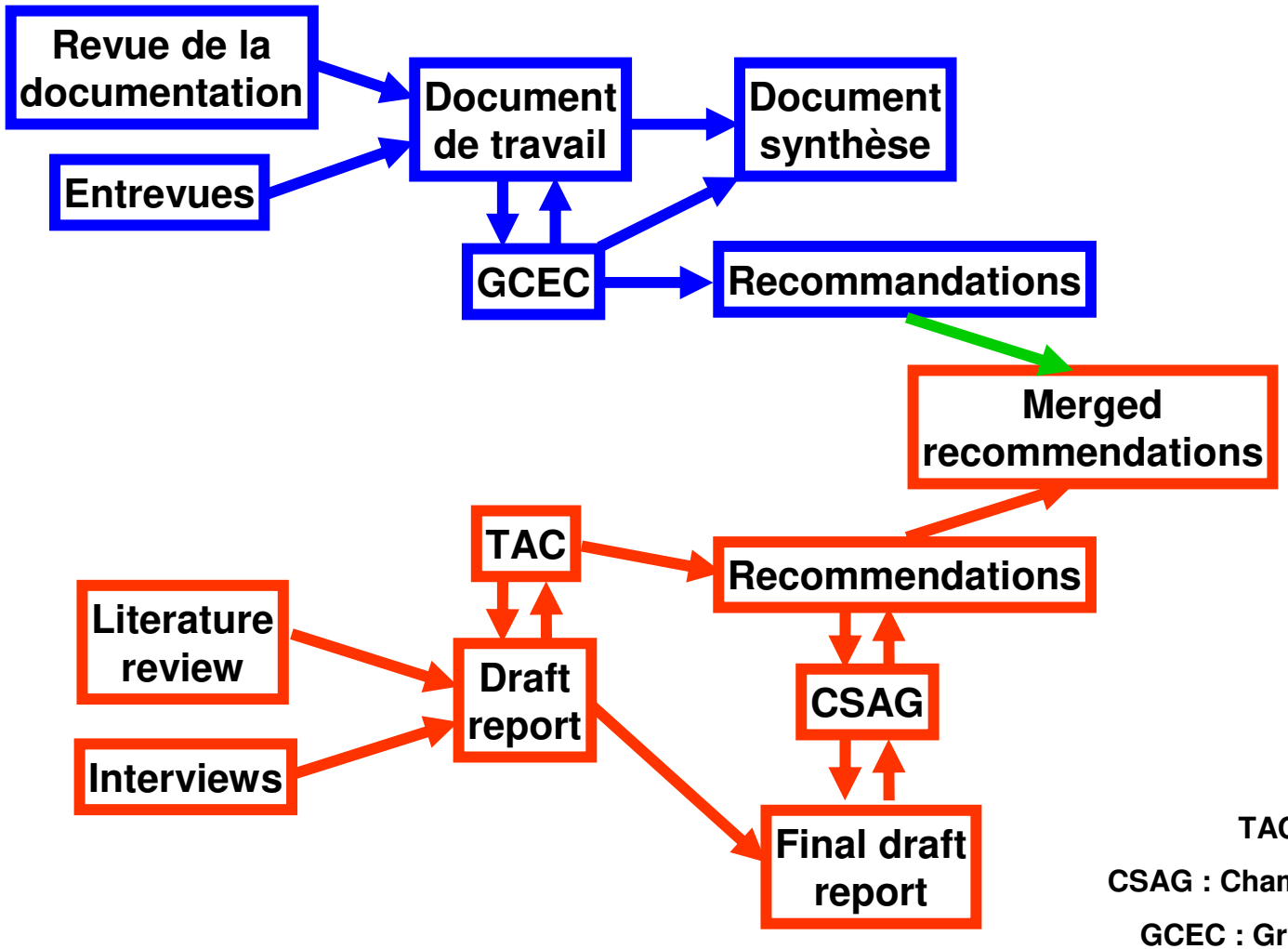
…and the team at the International Joint Commission

How did we get here (US Study)

TAC : Technical Advisory Group

CSAG : Champlain Study Advisory Group

How did we get here (US+Québec)

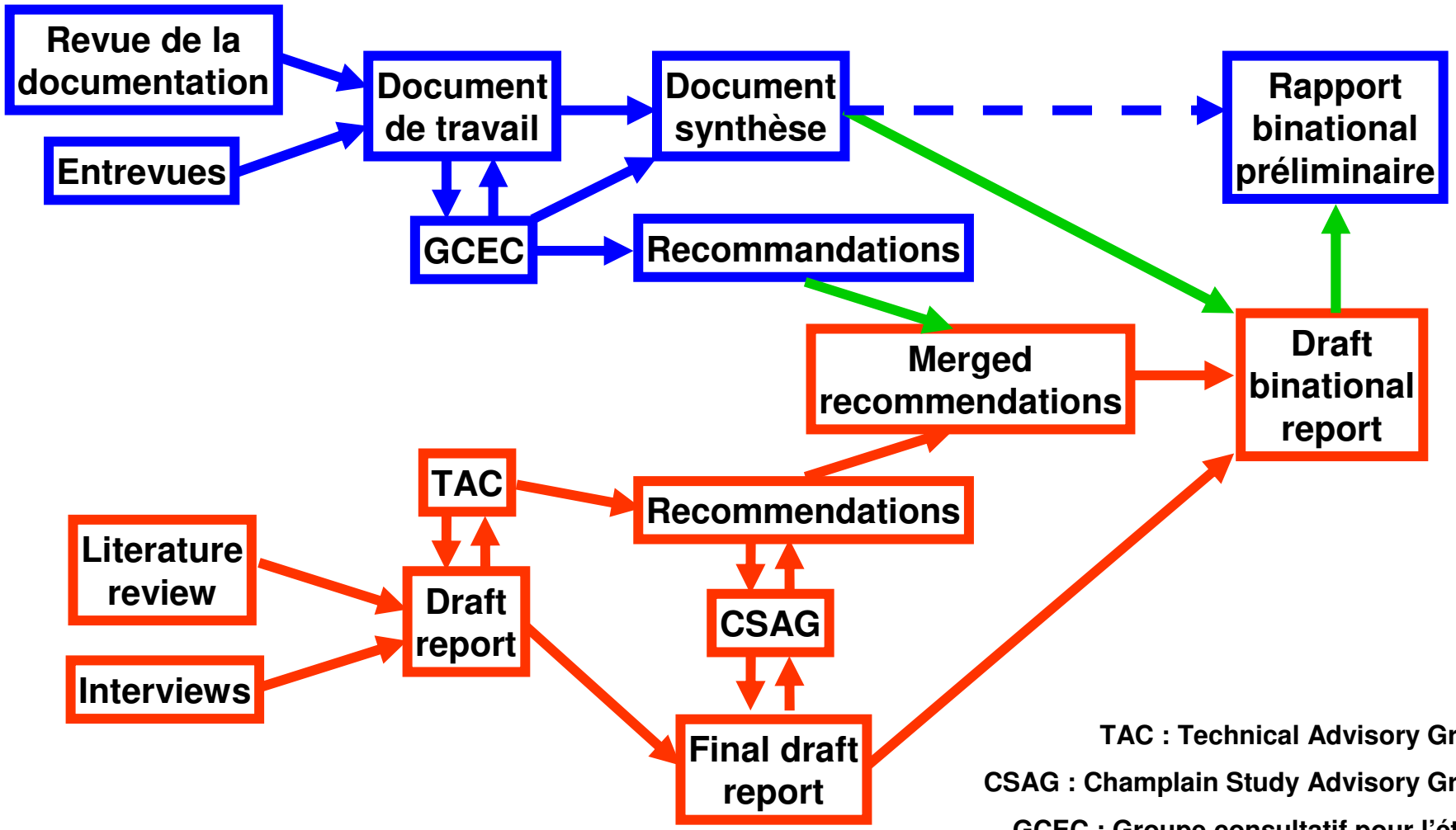


TAC : Technical Advisory Group

CSAG : Champlain Study Advisory Group

GCEC : Groupe consultatif pour l'étude sur le lac Champlain

How did we get here (Bi-national Report)



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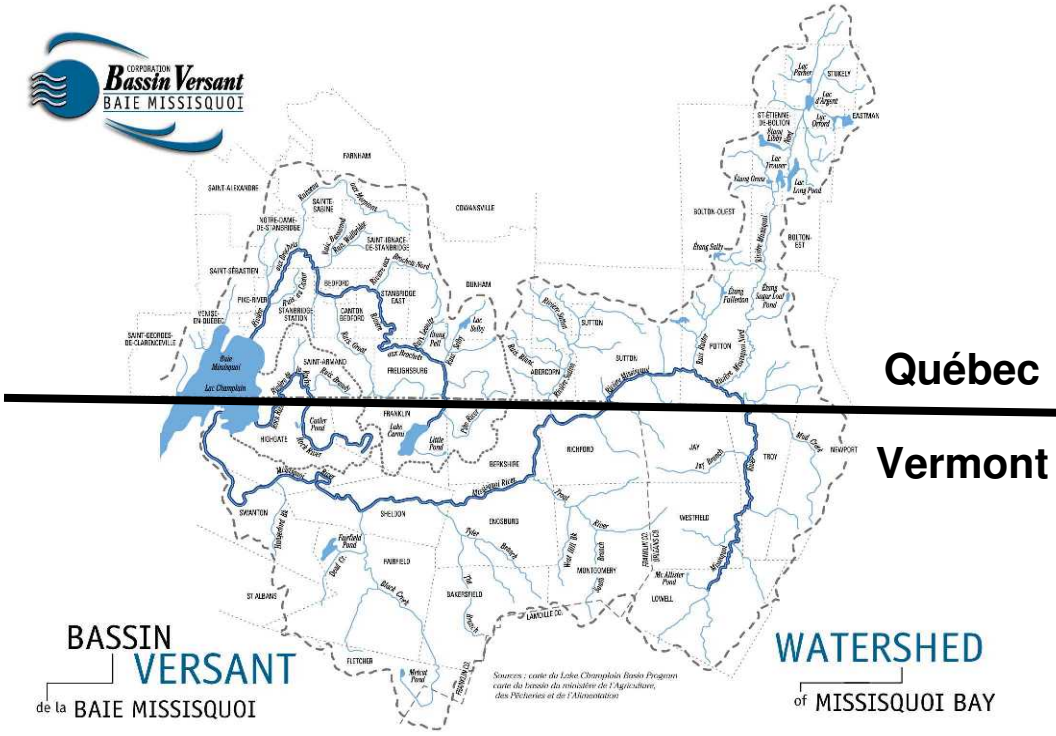
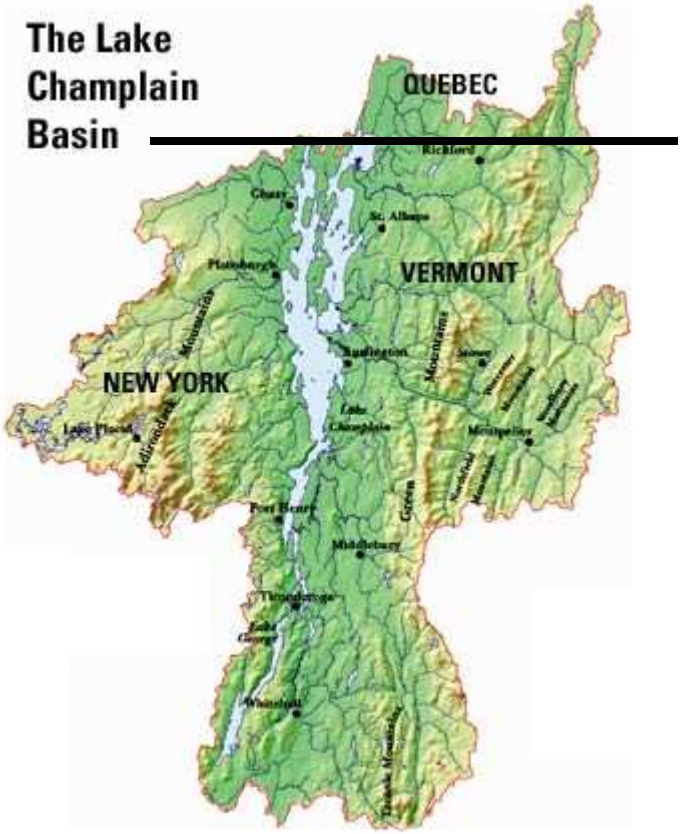
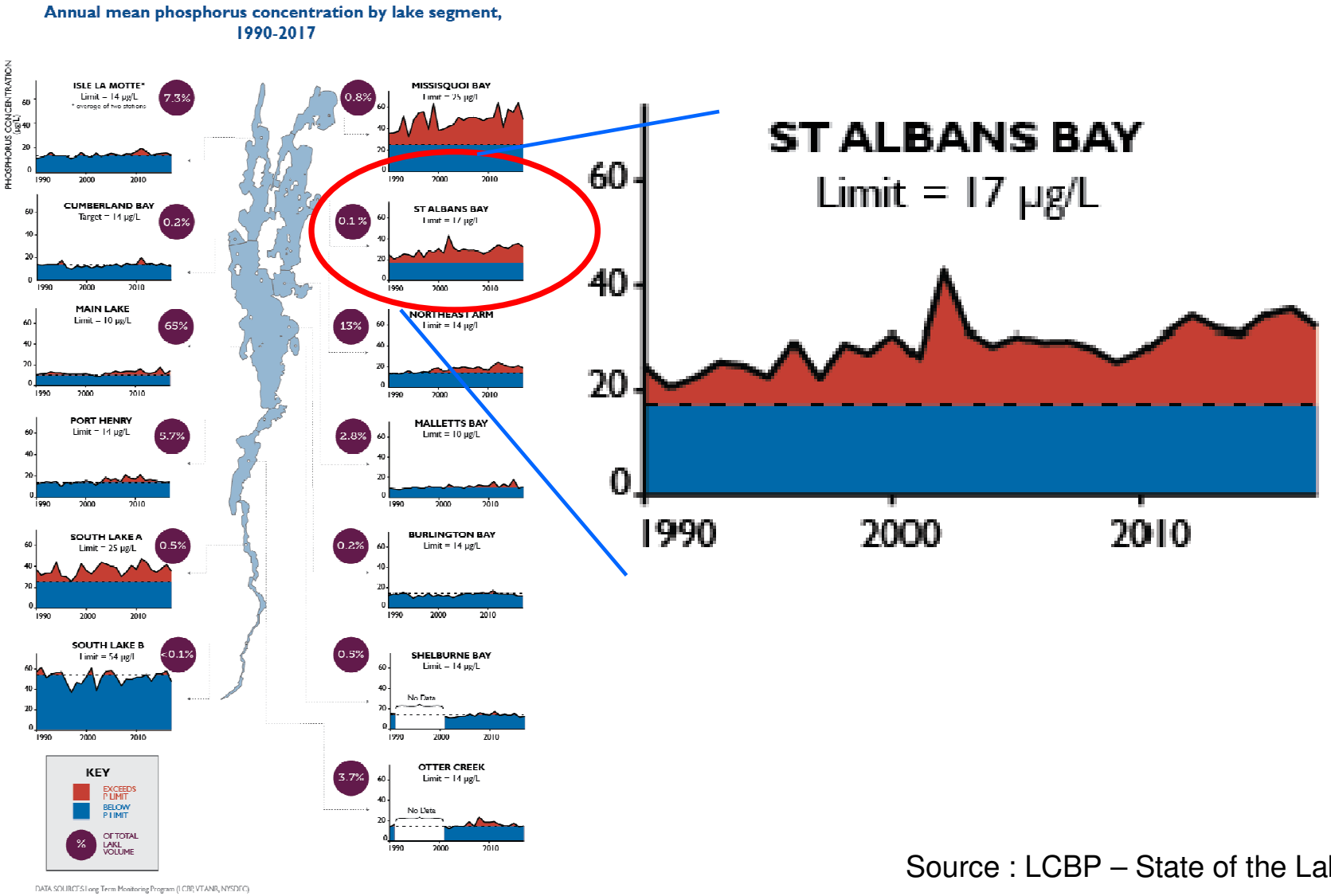
The Missisquoi Basin

		Missisquoi Bay	Lake Champlain
• Area (basin)	15 %	1,200 miles²	8,234 miles²
• Area (water)	7%	30 miles²	
• Average Depth		10 feet	65 feet
• Volume of water	0.8 %		
• Phosphorus load	24 %		



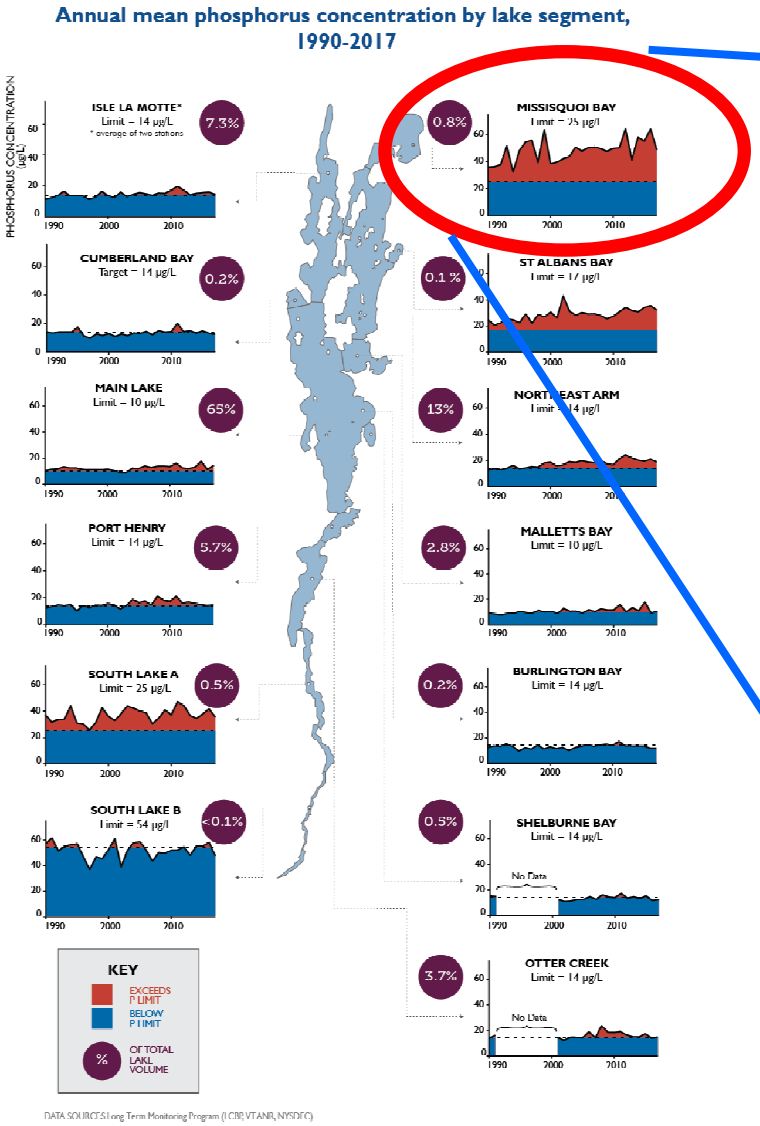


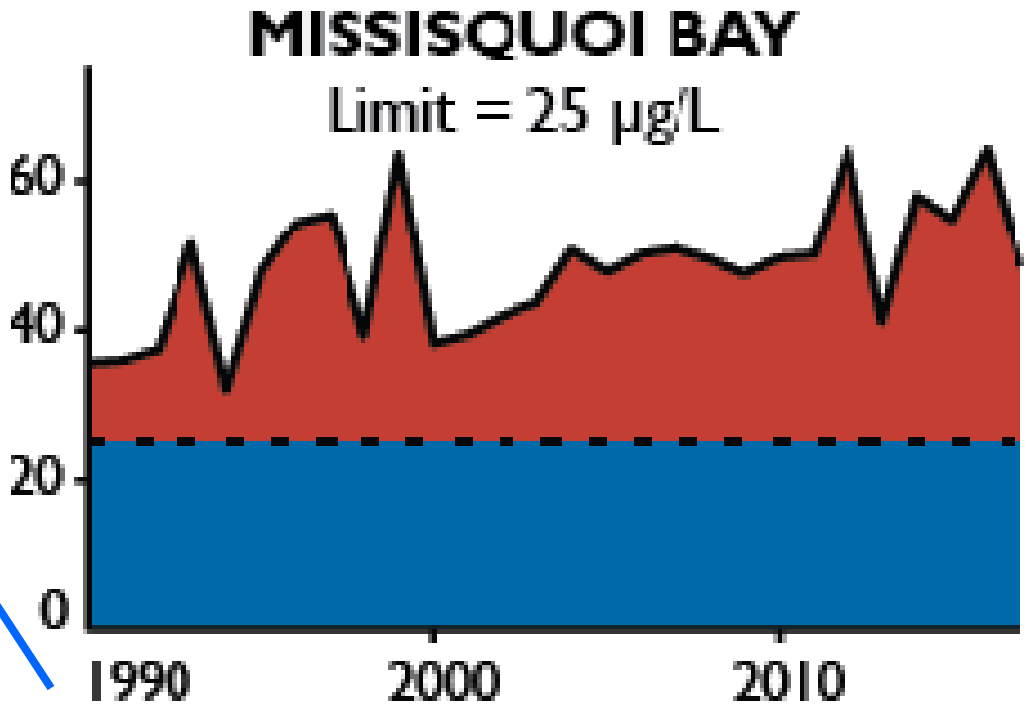
Phosphorus Concentrations



Source : LCBP – State of the Lake 2018

Phosphorus Concentrations

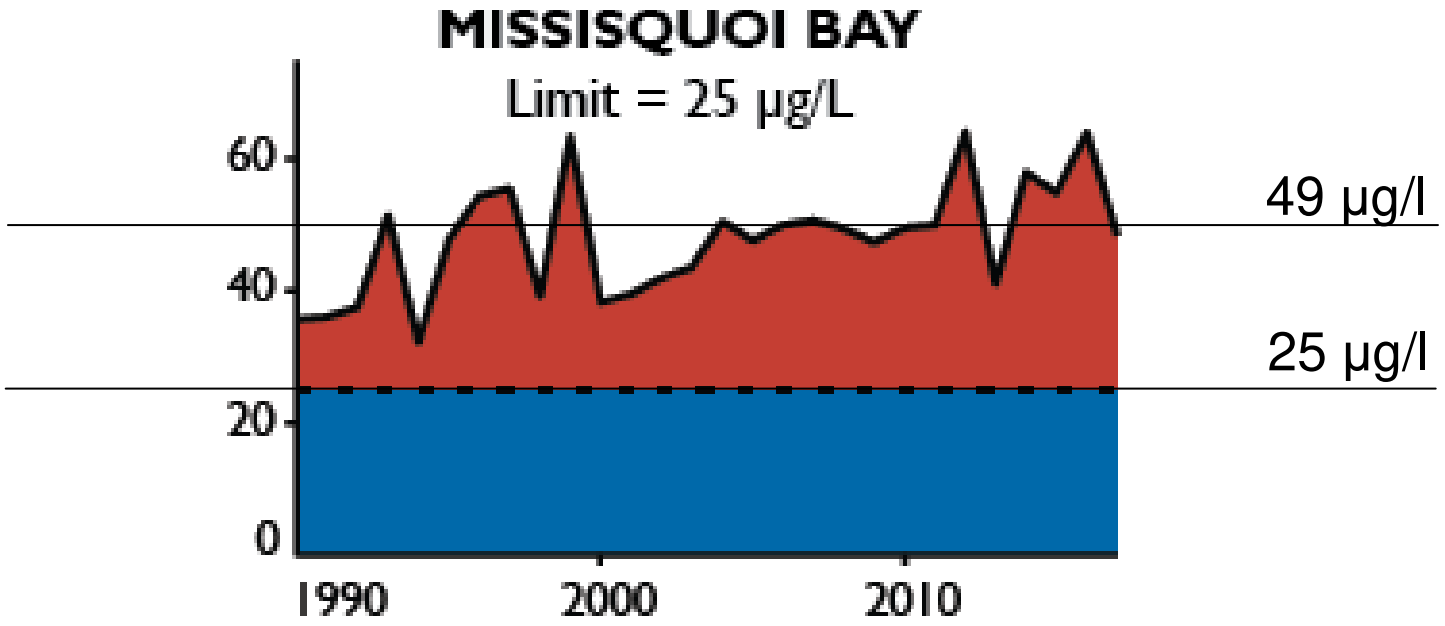




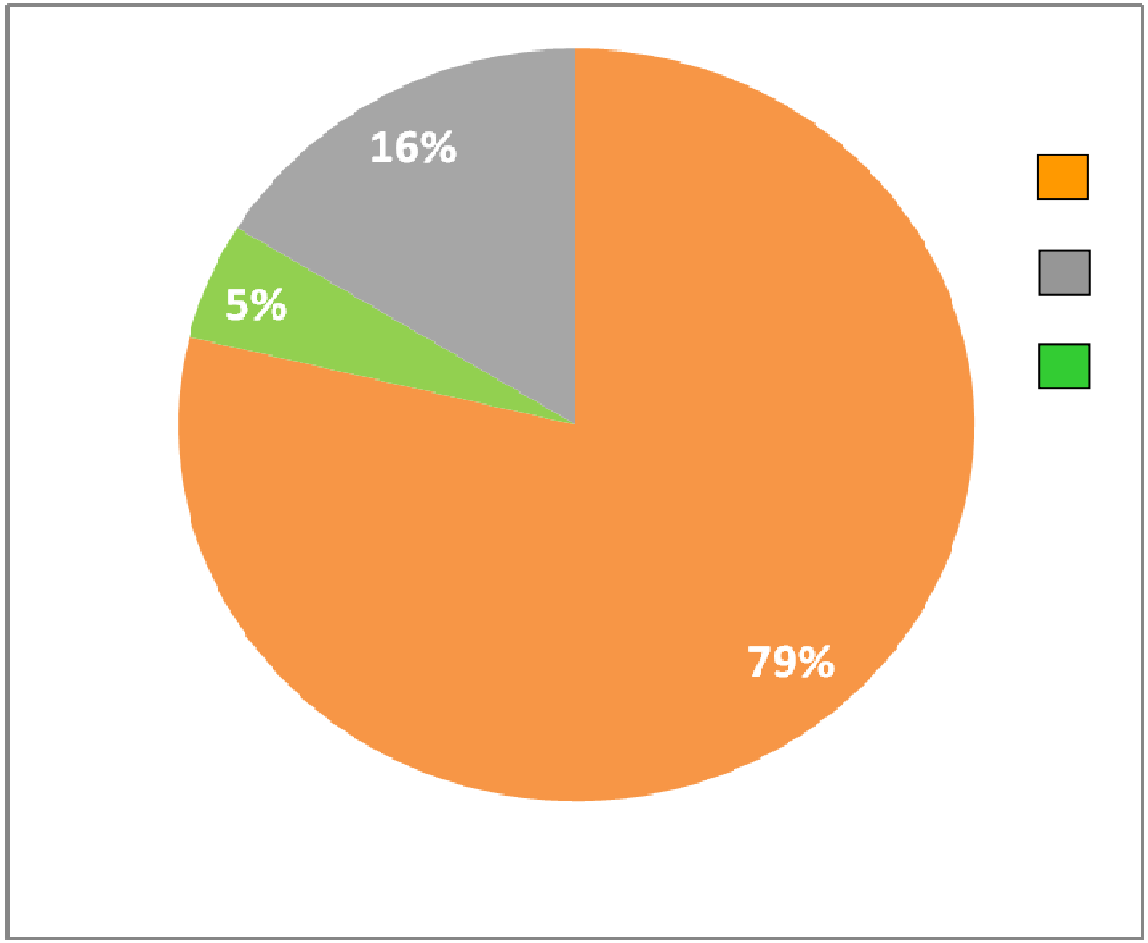
Source : LCBP – State of the Lake 2018

Phosphorus concentration in Missisquoi bay

Between 1992 and 2017, mean annual concentration of phosphorus in Missisquoi bay has been 49 µg/l, generating many problems such has massive Blue-green algae blooms with impacts on drinking water supply and touristic and economic activities in the region.

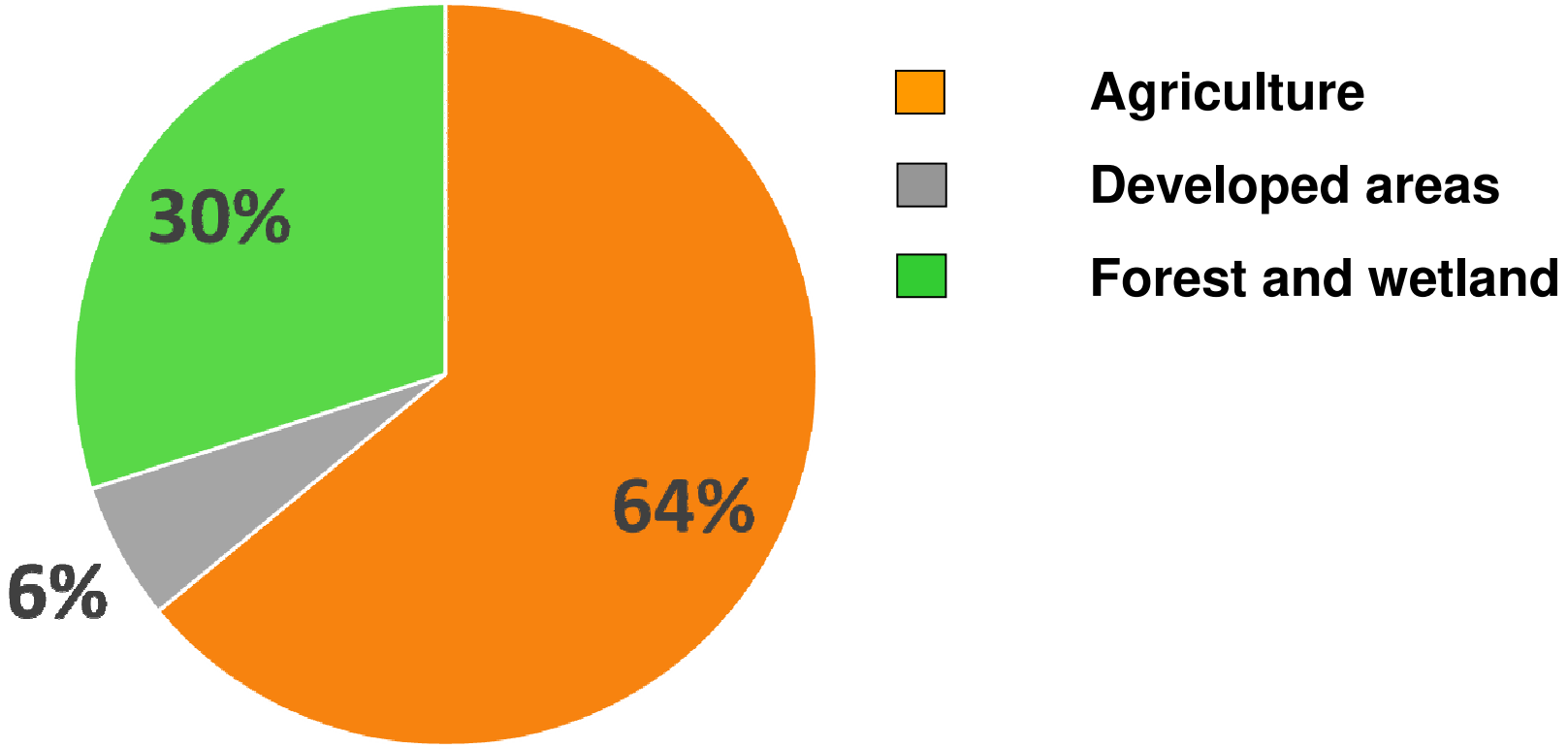


Phosphorus sources by land use - Québec



Not surprising – these are fertile grounds that are good for farming!

Phosphorus sources by land use - Vermont



Data from Stone Environmental, 2011

Not surprising – these are fertile grounds that are good for farming!

Load Reductions Required to Achieve Goals

EPA	TMDL 2002	TMDL 2016
Vermont	42%	64%
Quebec	41%	55%
Total	42%	61%

Sources : Hegman et coll., 1999, TetraTech, 2015

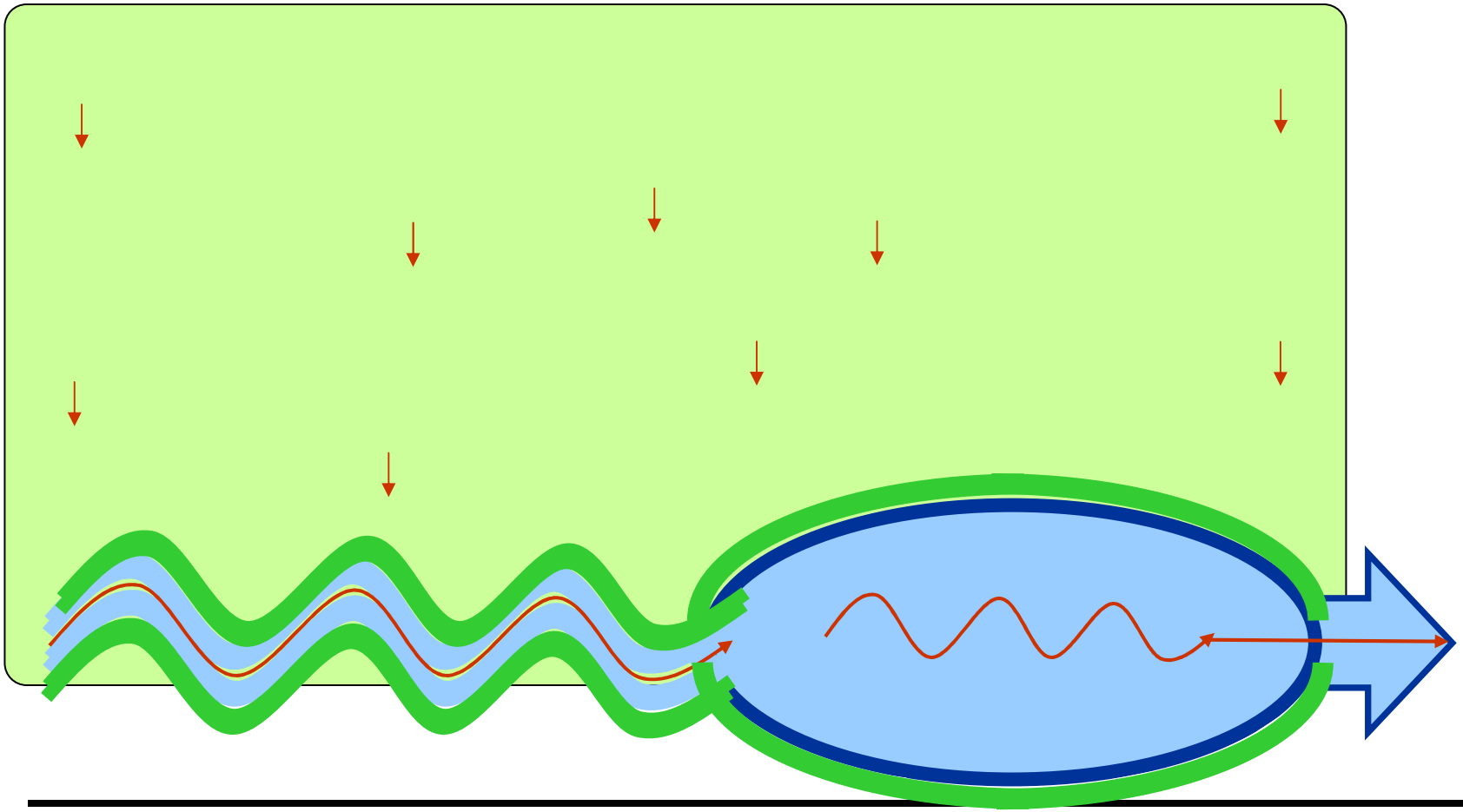
Too much phosphorus

Creates public health problems

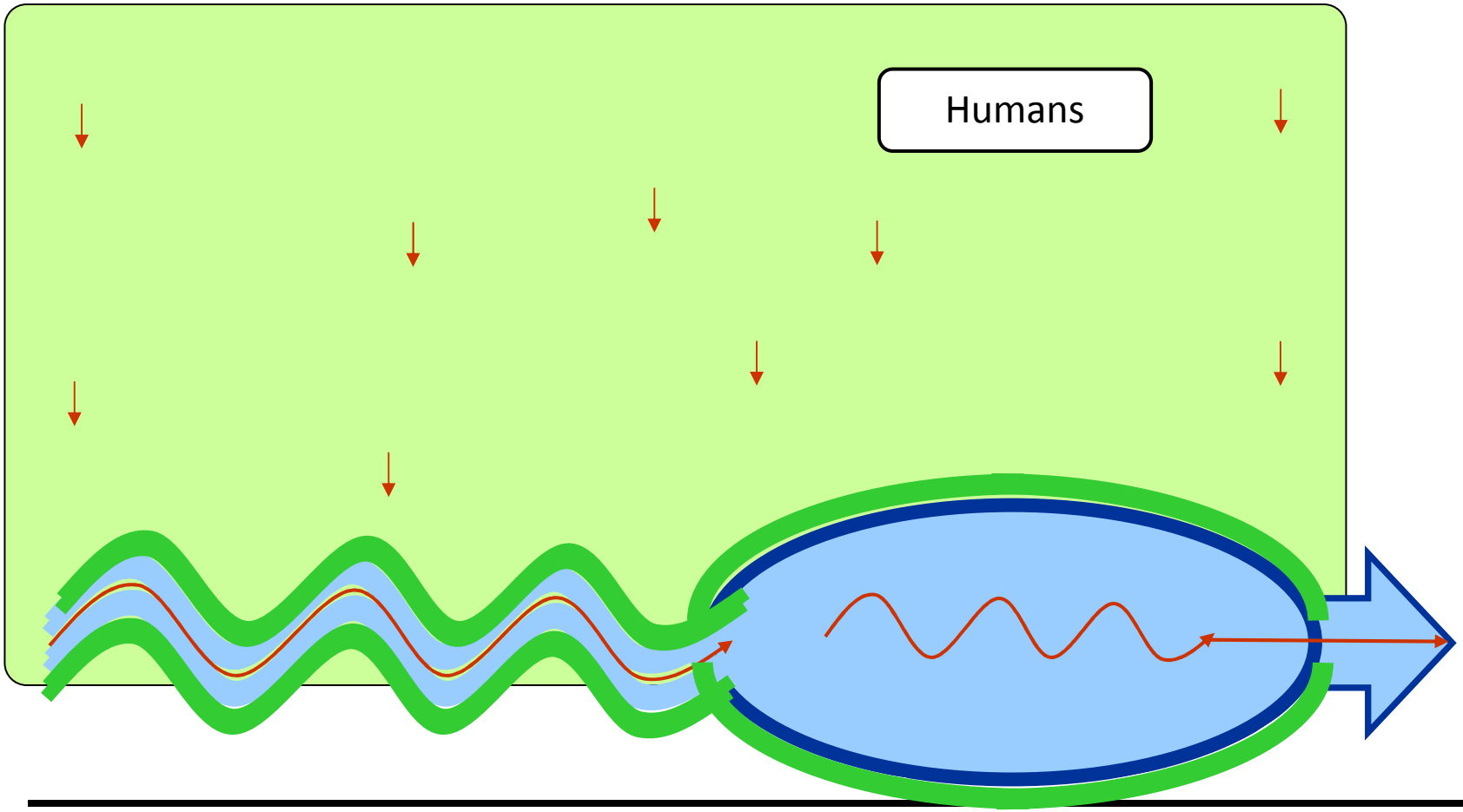
Philipsburg – 5 August 2018

Venise-en-Québec - 28 August 2018

Watershed Model



Watershed Model



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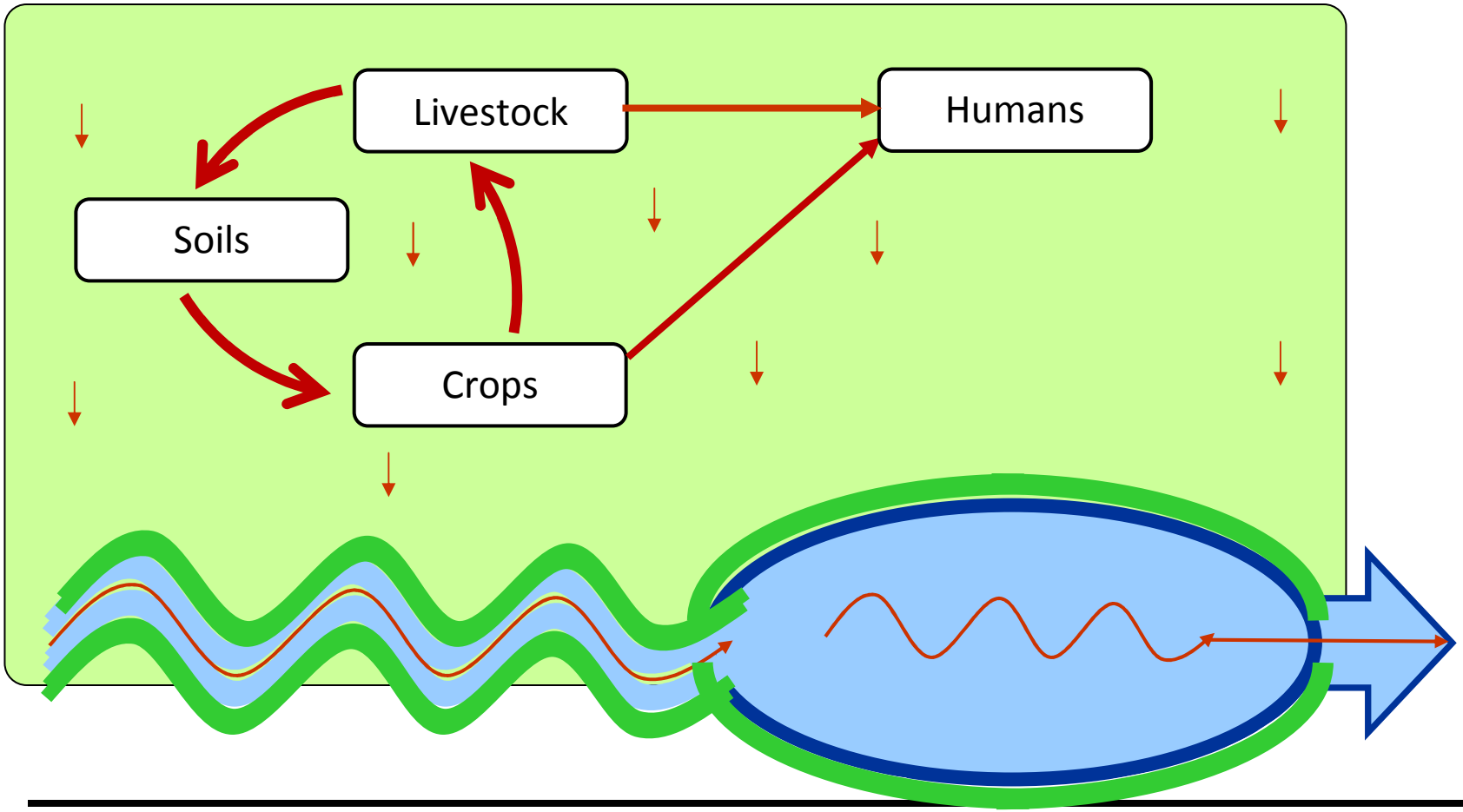
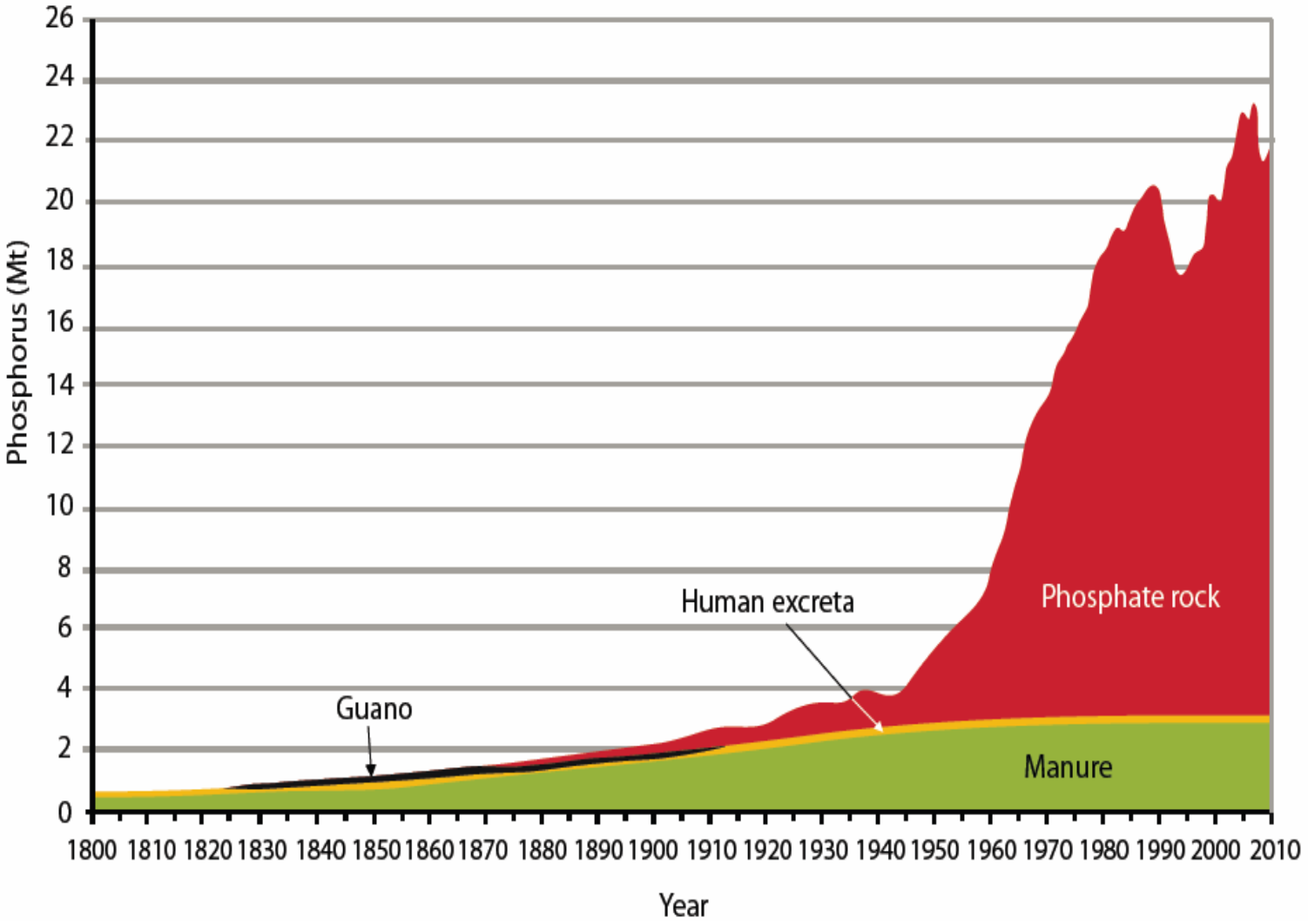


Introduction of phosphate rock



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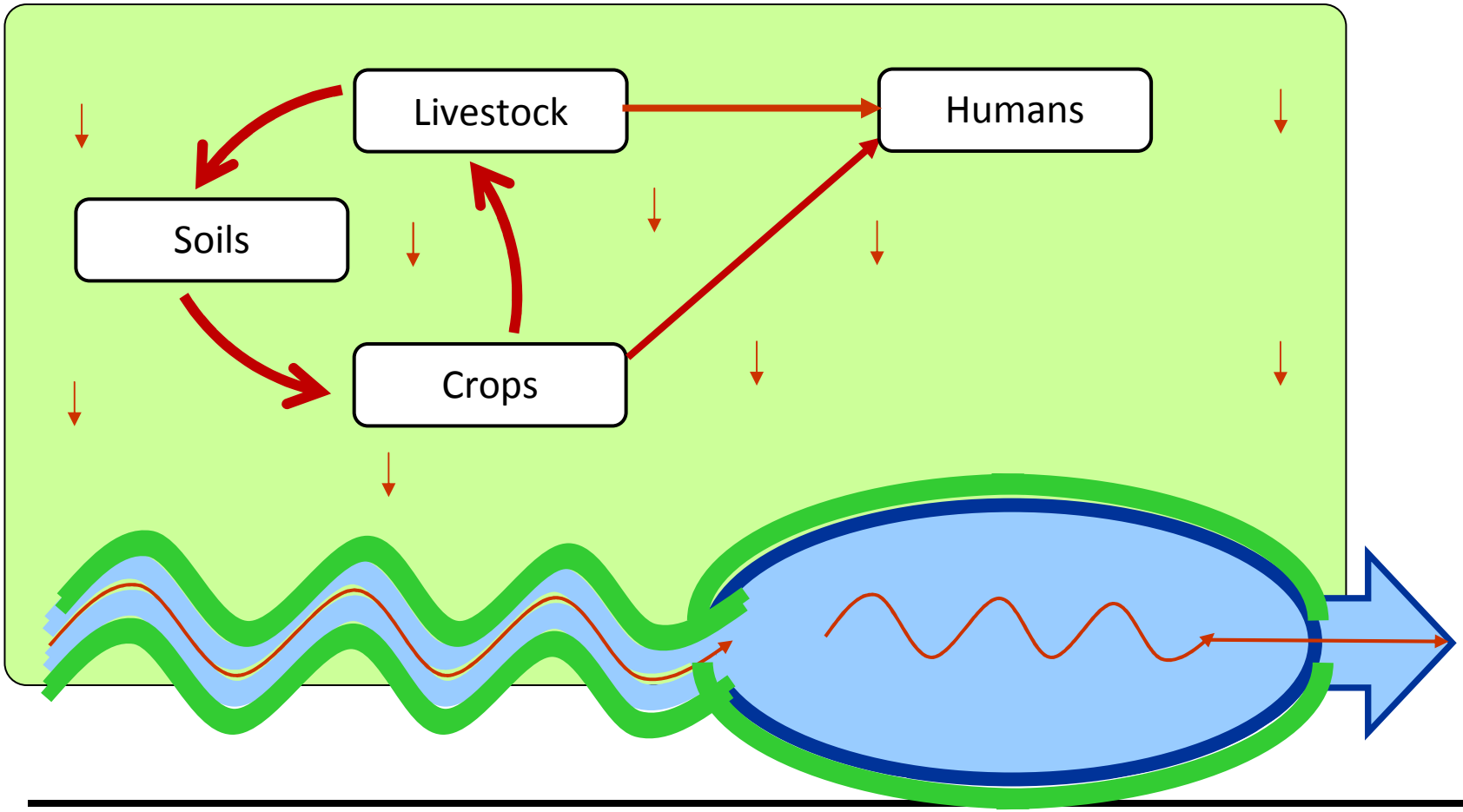

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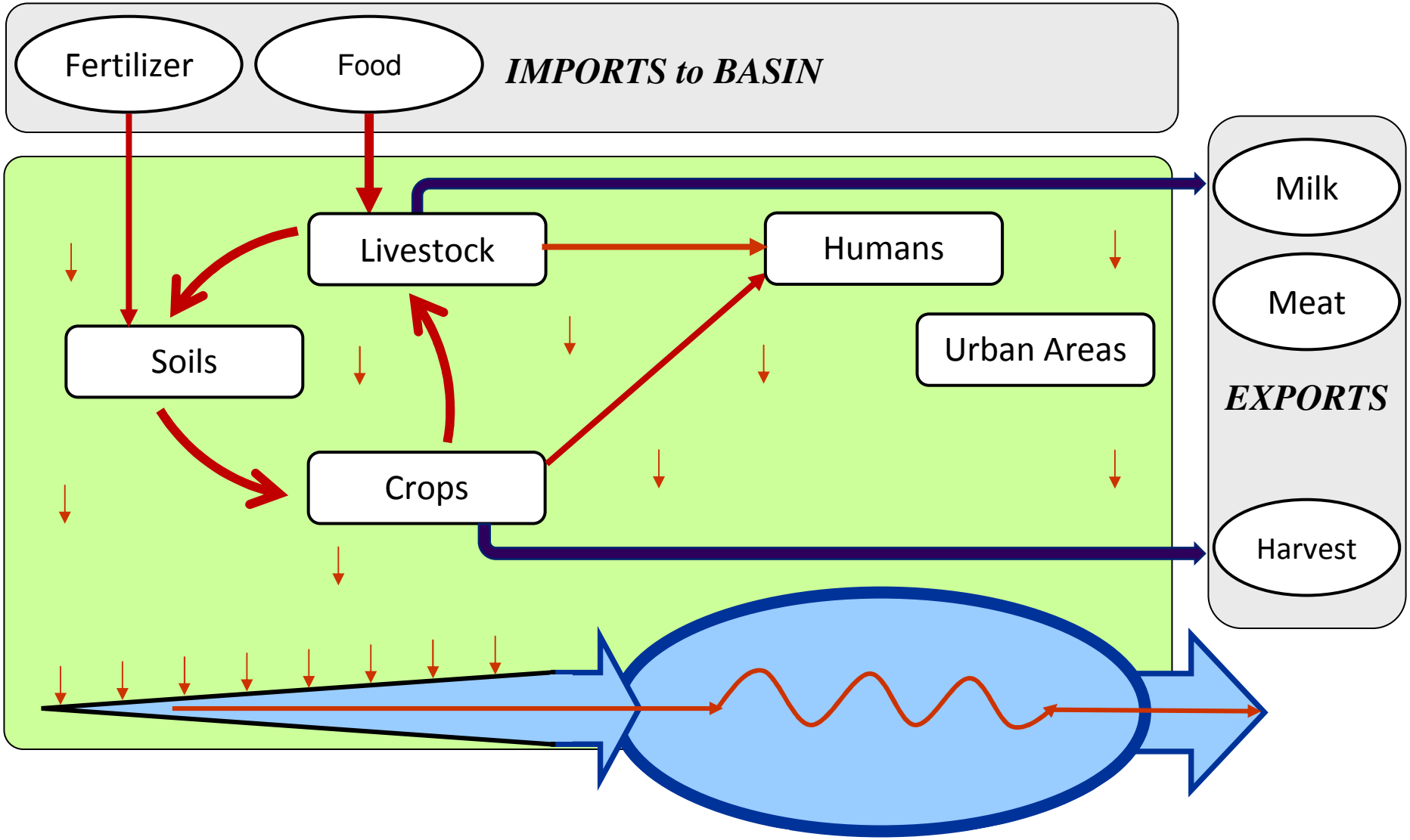

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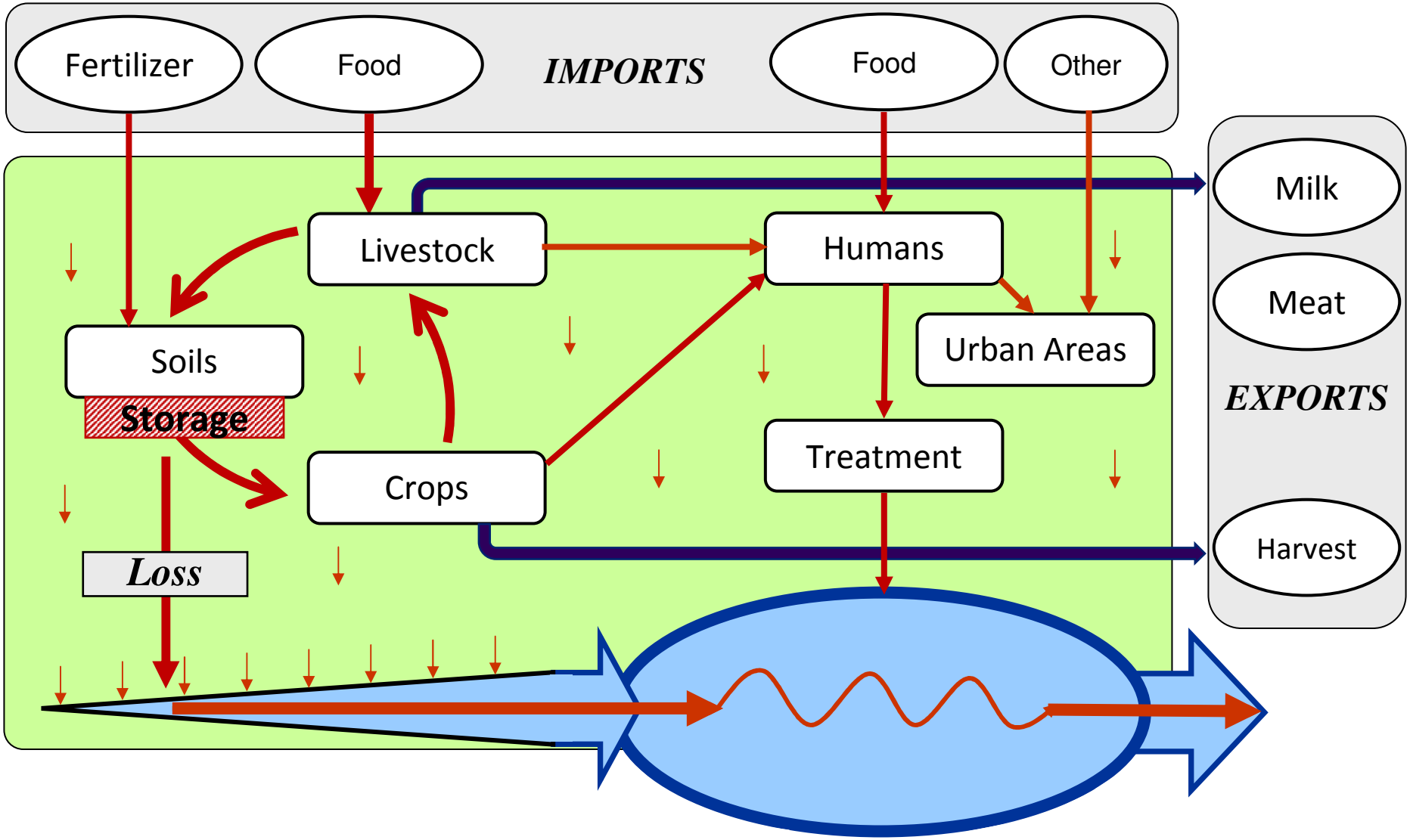

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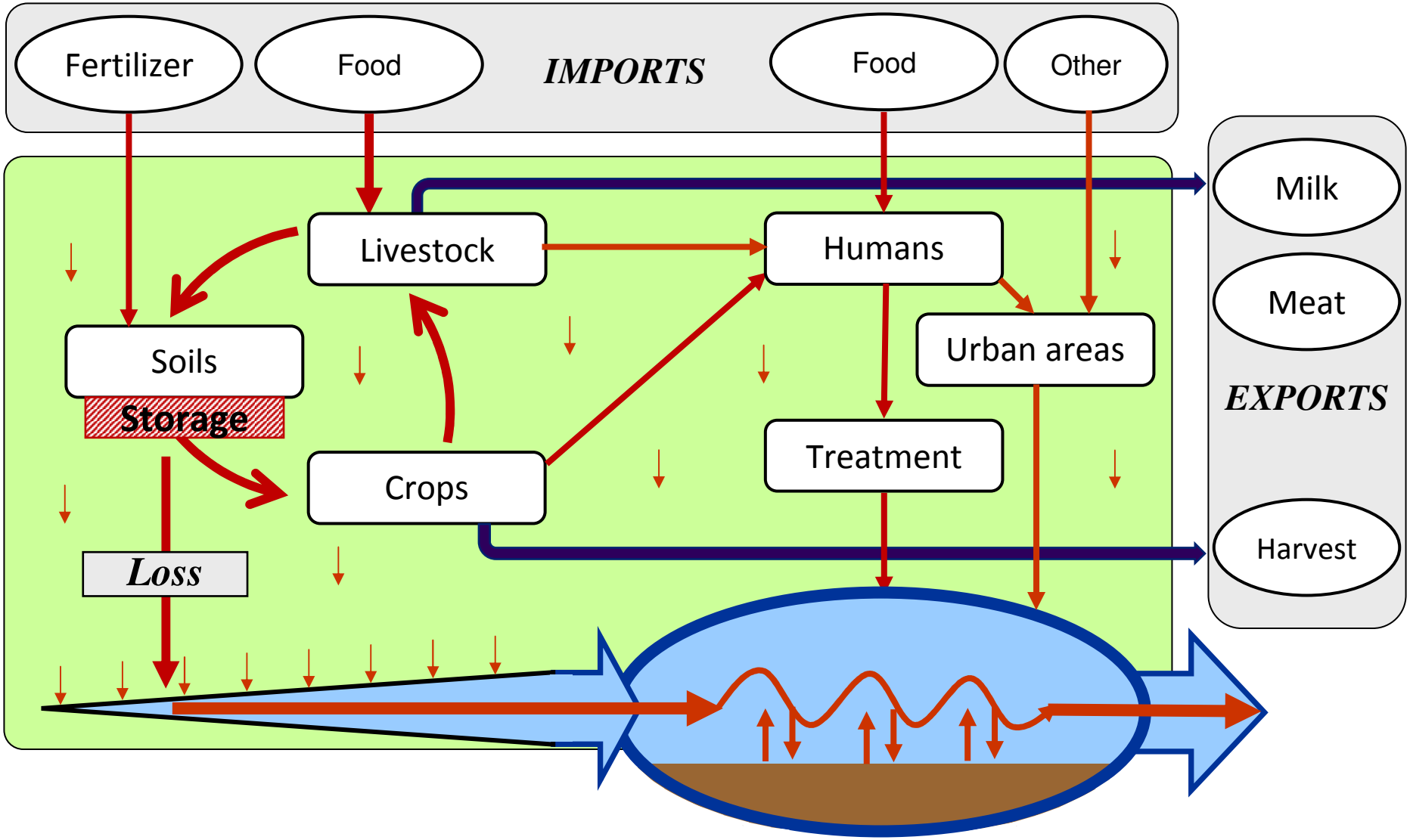


Changes are slow in an ecosystem

- There are 2 large phosphorus storage areas that react slowly
  - Soils
  - Sediment
- Many decades of human land use have created current conditions
- Will require similar amount of time to reverse the trend and achieve goals

Principles to Guide the Recommendations

Principles to Guide the Recommendations

Supported by Science and Research

Principles to Guide the Recommendations

Significant Impact

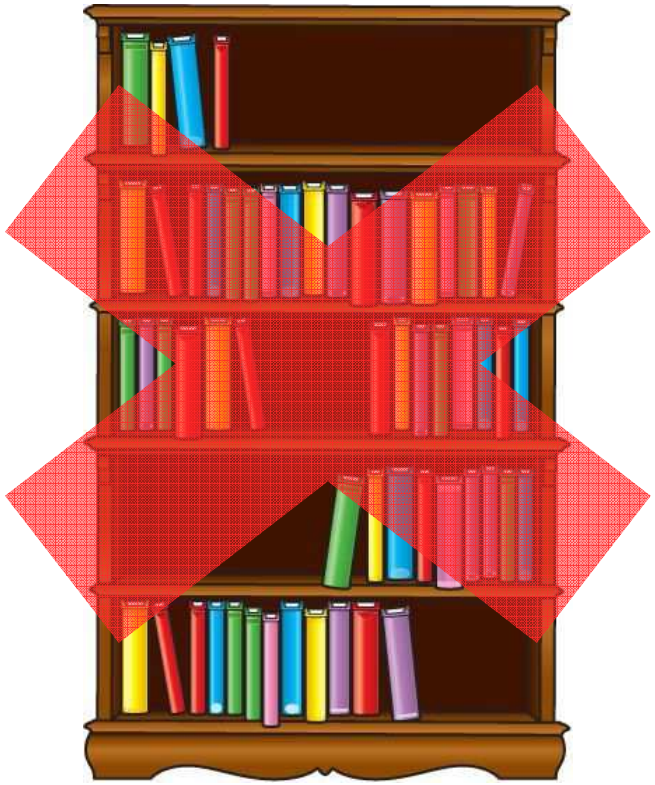
We aim to solve the problem

Principles to Guide the Recommendations

Not more of the same

Principles to Guide the Recommendations

Actionable



Report should not be “shelved”

Principles to Guide the Recommendations

- **Limited number of Priority Recommendations (6)**

- **Additional Recommendations (16)**

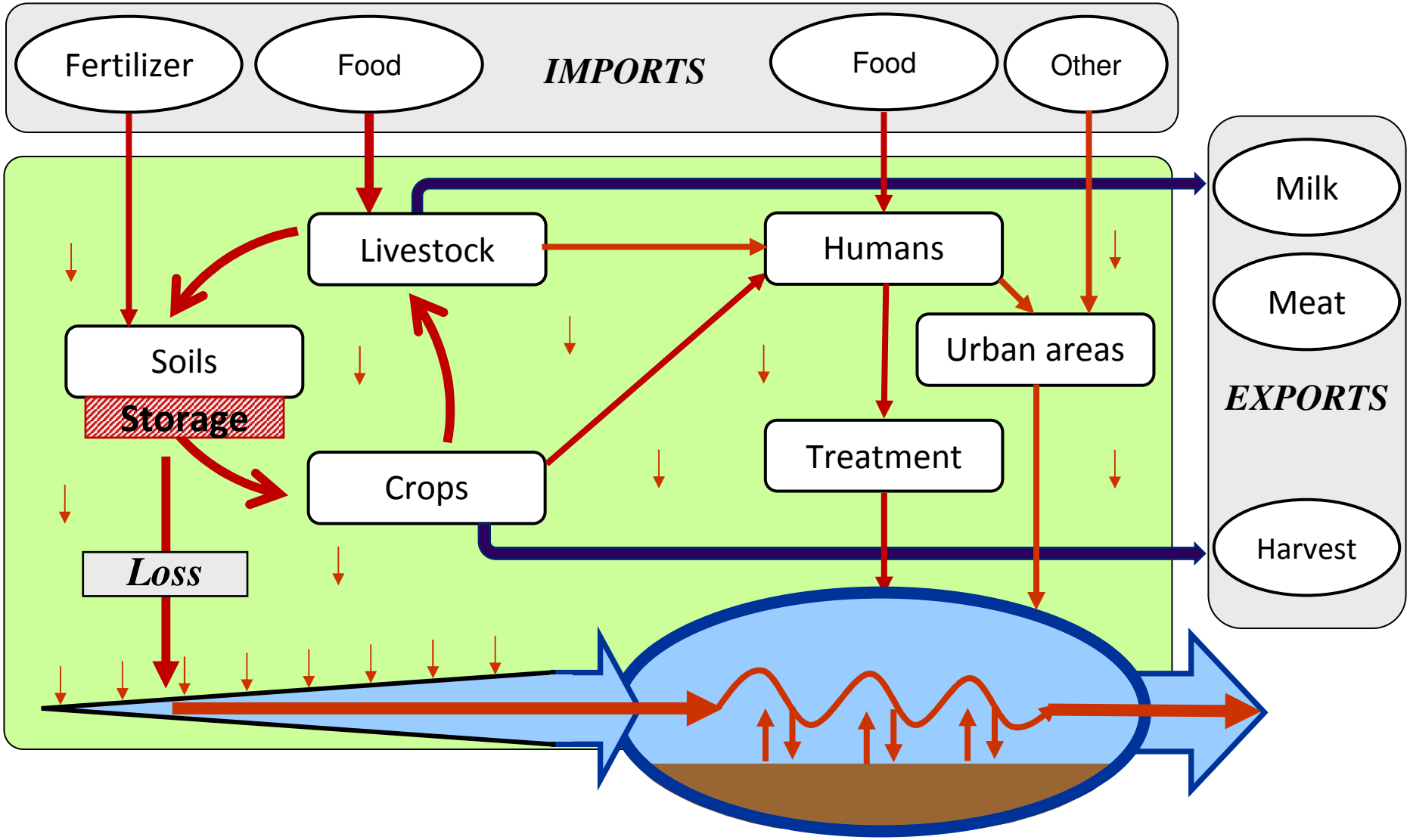
A note about the recommendations

- The recommendations are addressed to Canadian and US governments, and partners
- The recommendations may be applied differently in Quebec and Vermont
- Although Missisquoi Bay has special conditions, almost all recommendations can be applied across the Lake Champlain basin
- Do not act to the detriment of individuals or companies
    - Financial support
- Target critical areas

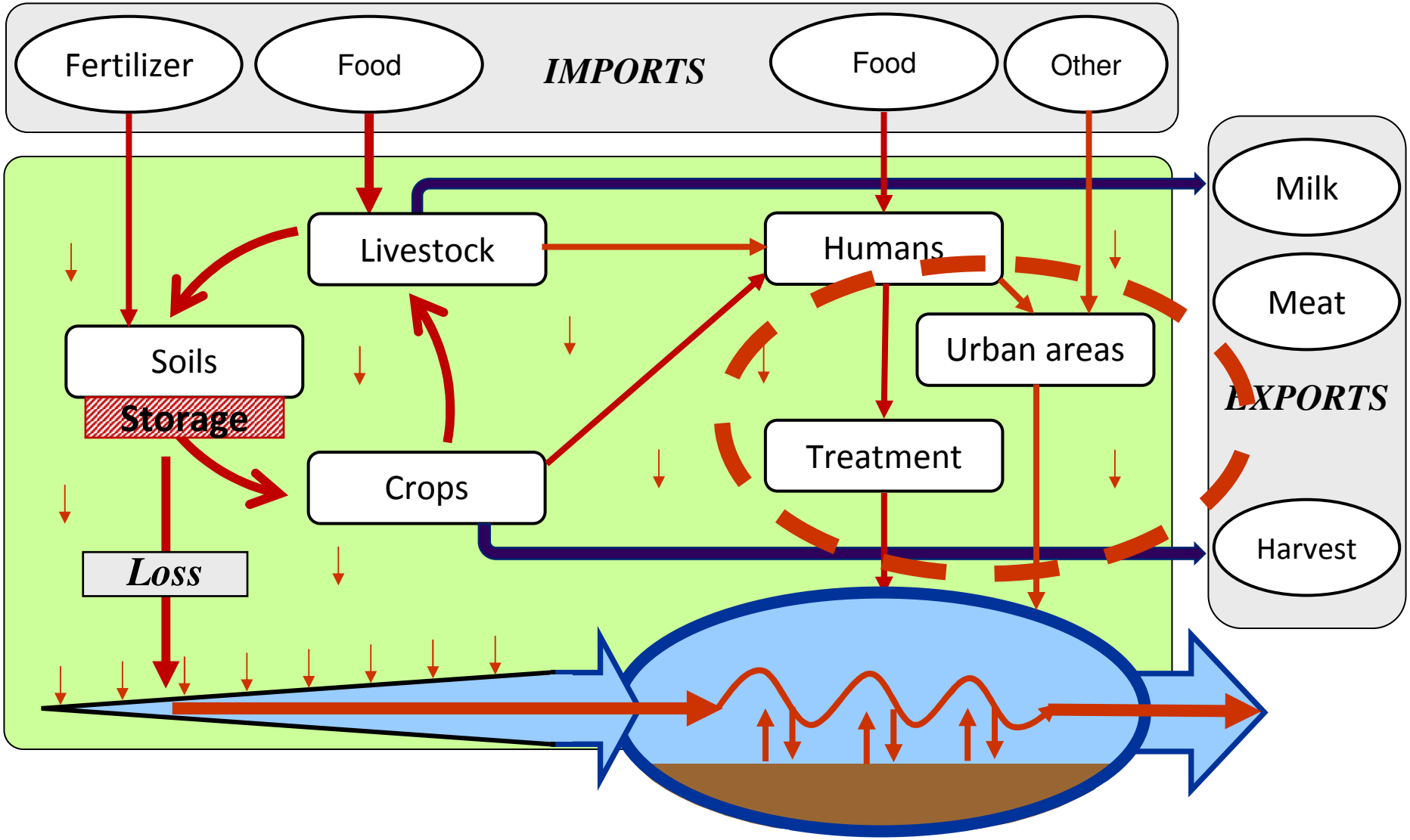
Priority Recommendations

1. Establish and coordinate a binational phosphorus reduction working group to enhance cooperation and accountability of parties to achieve mutually agreed goals
2. Develop a Binational Mass Balance for Phosphorus Imports and Exports in the Missisquoi Bay Watershed
3. Reduce the use of phosphorus on the lands of the Missisquoi watershed
4. Increase the proportion of cropping systems that exhibit less phosphorus loss
5. Increase protection and increase the area of floodplains, wetlands and forest lands and ensure that they are reconnected to promote nutrient retention
6. Engage public stakeholders to commit to the goals of safe water and healthy ecosystems

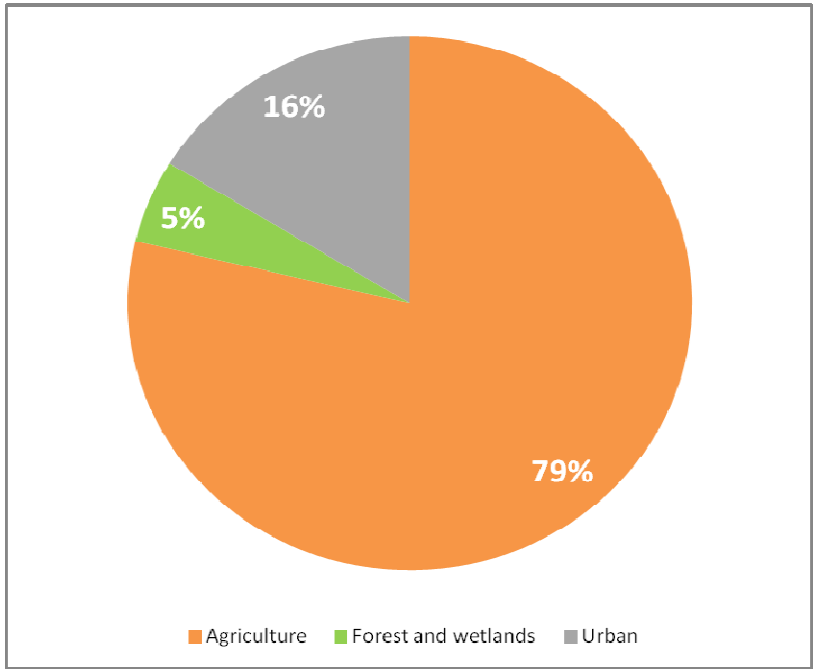
Watershed Model



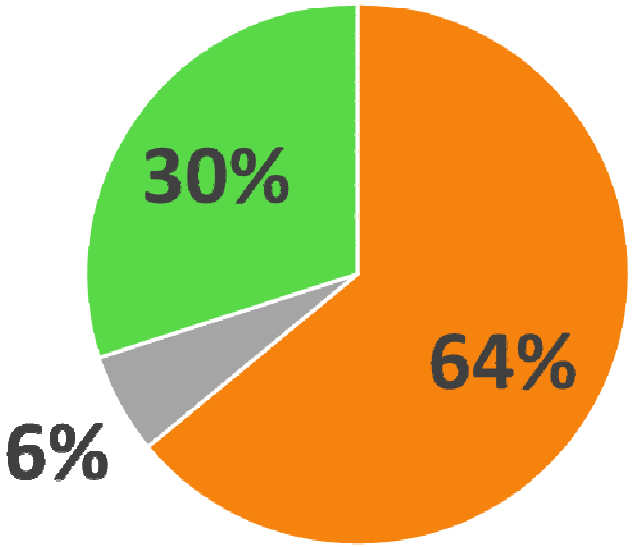
Urban areas


Fertilizer
Food
IMPORTS
Food
Other
Milk
Meat
EXPORTS
Harvest
Livestock
Humans
Soils
Storage
Urban areas
Treatment
Crops
Loss

Phosphorus sources by land use – Québec & VT



Quebec



Vermont

- Agriculture
- Developed areas
- Forest and wetland

One additional priority recommendation?

- Consider a Recommendation 7
- Developed areas
  - Ensure full compliance of wastewater infrastructure – public and private
  - Implement ecological stormwater management practices to reduce combined sewer systems and overland storm flows
  - Encourage amenities that protect the quality of water through regulatory tools

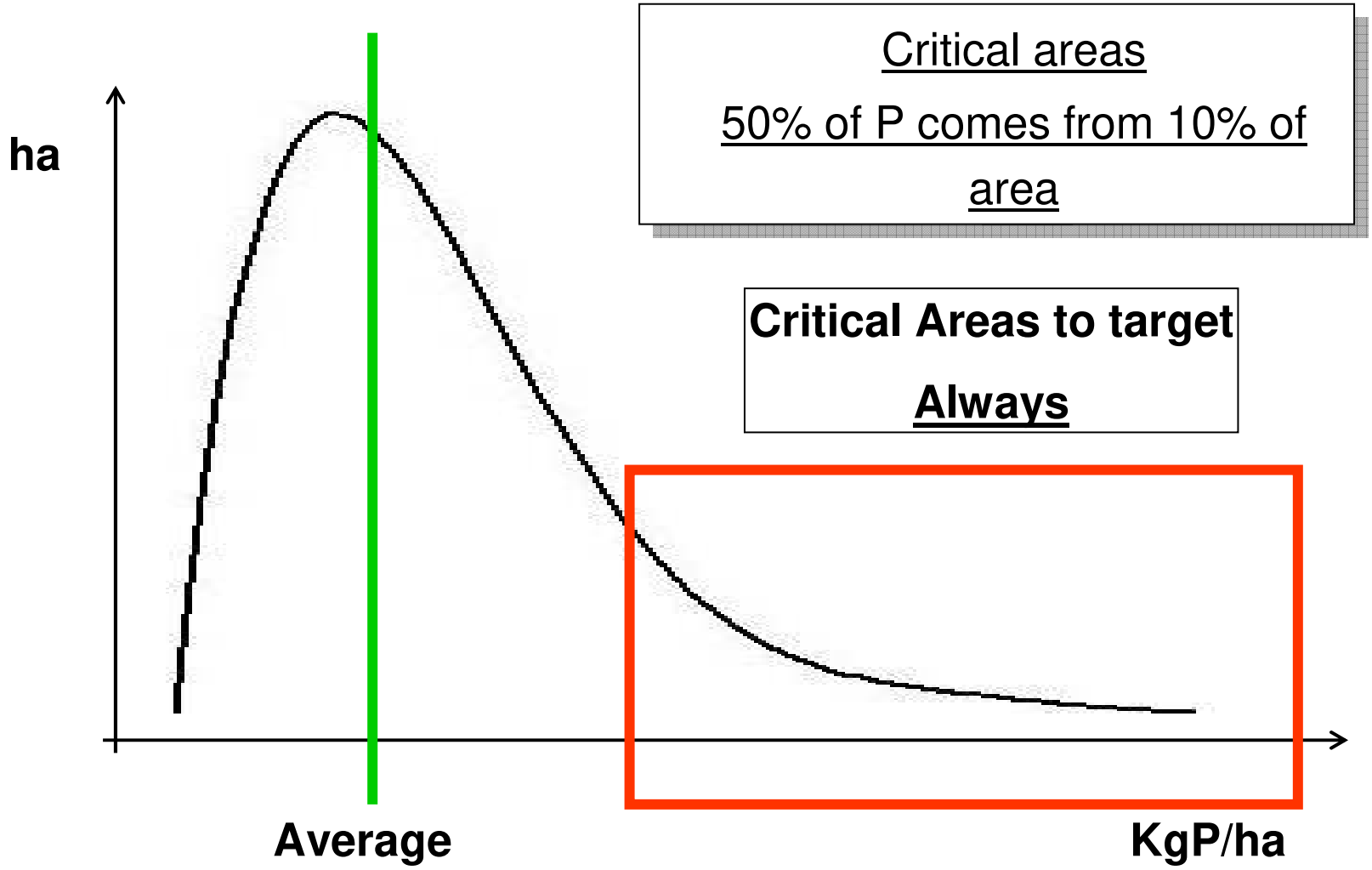
R1 – Form a permanent binational working group

- **Common Objectives** for partners (QC-VT)
  - Average annual target concentration of 25 µg/L in the Bay
  - Harmonize the collection and publication of data
- **Permanent Binational Workgroup**
  - Develops, implements and tracks an action plan to achieve goals by building on existing plans
  - Standing subcommittee of the LCBP
- **Accountability** – Must report progress annually
  - Lake Champlain Steering Committee
  - OBVBM Board
  - And to the public
- **Ongoing funding** from the federal and provincial/state governments to achieve goals

R2 – Develop a binational mass balance for phosphorus

- Understand sources of phosphorus:
  - External (imported)
  - Internal (in basin, in bay)
  - Storage (wetlands, soils, other places)
  - Exports
  - Loss
- Use results to target actions
- Will allow to improve strategy to reduce phosphorus imports and transport to waterways

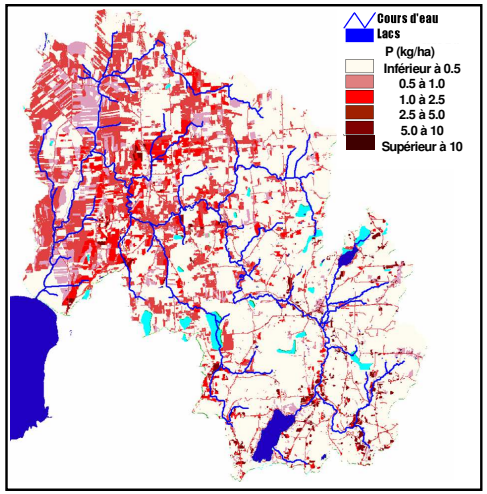
What is a Critical Area ?

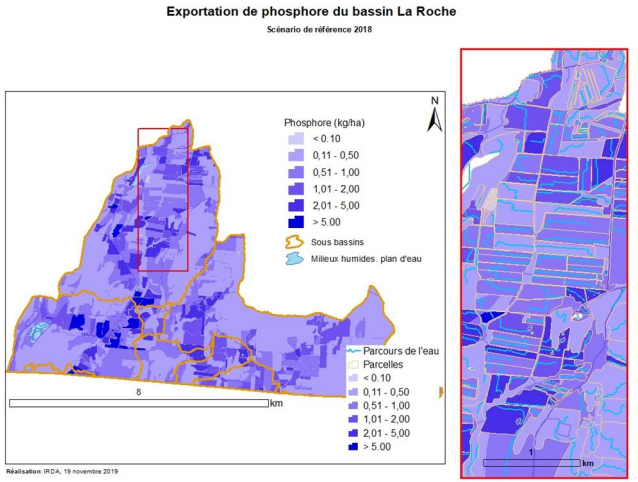


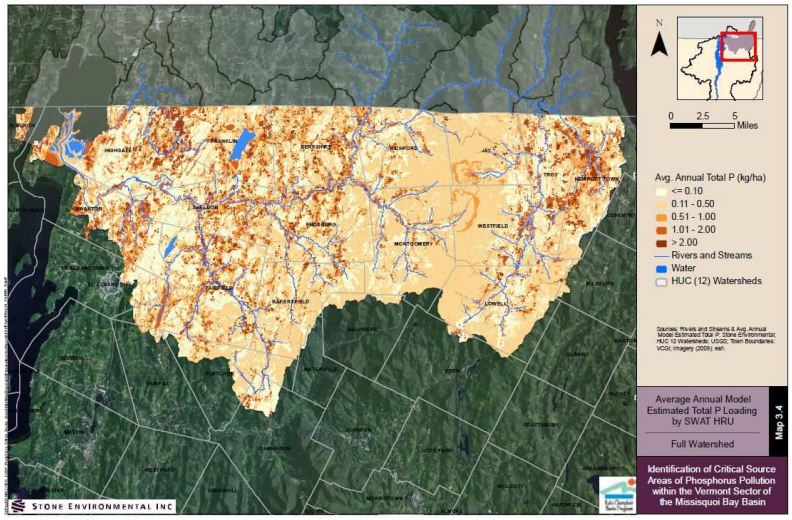
We know where Critical Areas are

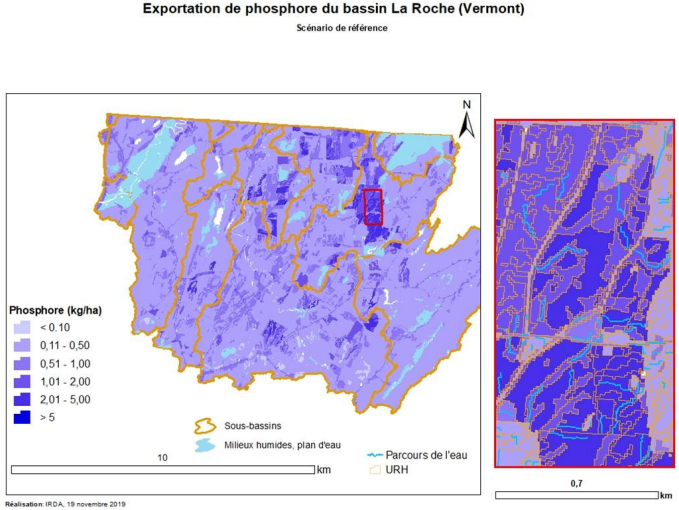
Have been mapped for

- Pike river
- Rock river
- Vermont







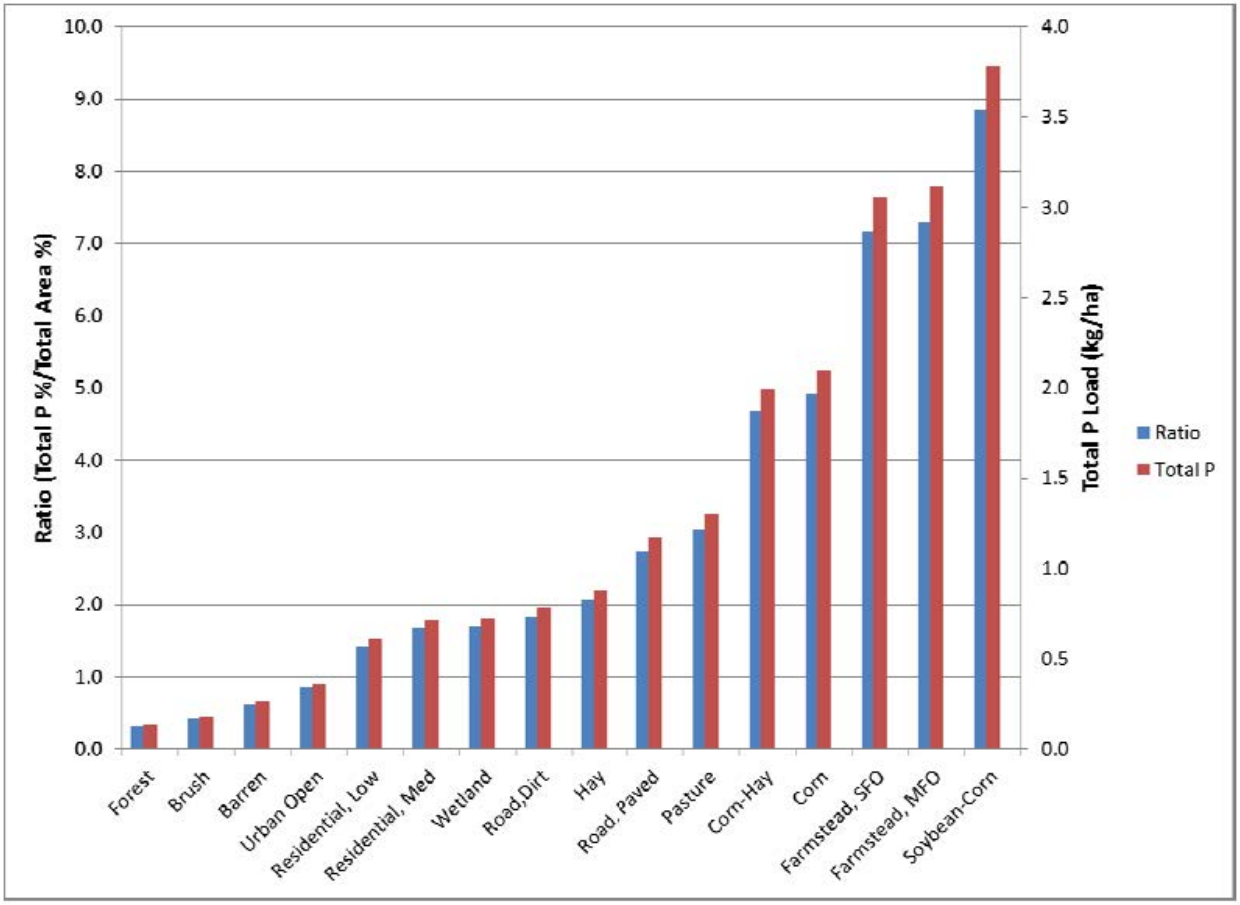


Sources : IRDA
Stone environmental

R3 – Reduce the use of phosphorus

- **Challenge** – Reduce fertilizer….while maintaining yields
  - **Target the "Critical Areas"**
- Phosphorus stored in the soil allows to do it in many places
  - The soil is often richer than necessary
- But there is a risk, at least **perceived**, of yield loss
- We recommend:
  - **Eliminate** risk with "Yield Insurance"
  - **Review** agronomic recommendations with emphasis on the need for plants and soil capacity to retain phosphorus
  - Implement practices to **reduce residual phosphorus**
  - Develop protocols for **sustainable management** of phosphorus in soils
  - To study the processes and markets for transforming and **exporting** manure outside of the watershed or in replacement of mineral fertilizers

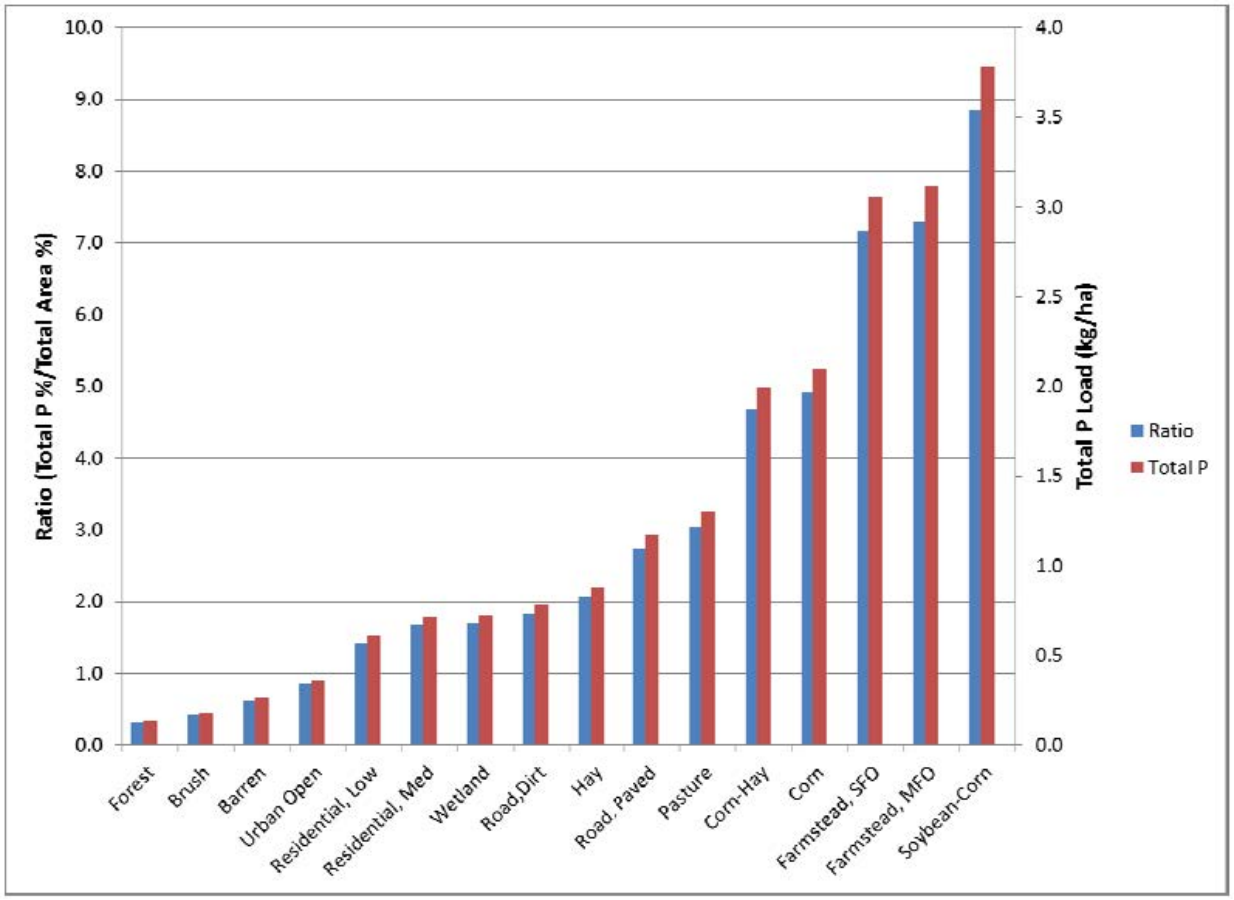
Phosphorus Loss by Land Use



P Loss by hectare

Land Use Type

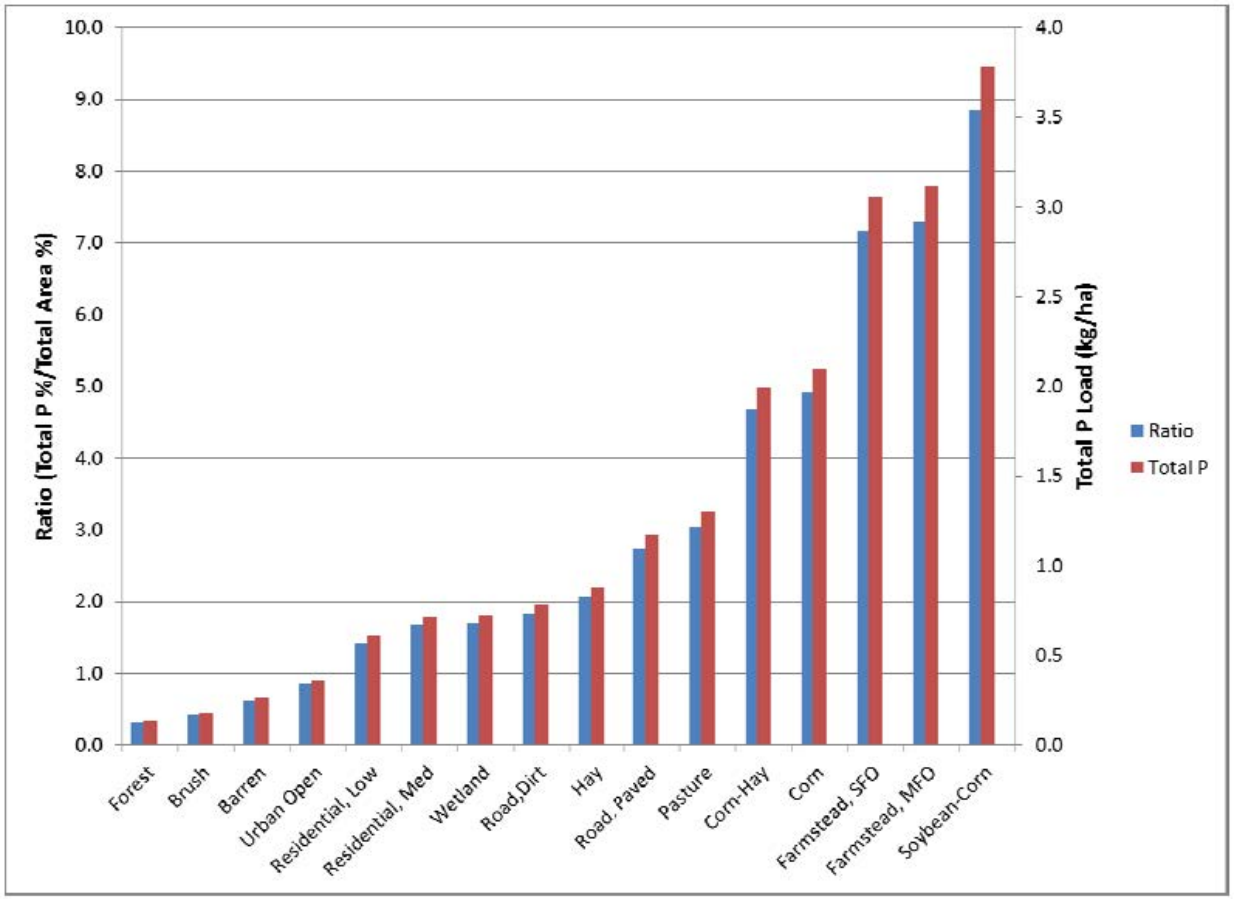
Phosphorus Loss by Land Use



R3

Do as well with less phosphorus

Phosphorus Loss by Land Use



R3

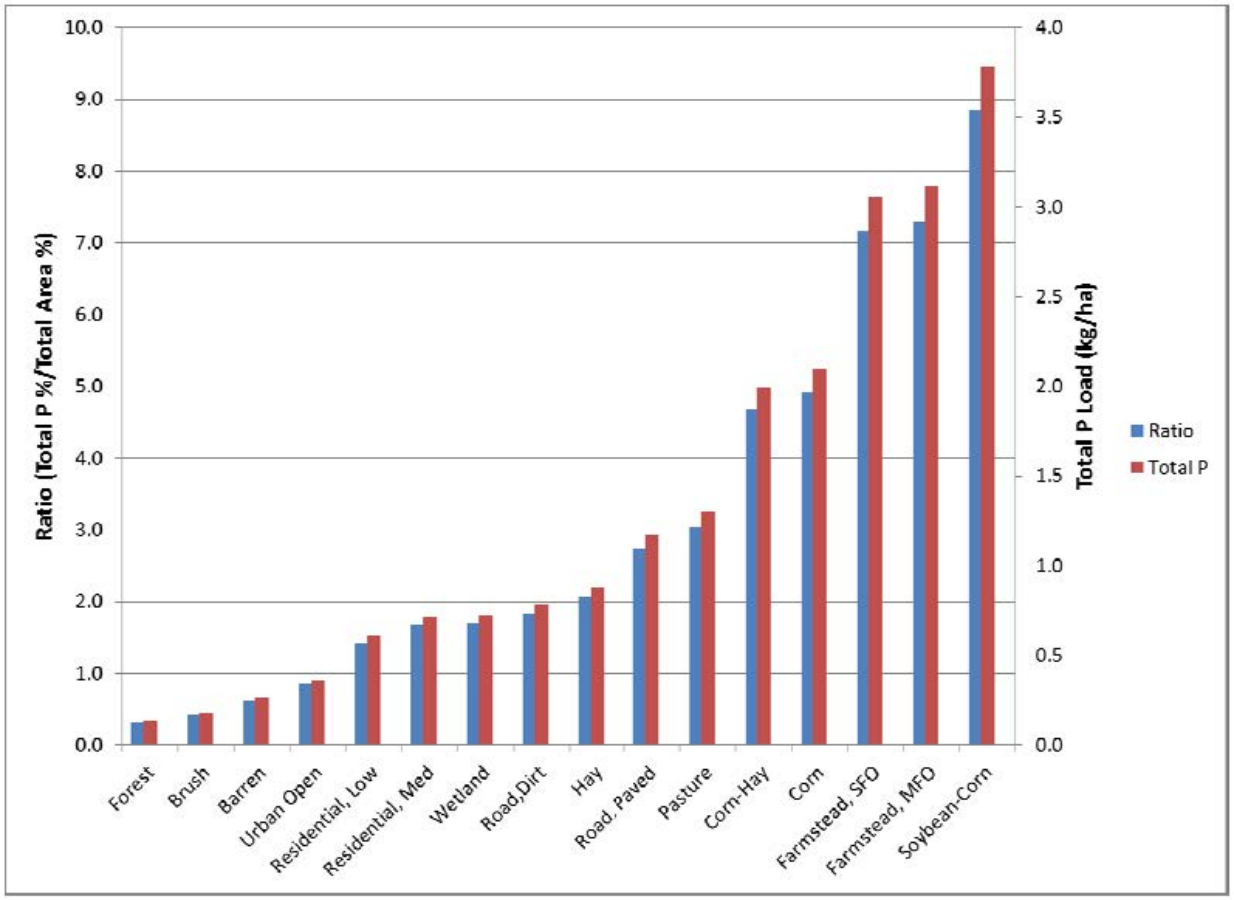
Do as well with less phosphorus

Financial support
Target critical areas

R4 – Reduce phosphorus loss

- **Reduce the risk of erosion** during winter and spring
  - Plant **cover crops** and intercrops
  - Promote the management of **crop residues** in spring
- Encourage **transition** from corn/soy to cereal grains
  - **Financial support**, market development
  - Revisit grant programs
- Establish financial support programs that promote conversion of crop systems supporting livestock operations to perennial forage (grassland) areas, **in critical areas** – sensitive to erosion

Phosphorus Loss by Land Use



R3

R4

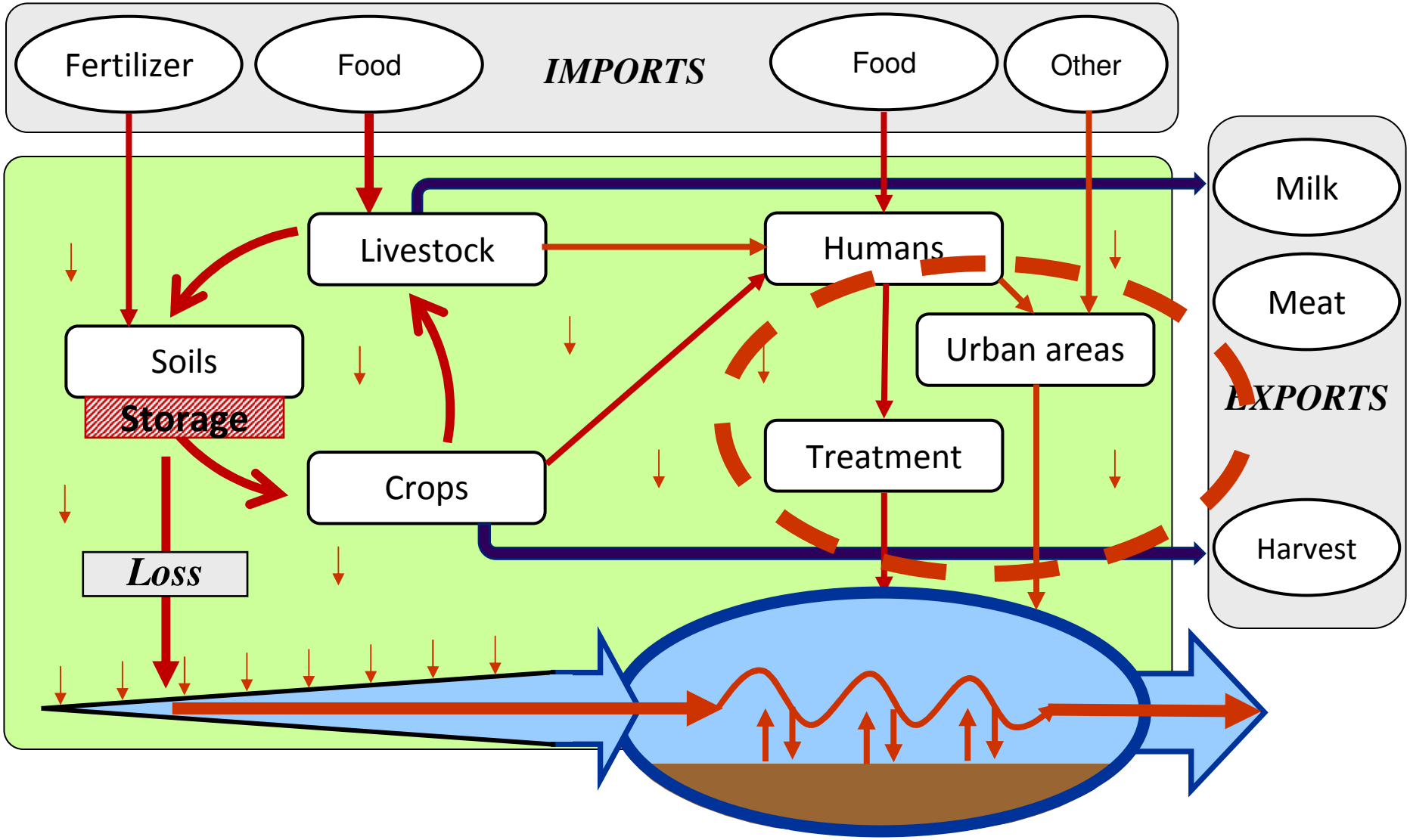
Do as well with less phosphorus

Change land use

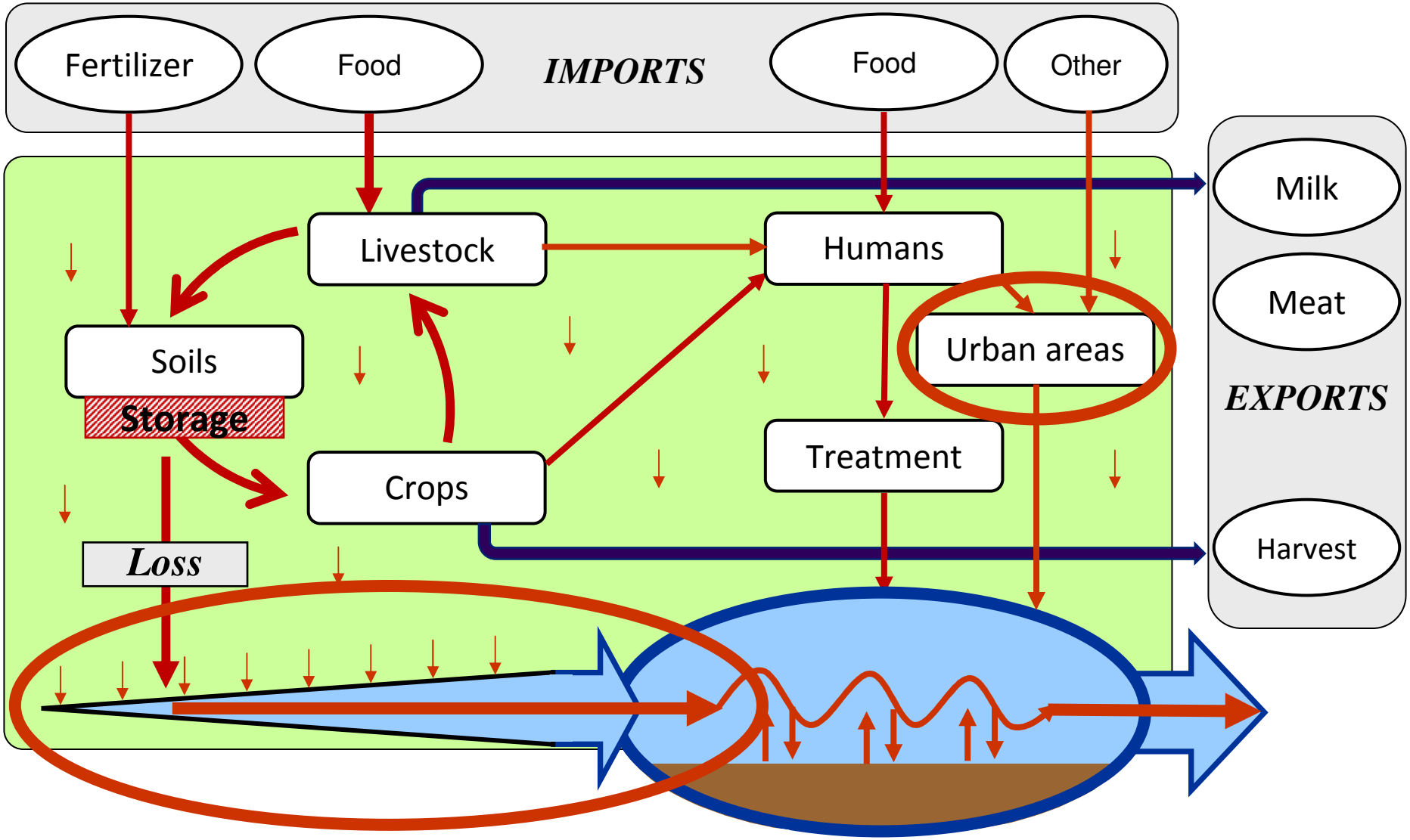
R4

Financial support
Target critical areas

Watershed model



R5 - Increase storage and filtration



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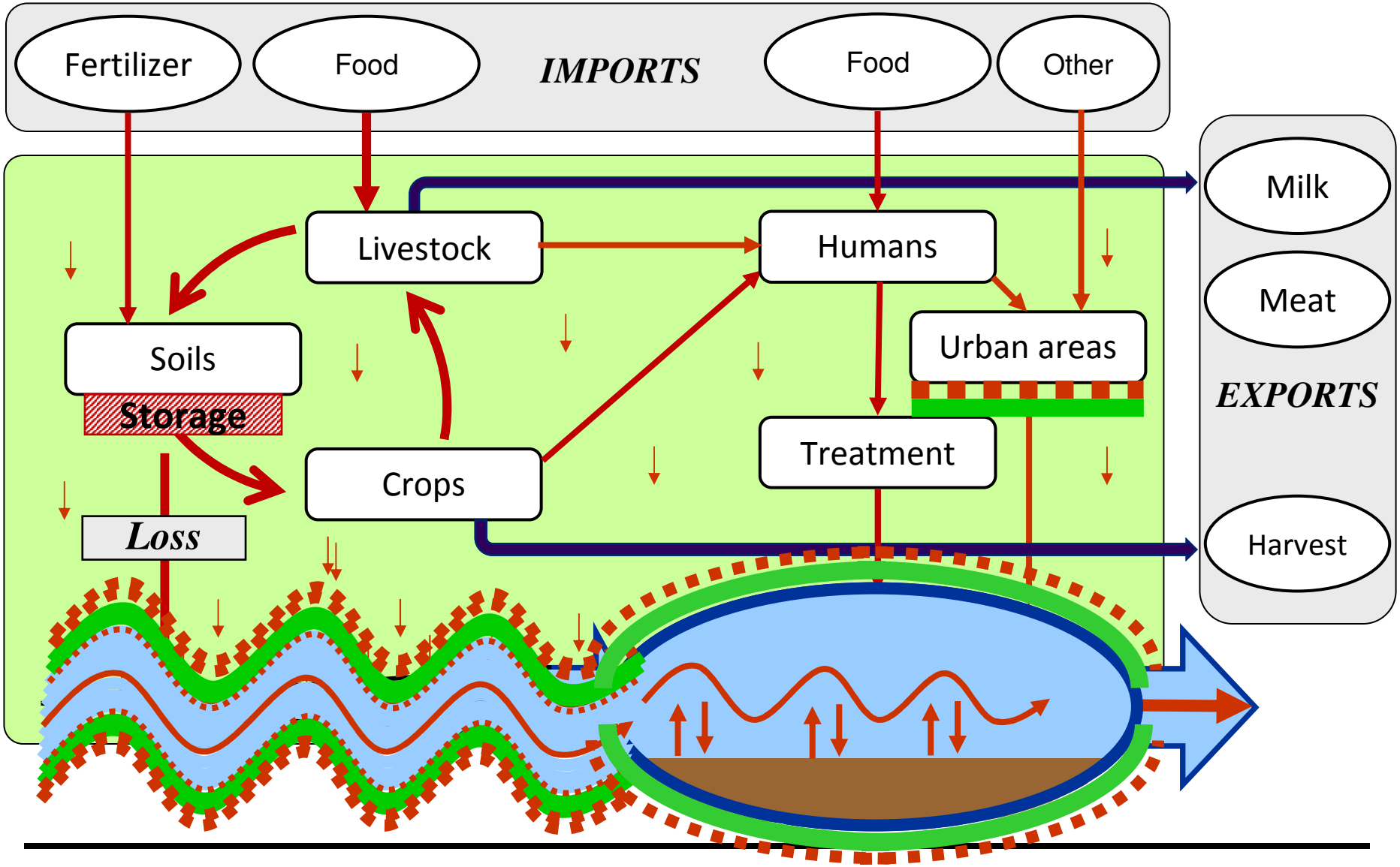
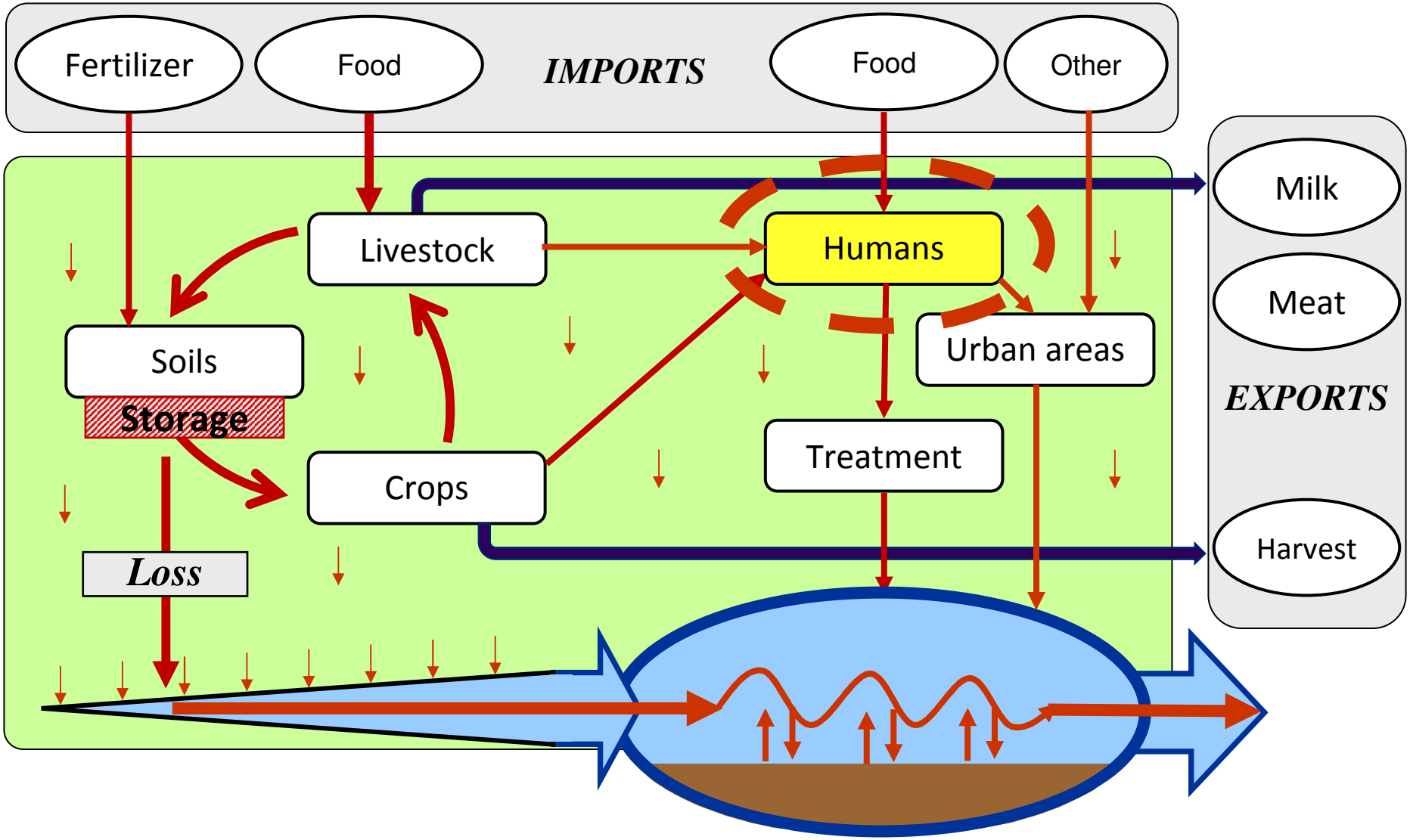


R5 - Increase storage and filtration

- Promote **nutrient retention** by protecting:
  - Riparian areas
  - Wetlands
  - Forested areas
- Restore dynamic balance and ecosystem services of rivers
- Extend withdrawal and conservation programs and recognize the economic benefits and ecological services provided
  - Flood mitigation
  - Wildlife habitat - biodiversity

R6 – Engage the public



R6 – Engage the public

- Nothing will be done without **political will**
- Political will comes from **public pressure**

WHAT YOU CAN DO:

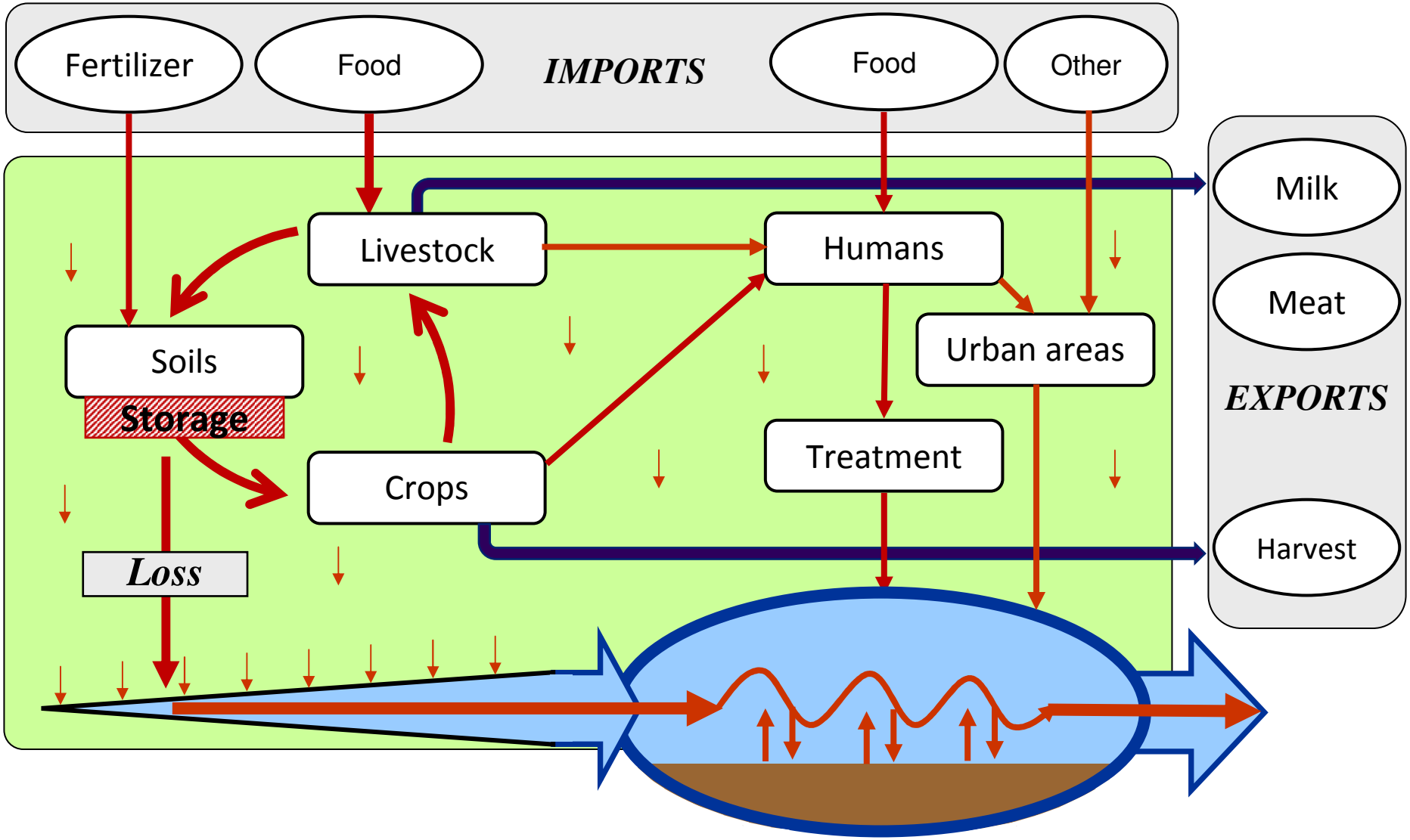
ACTIVATE!

Tobias Schwarz/AFP/
Getty Images

R6 – Engage the public

- Nothing will be done without **political will**
- Political will comes from **public pressure**
- The LCBP and OBVBM will **increase public education** awareness efforts to encourage participation
- The Workgroup should **report** progress (or lack of) and results achieved
- **Demand actions** from elected officials – at all levels
  - Does your municipality have an action plan?

Watershed Model



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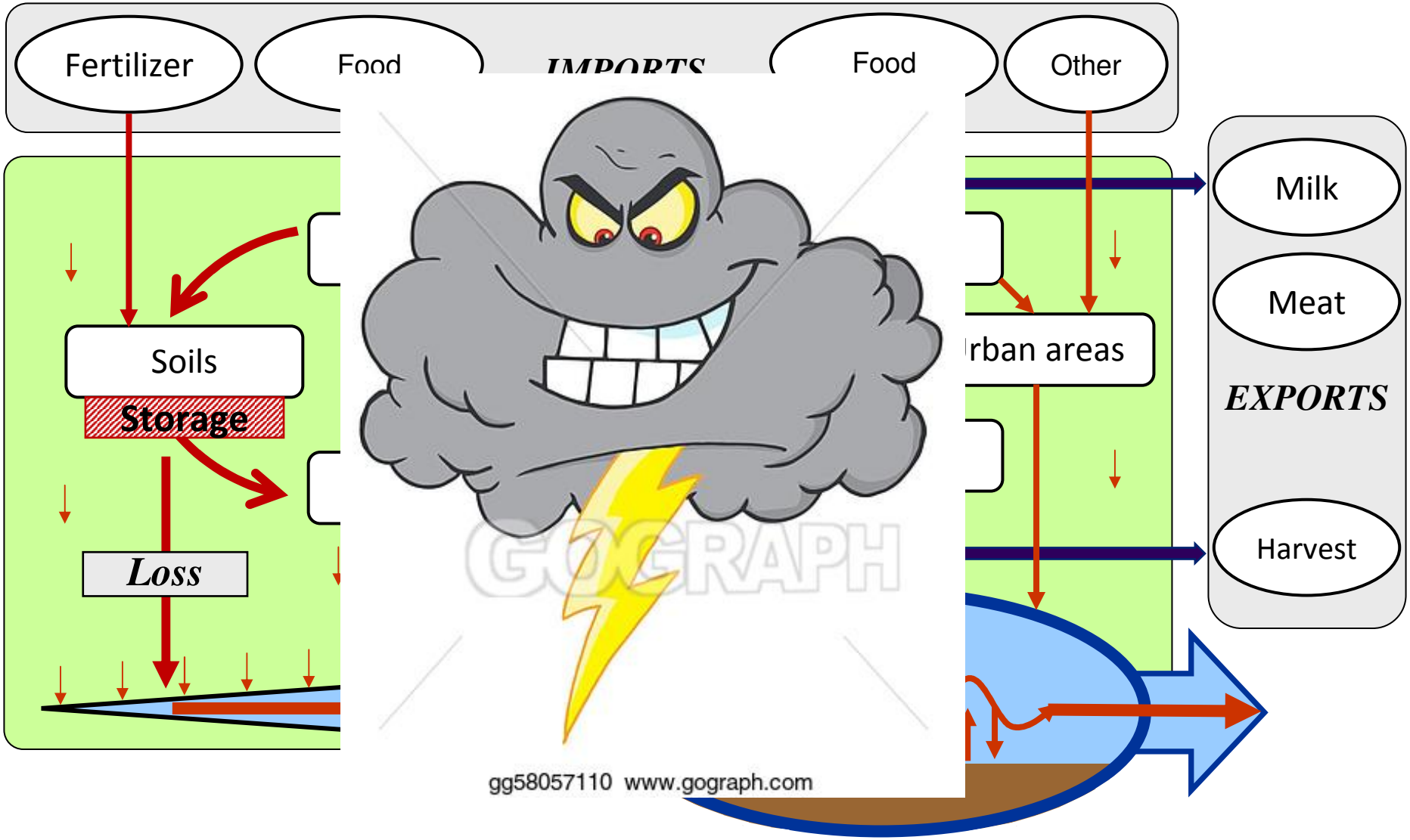


A word on climate change

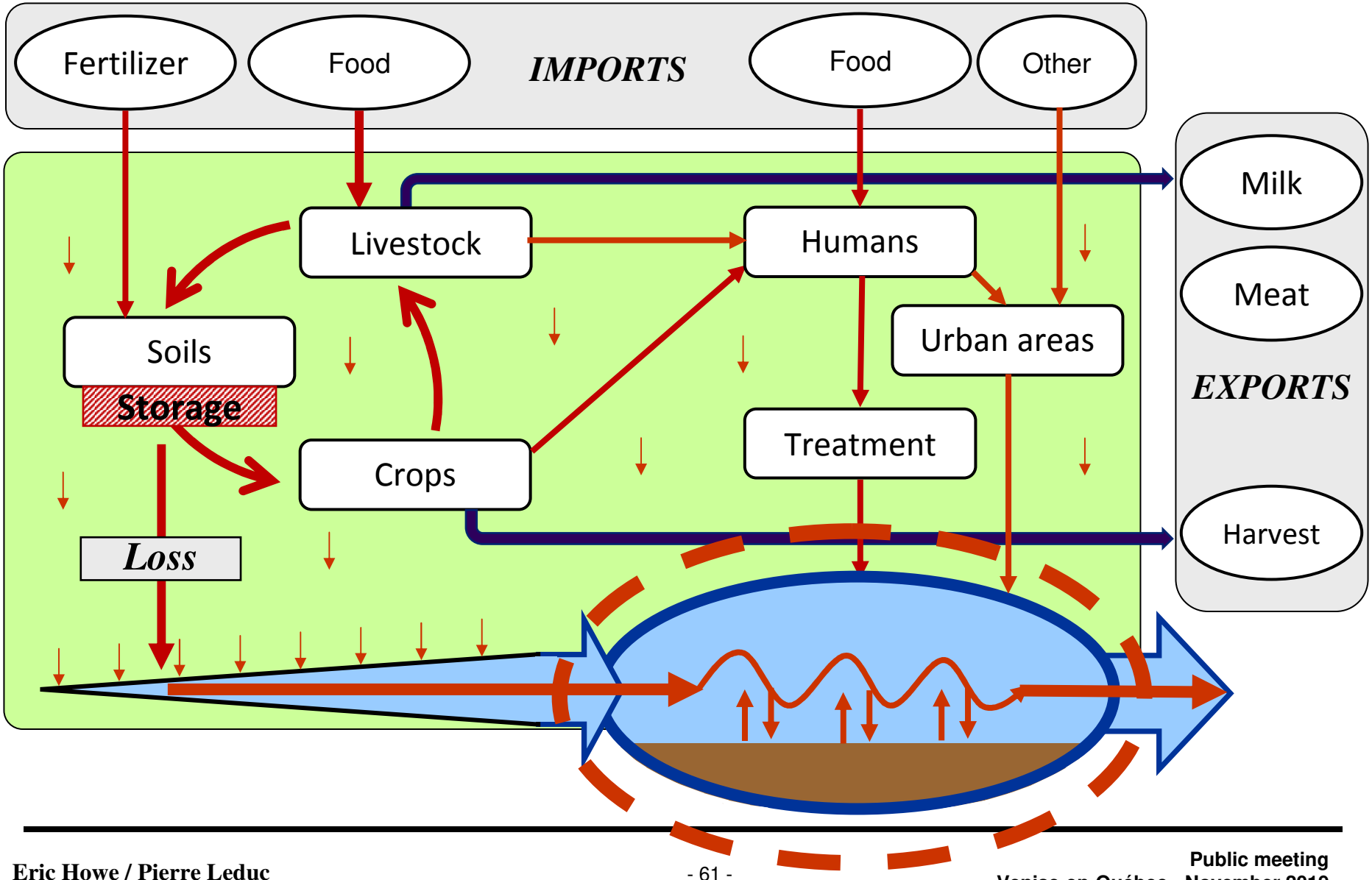
- Governments must develop and implement measures to combat climate change
- Climate change impacts on hydrology is **an additional challenge** to achieving water quality objectives
- Increasing temperatures and extreme weather events are **already leading** to higher nutrient loads and more frequent cyanobacteria blooms

Not a recommendation in itself but…

it needs to be tackled seriously

Additional recommendations

Strorage area - sediments



Additional recommendations

Sediments accumulated in Missisquoi Bay

- In-situ restoration techniques have **limited effectiveness and limitations**
- Shallow Missisquoi Bay covers 30 mi^2 and the wind and waves are strong, so no technique lends itself to this kind of condition.
- The identified in-situ restoration techniques are not adapted to a lake as large as Missisquoi Bay, or become **very expensive**
- We recommend:
  - Improve the understanding and modeling of phosphorus movement in the bay to facilitate the study of sediment management, neutralization or removal techniques that will eventually need to be addressed

Additional recommendations

- Financing and Regulation
  - Expand incentive programs to increase the implementation of best management practices, including in developed, wooded and agricultural areas
- Agriculture
  - Review fertilizer application standards and equipment to encourage nutrient incorporation into the soil
- Research
  - Increase funding for nutrient reduction research, especially in critical areas

For more information

- What is in the report – Background for the recommendations
- What is not –not a comprehensive summary of all of the work happening in Missisquoi Bay
- Where to find it:

www.ijc.org/en/lclm

For More Information: www.ijc.org/en/lclm

US EPA Champlain TMDL webpage:

https://www.epa.gov/tmdl/lake-champlain-phosphorus-tmdl-commitment-clean-water

Vermont Champlain TMDL webpage:

https://dec.vermont.gov/water-investment/cwi/restoring/champlain

Lake Champlain Basin Program webpage:

www.lcbp.org

LCBP's State of the Lake Report for Lake Champlain:

https://sol.lcbp.org/en/ (English)

https://sol.lcbp.org/fr/ (Français)

LCBP's Management Plan for Lake Champlain (Opportunities for Action)

http://plan.lcbp.org/

For More Information: www.ijc.org/en/lclm

Plan directeur de l'eau de l'OBVBM:

http://www.obvbm.org/pde

Plan d'action de la MRC Brome-Missisquoi:

https://mrcbm.qc.ca/fr/eau_plan_d_action.php

Ministère de l'environnement et de la lutte aux changements climatiques du Québec (MELCC)

http://www.environnement.gouv.qc.ca/eau/bassinversant/bassins/missisquoi/

http://www.environnement.gouv.qc.ca/eau/strategie-quebecoise

http://www.environnement.gouv.qc.ca/eau/protection/index.htm

Ministère de agriculture, des pêcheries et de l'alimentation du Québec (MAPAQ)

https://www.mapaq.gouv.qc.ca/fr/Productions/Agroenvironnement/Pages/Agroenvironnement.aspx

Regroupement des Organismes de bassin versant du Québec (ROBVQ)

http://reperteau.info/

https://robvq.qc.ca/

Institut de recherche et de développement en agroenvironnement (IRDA)

https://www.irda.qc.ca/fr/

Public Comment Period

Public Comments accepted until:

December 14, 2019

Email: lclm@ottawa.ijc.org

Online: ijc.org/en/lclm or ijc.org/fr/lclm

Tonight! – step up to the microphone or fill out a comment card

Your turn


Comments ?
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lclm@ottawa.ijc.org
or
https://ijc.org/fr/lclm/nouvelles/consultation-publique-2019

Simple phosphorus cycle in a watershed