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# Water Footprinting: Where are we now?

DF50, Zurich, Tuesday December 4th, 2012

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POLYTECHNIQUE MONTRÉAL
LE GÉNIE EN PREMIÈRE CLASSE

ESG UQÀM

# Plan

- **Timeline** of water footprint and Water/LCA initiatives
- **WULCA working group** of UNEP/SETAC Life-Cycle Initiative
- **ISO Standard** development on Water Footprinting
- **What is a water footprint** and how do the different methods interact together?
- **Discussion** points

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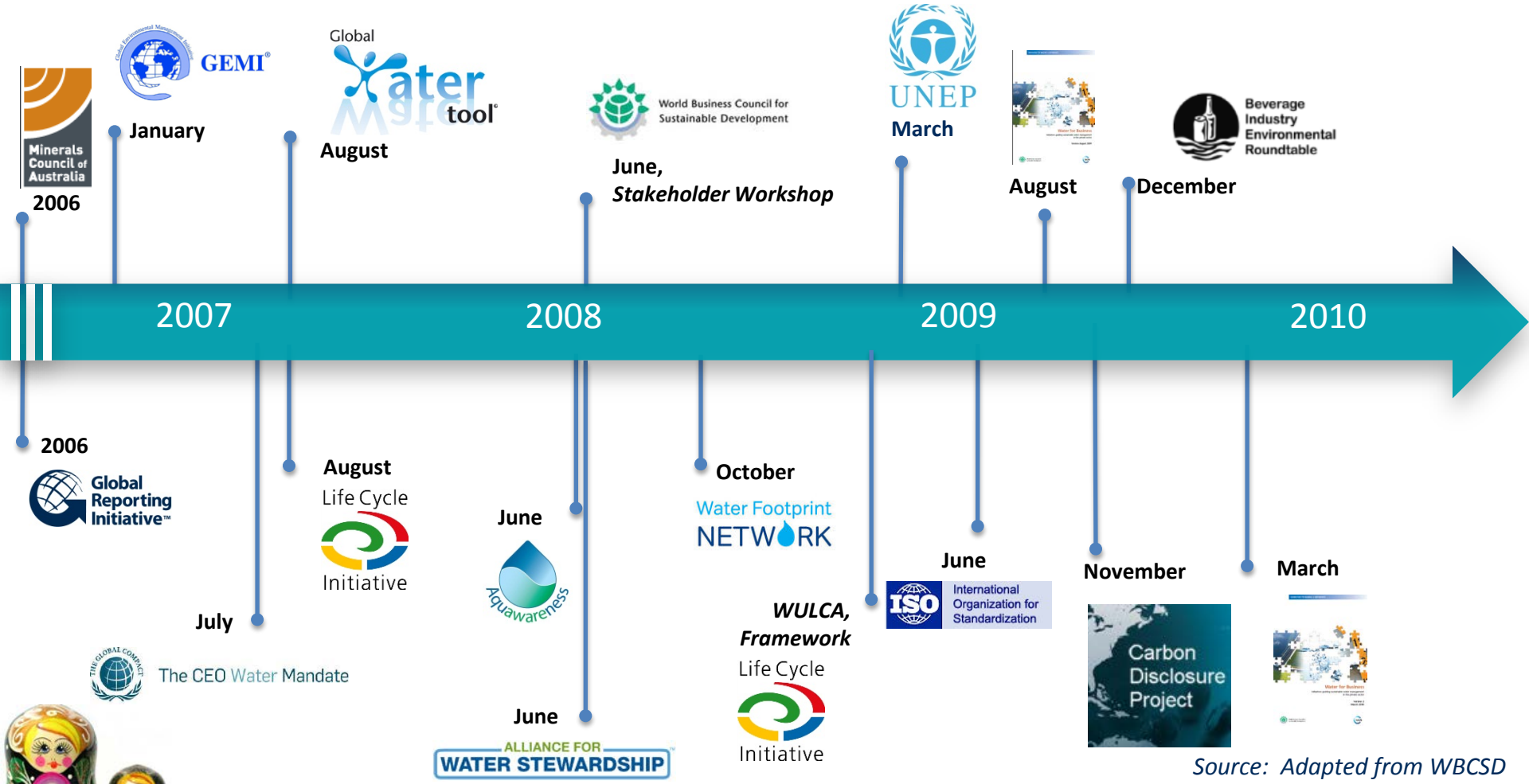
# The water footprint initiatives and timeline




*Source: Adapted from WBCSD*



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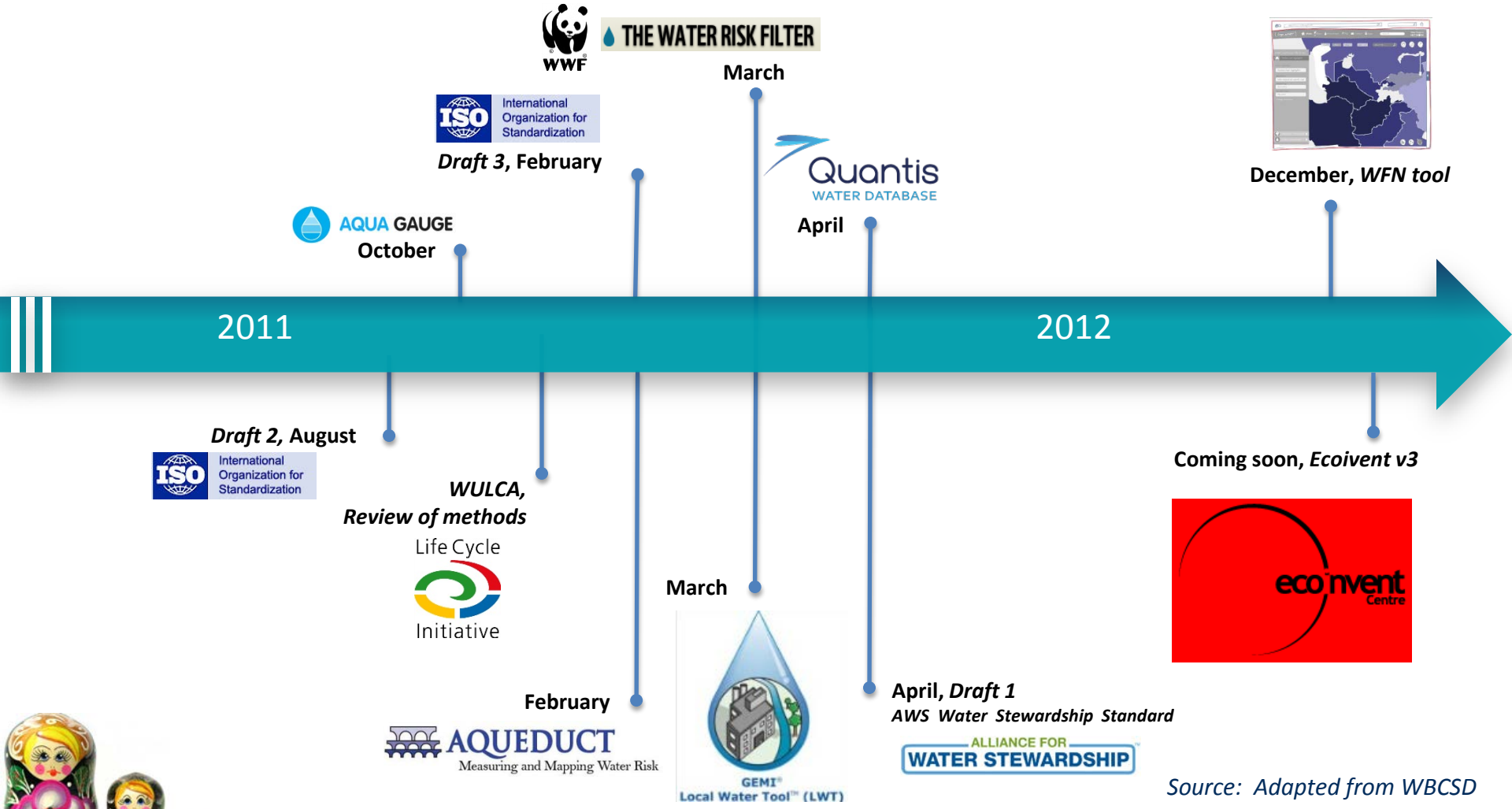
# The water footprint initiatives and timeline






*Source: Adapted from WBCSD*

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# Introduction

**What a Water Footprint in LCA is <u>not about</u>:**

Only inventory of water volumes

**What "most" agree about what a Water Footprint is:**

- Includes both inventory and impact assessment
- Considers quantity and quality
- Is regionalized

**Technical details:**

- Still being settled in ISO Water Footprinting Working Group – 14046: *Planned for 2014*
- *WULCA Project from UNEP/SETAC Life Cycle Initiative*

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# UNEP/SETAC Life Cycle Initiative

**Water Use in LCA -** International initiative for LCA

Goal:→ Recommendations for:

- Science
- Practitioners (incl. industry)

Output (no officially endorsed documents):

- **Phase 1:** Proposed a framework to evaluate water in LCA (Bayart et al. 2009)
- **Phase 2:** Review of different methods (Kounina et al. 2012)
- **Phase 3:** Quantitative comparison (Boulay et al, in preparation)

www.wulca-waterlca.org

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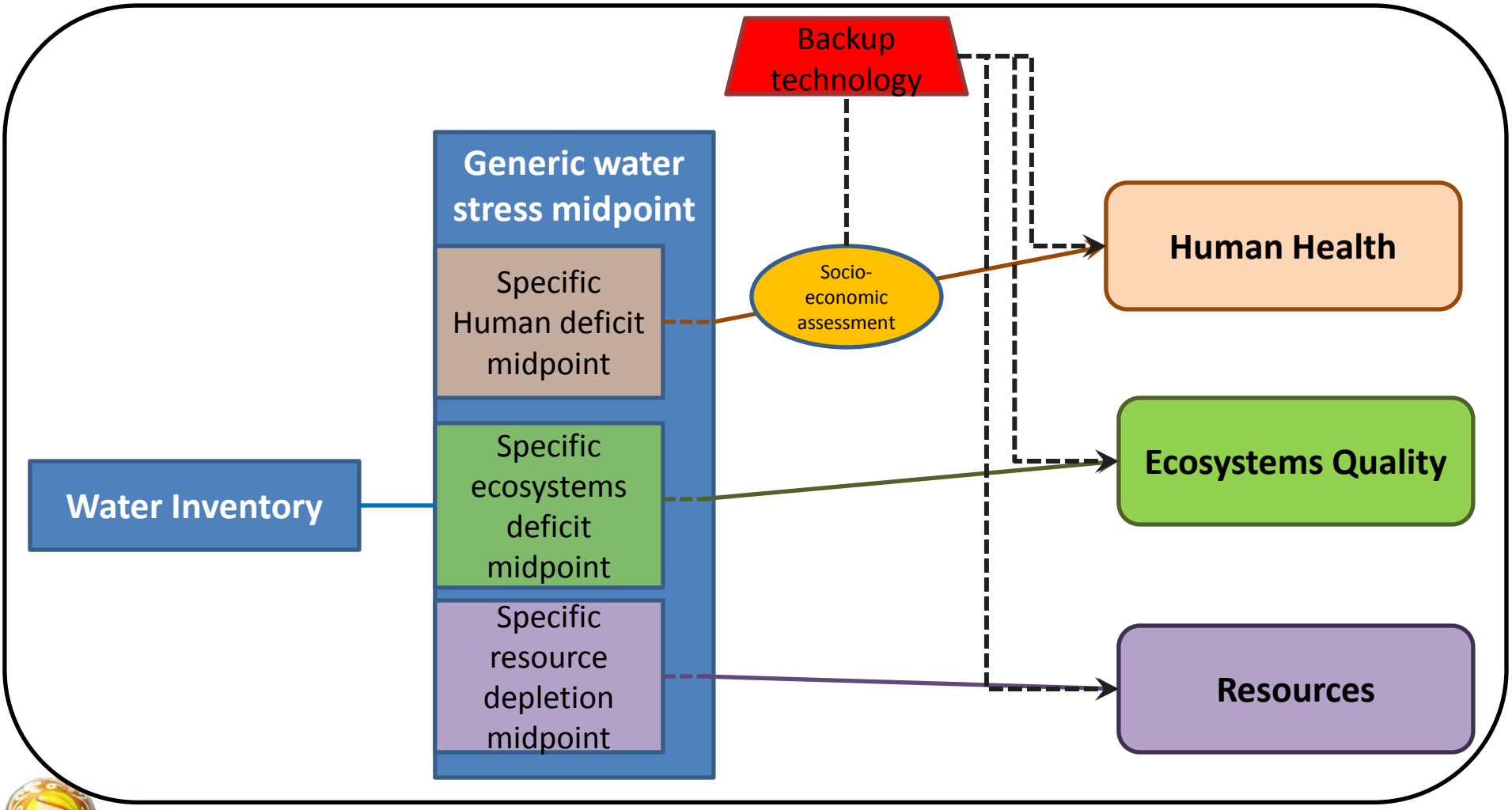
# Phase 1: Framework for impacts from water use in LCA (Bayart et al. 2010)

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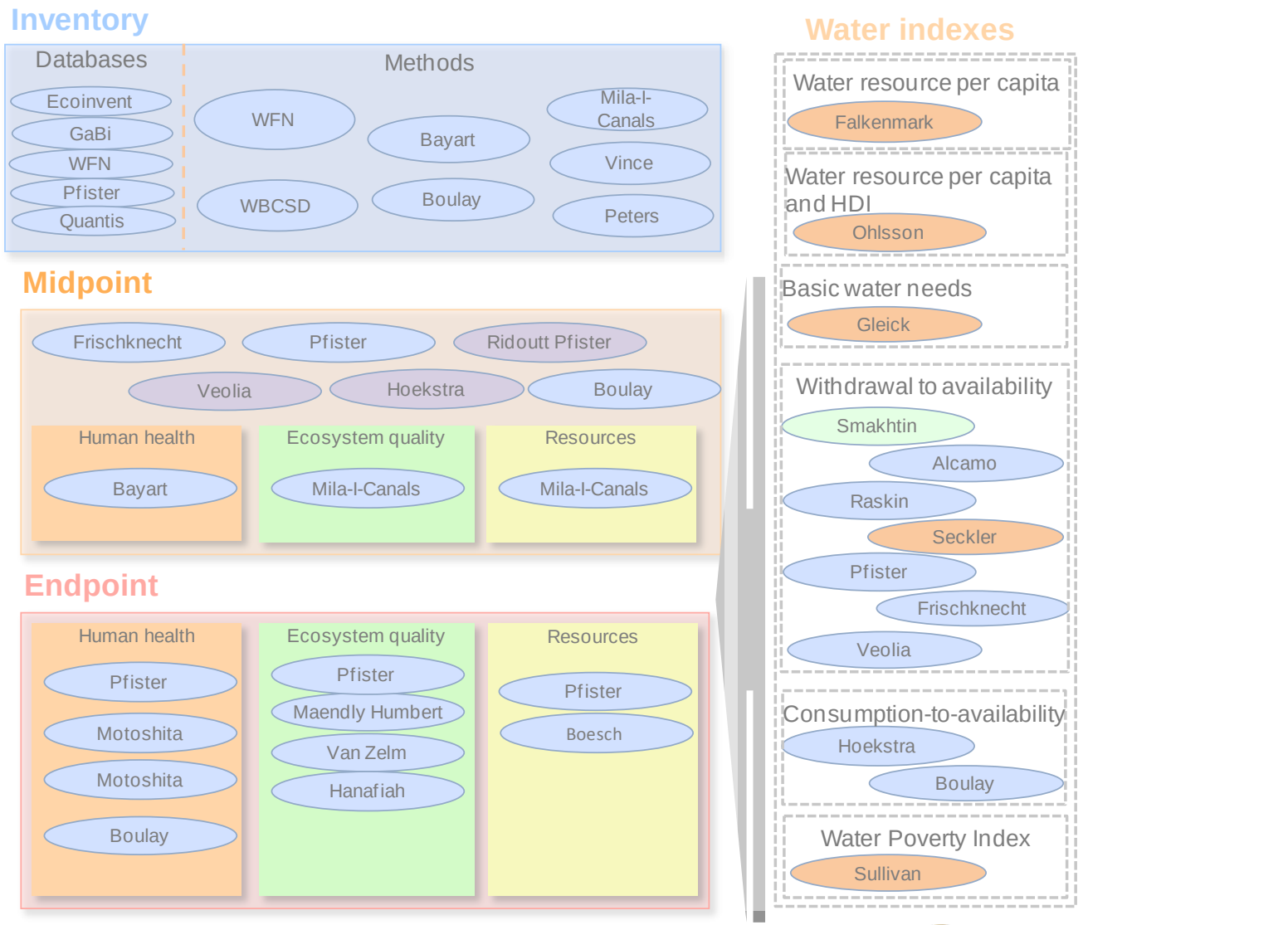
# Phase 2: Review of methods
## (Kounina et al, 2012)



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# Phase 3: Quantitative method comparison
(Boulay et al, in preparation)

- Methodological comparison of midpoint methods and human health endpoint methods
- Identify source of differences and similitudes
- Quantify uncertainty
- Provide insight and guidance for the development of a consensual method

Preliminary results presented this afternoon!

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# ISO 14046 Water footprint
## Requirements and guidelines

WG 8 set up by ISO/TC 207 subcommittee SC 5, *Life cycle assessment*.

**Timeline:**

**1st: June 2009, Cairo → launch (NP)**

2nd: Fall 2009, Stockholm (PWD)

**3nd: June 2010, Mexico (PWD)**

4rd: January 2011, Lausanne (PWD)

**5th: June 2011, Oslo (WD)**

6th: Fall 2011, Sao Paolo (CD)

7th: June 2012, Bangkok (CD)

8th: December 2012, Padova

Standard development steps:
**1- NP**: New Proposal
**2- WD**: Working Draft (PWD = preliminary WD)
**3- CD**: Committee Draft
**4- DIS:** Draft International Standard
**5- IS**: International Standard

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# ISO 14046 Water footprint
## Requirements and guidelines

**Participants:**

15 – 30 Countries

35 – 80 experts

→ *Draft has been registered and ballot initiated*

→ Standard expected in 2014



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# ISO 14046 Water footprint
## Requirements and guidelines

- 1- Should be life-cycle based
- 2- Could be “stand-alone” or part of a Life Cycle Assessment
- 3- Results should include impact assessment (volumes not sufficient)
- 4- Both quantity and quality should be considered
- 5- Comprehensive impact assessment related to water (not only water use but all impacts related to water)
- 6- Can result in one or several indicators
- 7- A critical review should be done before public communication

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# From inventory, to risk, to impacts…

**Inventory of water use**


**Water risk assessment (stress)**

**WATER FOOTPRINT**

Pollution

Resource Availability

Toxicity

Eutrophication

**Endpoint**

| Human health | Ecosystem quality | Resources |
|---|---|---|
|  |  |  |
| [DALY / y] | [PDF-m$^2$-y / y] | [MJ / y] |



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# What are the impacts associated with water?

**Problems**

**Areas of protection**

**Outputs**
Pesticide
Diesel
Cu
$CO_2$
Phosphate
…

**Inputs**
Irrigation Water
Crude Oil
Iron Ore
…

Respiratory effects
Photochem. oxydation
Ozone layer depletion
Ionizing radiation
Toxic Impacts
Global warming
Water availability
Acidification
Eutrophication
Land use
Biotic ressource use
Abiotic ressouce use

**Water Footprint**

Human Health
Ecosystem Quality
Resources



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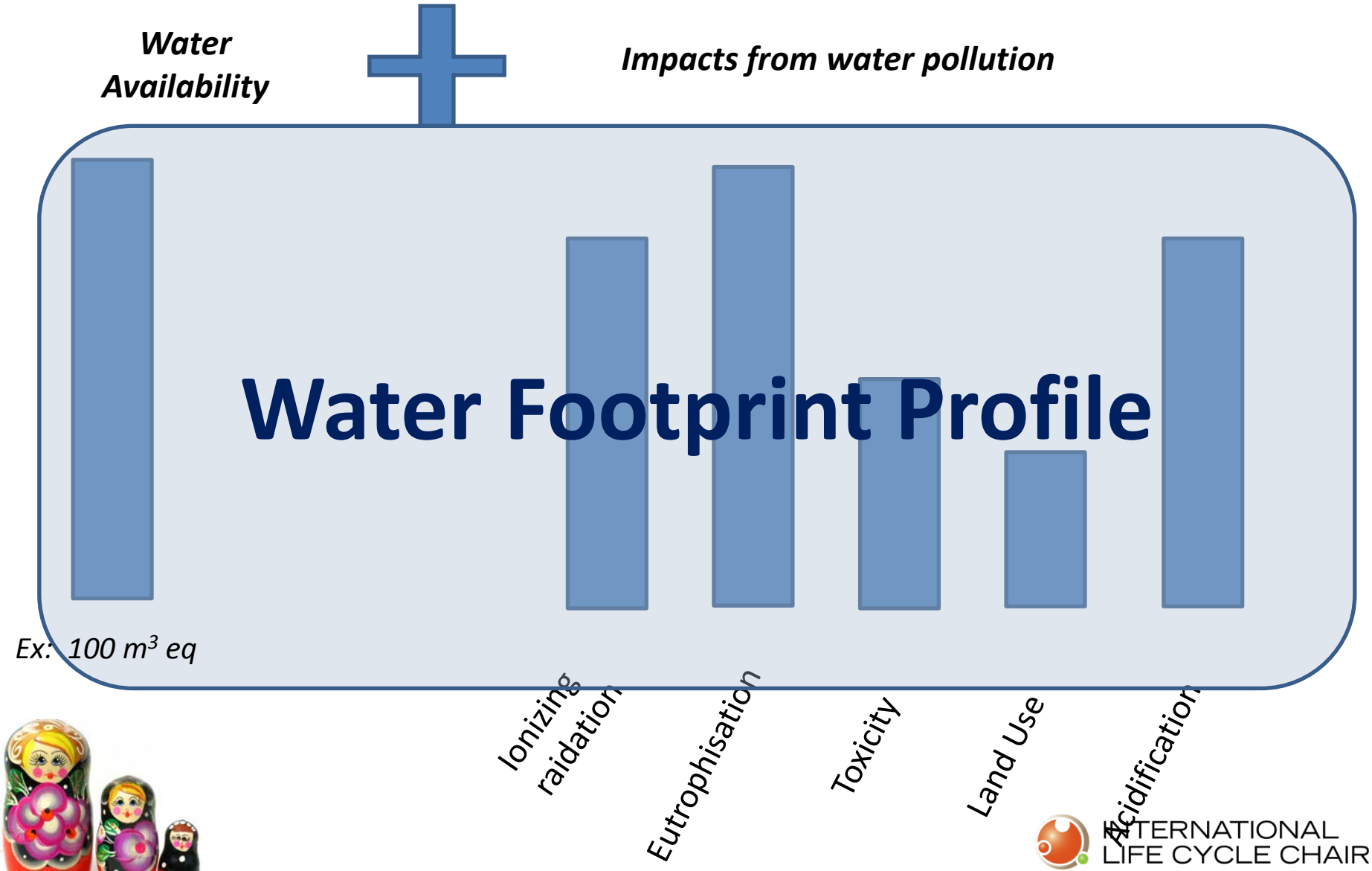
# Water Footprint Profile



# Water Footprint Profile

***Water Availability***

***Impacts from water pollution***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# Water Footprint as part of LCA

Water Availability Footprint

+

Impacts from water pollution

Water Footprint impacts

**Water Footprint Assessment Profile**

IMPACT World+ ™

***Impact World+ allows to produce a water Footprint, carbon footprint, etc… within an LCA***

All other LCA impacts not related to water

Human Health

Ecosystems

Resources

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# In perspective…

Life Cycle
Assessment

Water Footprint
Assessment

Water availability
Footprint

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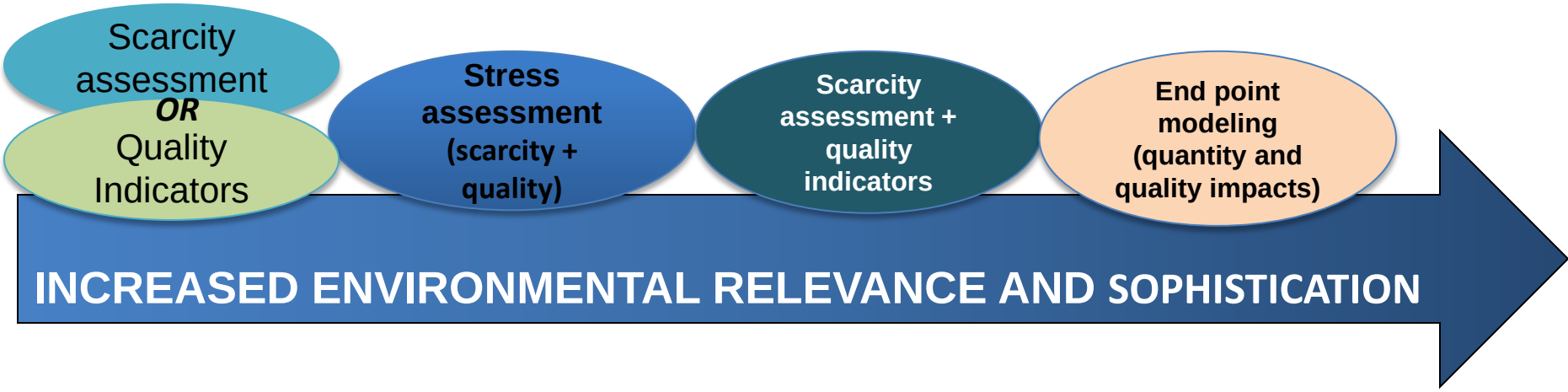
# Summary: Water impacts metrics




- Scarcity Indicators – ex: Pfister et al., Boulay et al (simplified version)
- Stress Indicator – ex: Boulay et al., Veolia method
- Quality indicators: Eutrophisation, ecotoxicity, acidification, etc.
- Endpoint Modeling: Human health, Ecosystems and Resources

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# Conclusion and discussion points

1- ISO is still defining the principles and guidance for water footprinting:

- Where does the modeling stop? (ex: emission of SOx to air)
- Desire of one number versus challenges of aggregating impacts with no hidden weighting

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# Conclusion and discussion points

2- WULCA Group is fostering developments for an harmonized method:

- Some methods should be used in combinations, while others may create double counting
- Some impacts pathways are still poorly assessed (ex: impacts on ecosystems from hydropower)
- Optimal regionalization is not identified

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# Conclusion and discussion points

3- In practice:

- Databases (Quantis water database, ecoinvent 3) can now support most methods, but stress assessment methods (including quality) are still lost between inventory databases and impact assessment softwares
- Strong need and motivation from industry to report/label on WF, **BUT**:
  - Only one or 2 numbers
  - Should include all relevant impacts
  - No weighting and
  - No mention of dalys (especially for the food industry)

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# Acknowledgements





















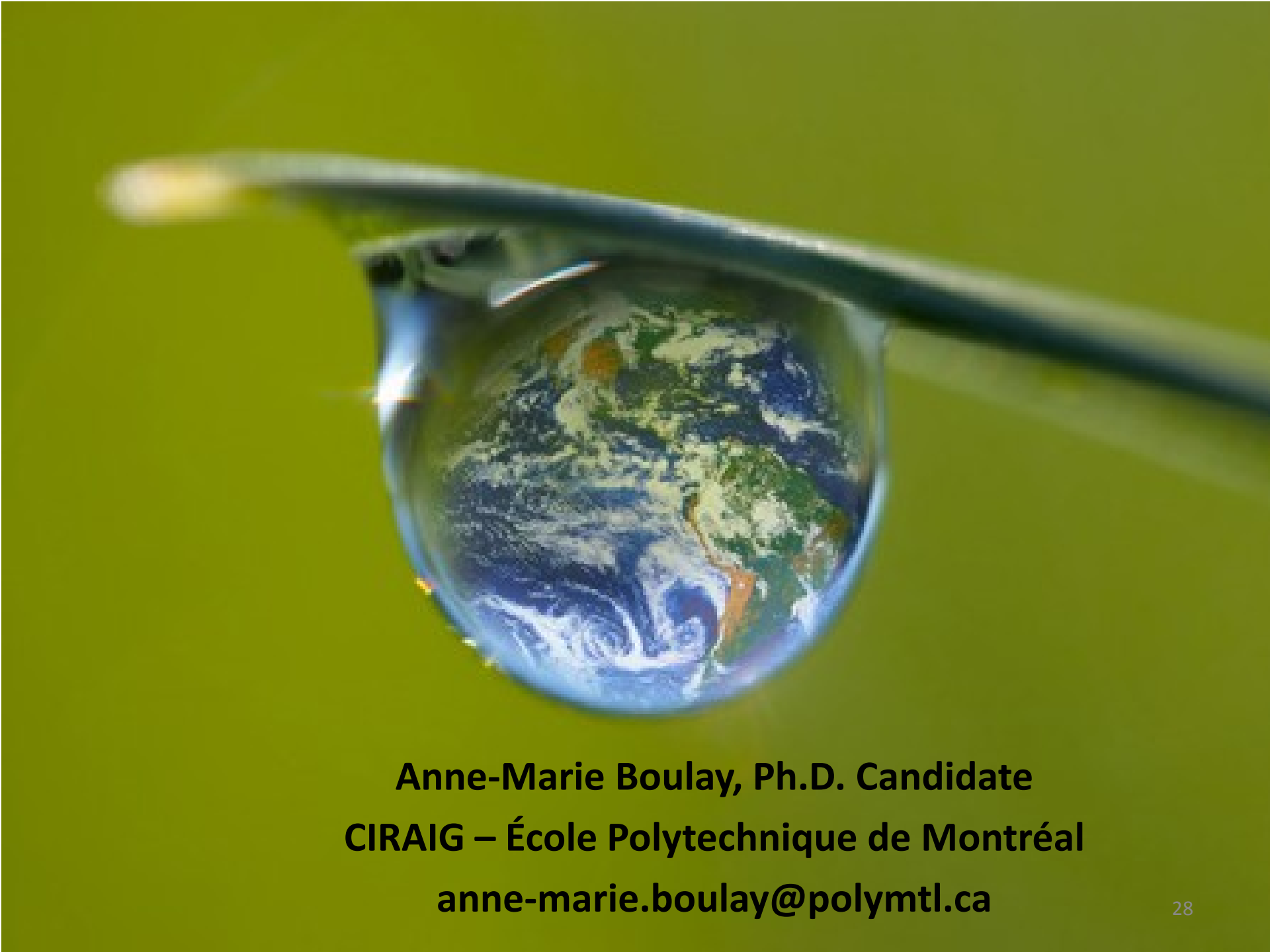

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