RiReMo project: operational monitoring of riparian zones in Wallonia

STEREO III programme (SR/00/347 & SR/12/383)

BEODAYS 2020

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24/11/2020

Riparian **Re**mote **Mo**nitoring for river management

OBJECTIVES

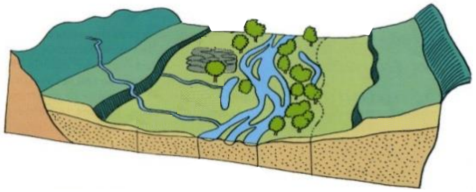
Central objective:

- Develop cost effective tools (based on remote sensing approach) to monitor 12000 km of riparian area

Target audience:

- River (and riparian) managers from public administrations of Wallonia



RiparianRemote Monitoring for river management

PARTNERSHIP

"Development of application" project - STEREO III program

Coordination

- The directorate of non-navigable watercourses

Scientific partner

- Gembloux Agro-Bio Tech, University of Liège
- Forest management research group
- Based on previous research projects on regional characterization of riparian area
- Employees of project: 1 post-doc researcher and 1 technician (6 months)

Timetable

- Start in February 2017
- End of project: April 2020

Riparian Remote Monitoring for river management

CONTEXT: River and riparian areas management in Wallonia

Important ongoing reform: PARIS actions program

- Gather all actions of public administrations related to river (“*physical*”) management
  - → Official launch in 2021
- Duration: 6 years
- Monitoring wanted at start / middle / end of the programs
  - > 12000 km of rivers targeted
- Field based monitoring not realistic

→ Interest for RS approach !

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CONTEXT

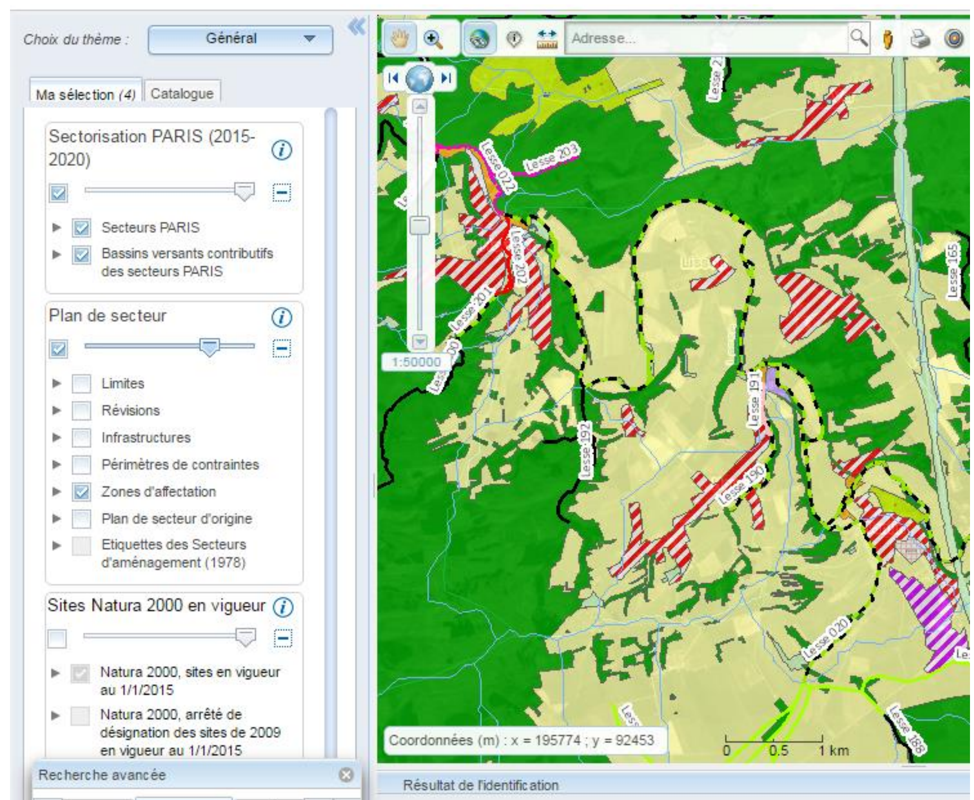
Scientific support needed to develop remotely sensed decision-making tools to monitor riparian area at a regional scale

→Rationale behind the RiReMo project

PARIS online platform developed by SPW:

- Decision-making tools
- Management actions encoding

→ ***Medium of project outputs!***



Riparian Remote Monitoring for river management

OBJECTIVES

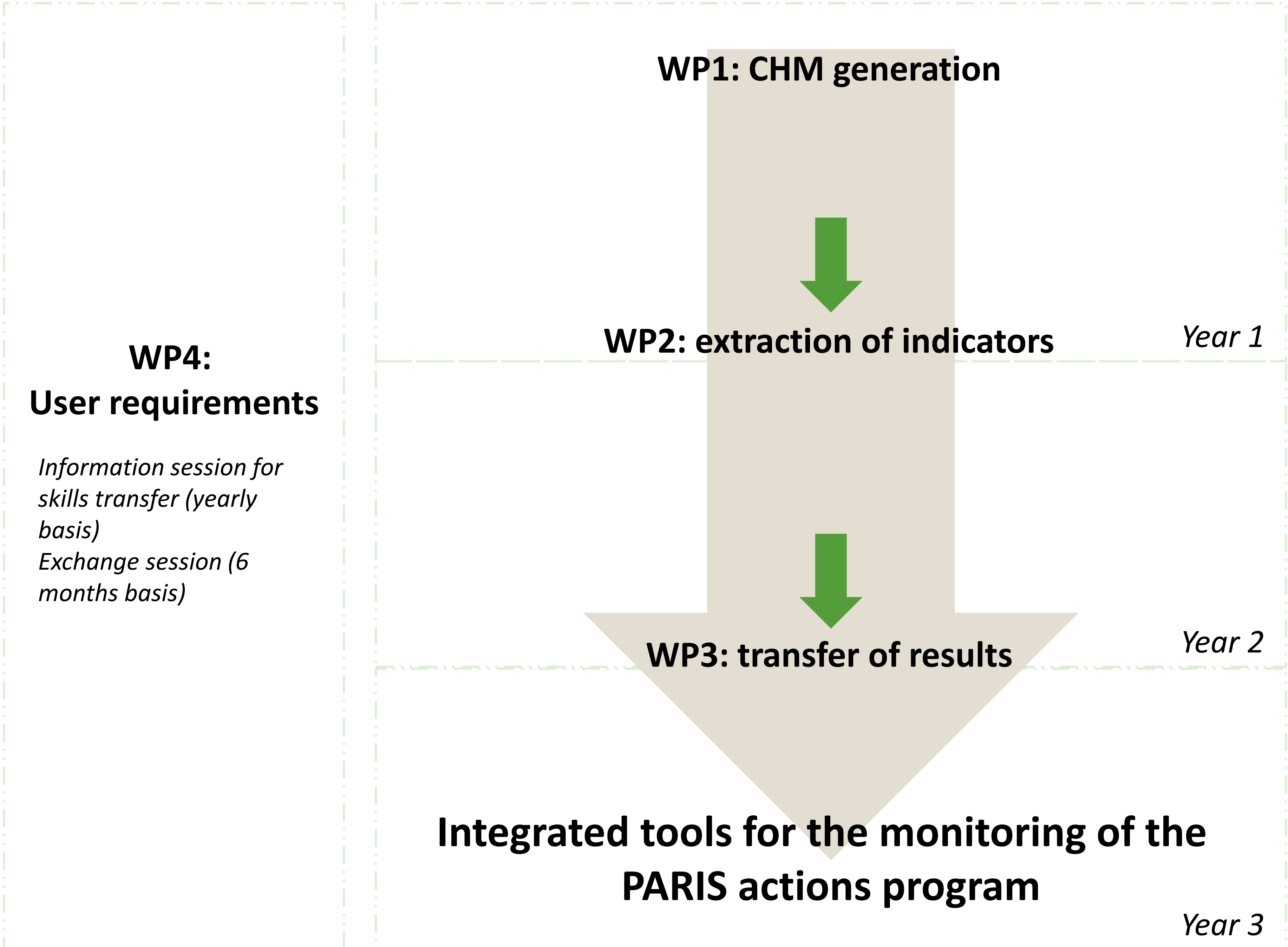
Development of management indicators (river managers)

- Regional scale (entire river network and riparian area)
- Cost effective approach (repeatability):
  - data free-of-charges / already acquired on a regular basis (LiDAR, orthophoto surveys)

Integration of main outputs (decision making tools) in online platform for river managers

Training of the administration staff

- Familiarization with RS techniques deployed (photogrammetry / LiDAR)
- Update of the identified indicators after the project


WP4:
User requirements
Information session for skills transfer (yearly basis)
Exchange session (6 months basis)
WP1: CHM generation
WP2: extraction of indicators
Year 1
WP3: transfer of results
Year 2
Integrated tools for the monitoring of the PARIS actions program
Year 3

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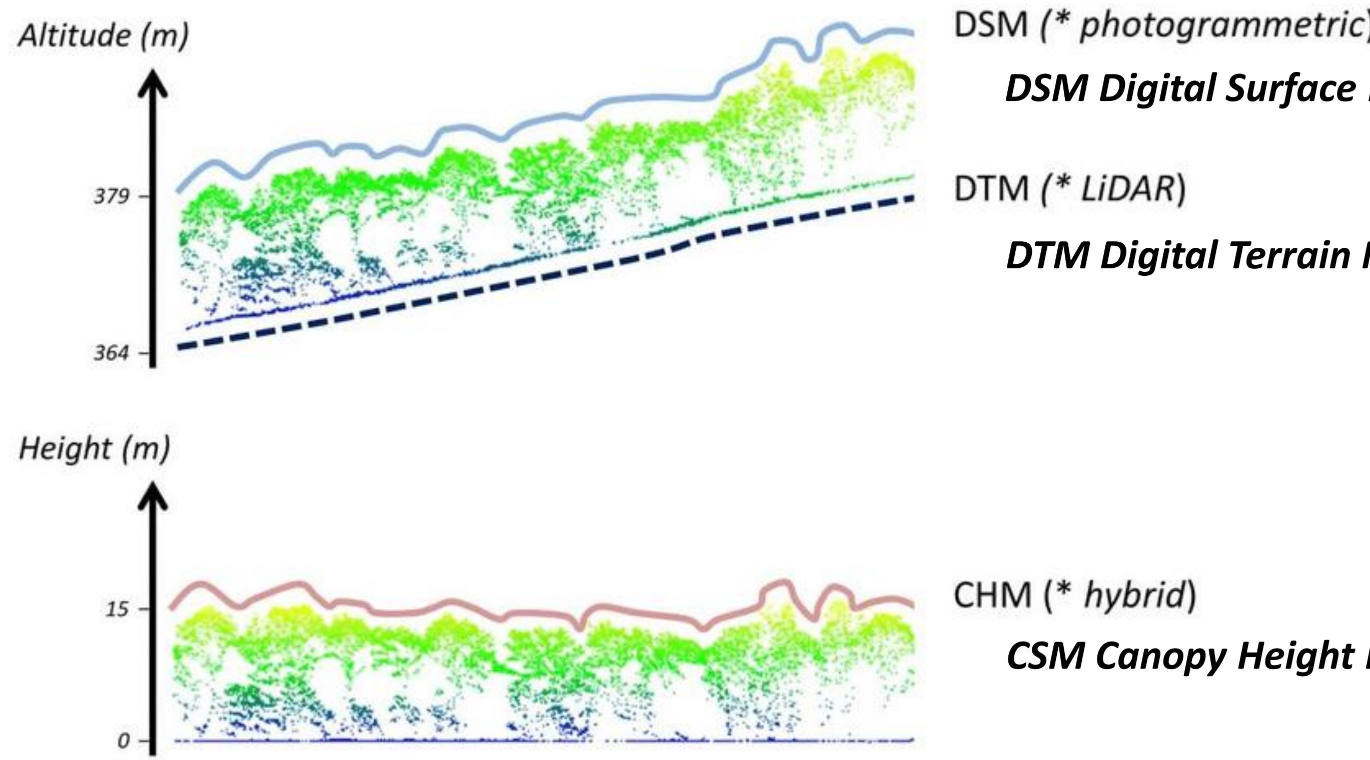
WP1: canopy height model (CHM) generation

Objective: Multitemporal characterization of riparian vegetation (indicators)



DSM Digital Surface Model

DTM Digital Terrain Model

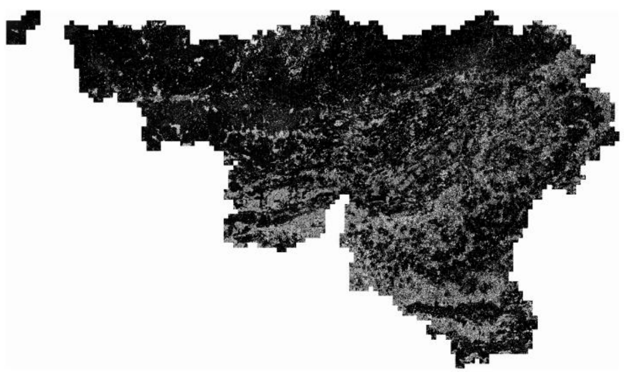
CSM Canopy Height Model

WP1: canopy height model (CHM) generation

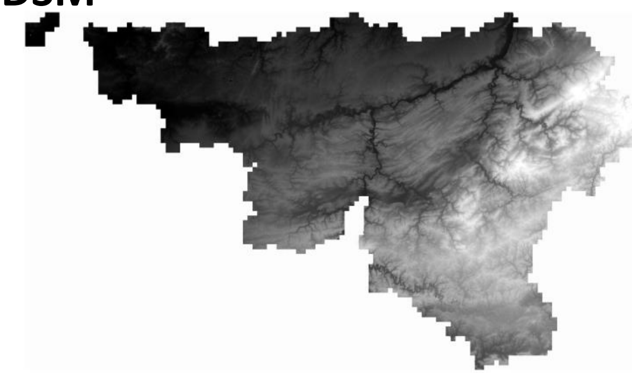
DSM and CHM publically available for 2006, 2009, 2015 and 2016 Walloon orthophoto surveys

- Soon available on geoportail.wallonie.be

CHM



DSM



- Validation paper (OA)

ELSEVIER

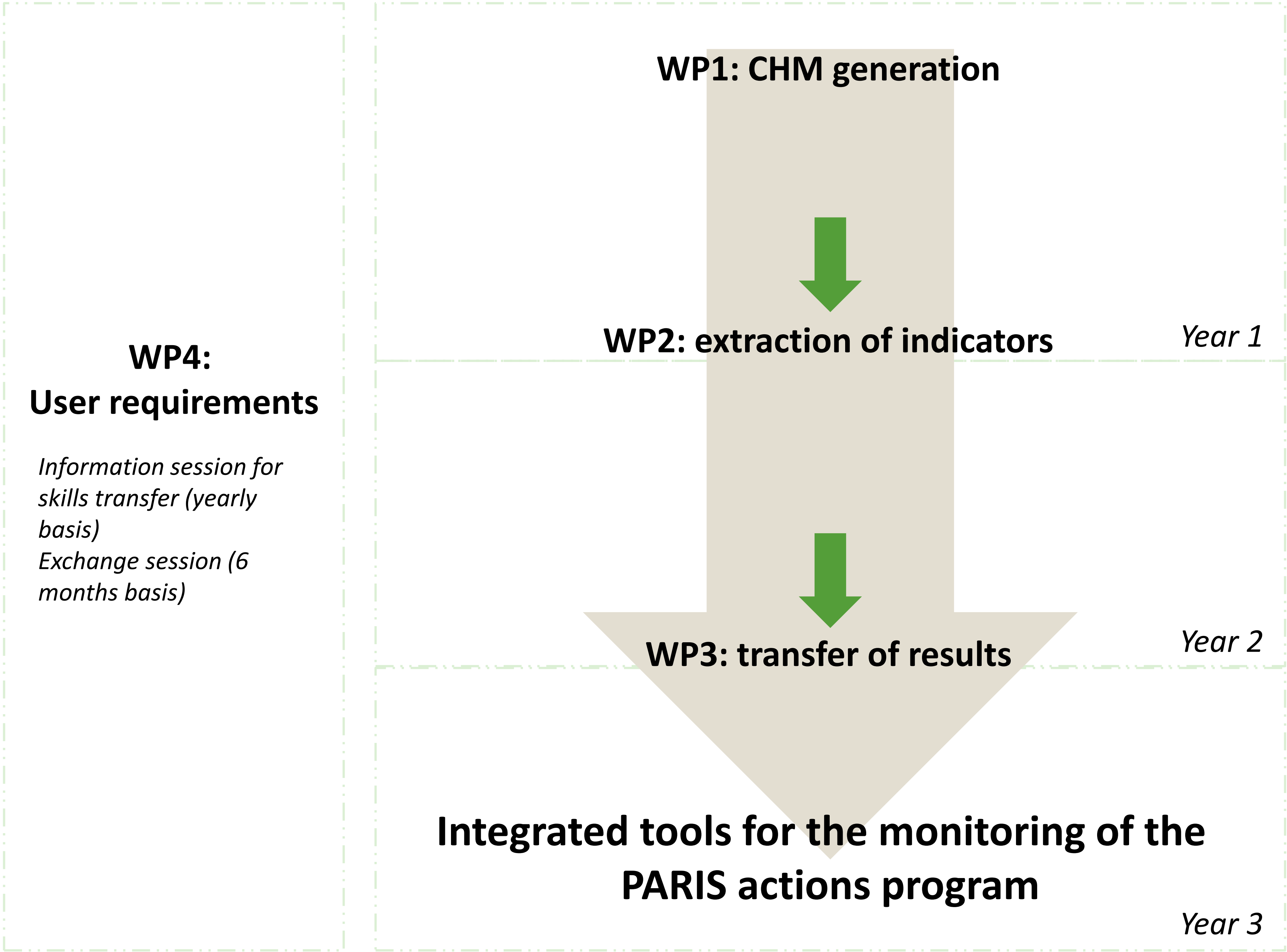
International Journal of Applied Earth Observation and Geoinformation

Volume 92, October 2020, 102190

Can regional aerial images from orthophoto surveys produce high quality photogrammetric Canopy Height Model? A single tree approach in Western Europe

https://doi.org/10.1016/j.jag.2020.102190

Adrien Michez [a, b], Leo Huylenbroeck [b], Corentin Bolyn [b], Nicolas Latte [b], Sébastien Bauwens [b], Philippe Lejeune [b]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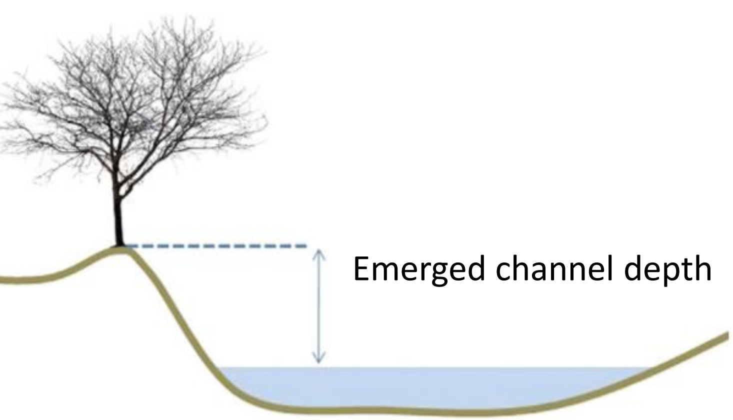
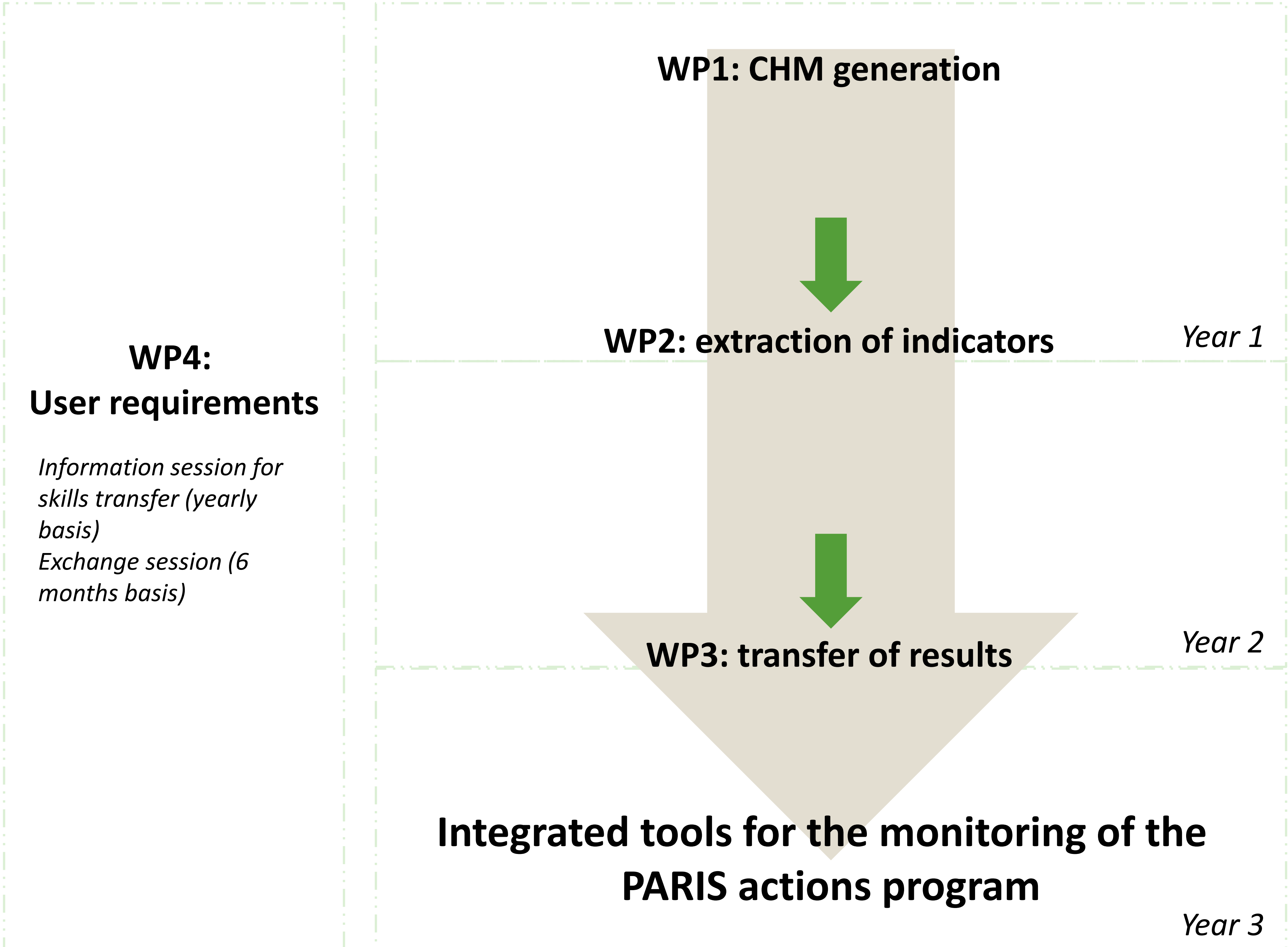
WP2: extraction of quality and management indicators

3D indicators of the riparian area

- Time series of CHM + LiDAR DTM
- Temporal evolution of key indicators: longitudinal continuity, height growth, …
- Morphological indicators (DTM)
- Computed for the entire river network (12000 km, 6000 management units)



Michez, A et al. (2013). LiDAR derived ecological integrity indicators for riparian areas: Application to the Houille river in Southern Belgium/Northern France. *Ecological indicators*
Michez, A et al. (2017). Multi-temporal monitoring of a regional riparian buffer network (> 12,000 km) with LiDAR and photogrammetric point clouds. Journal of Env. Management.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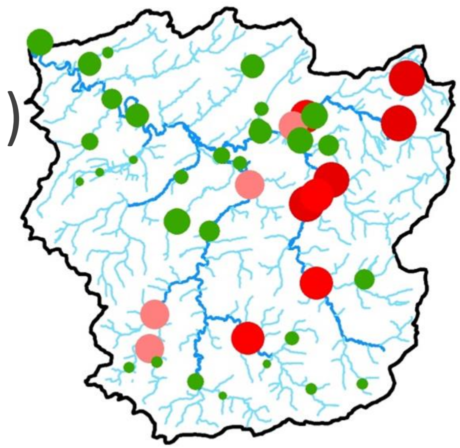
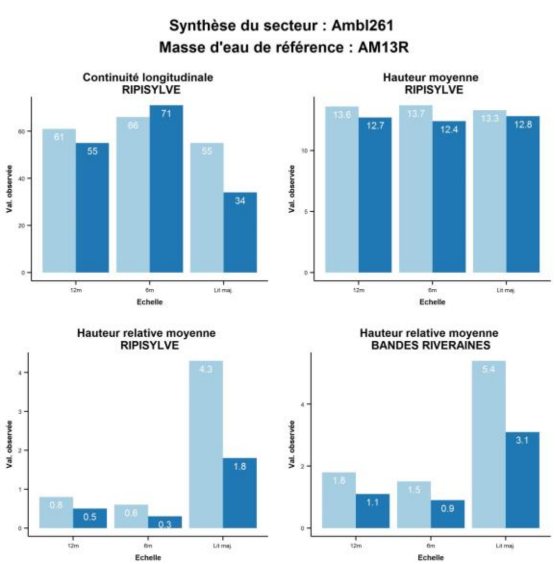
WP3: transfer of results

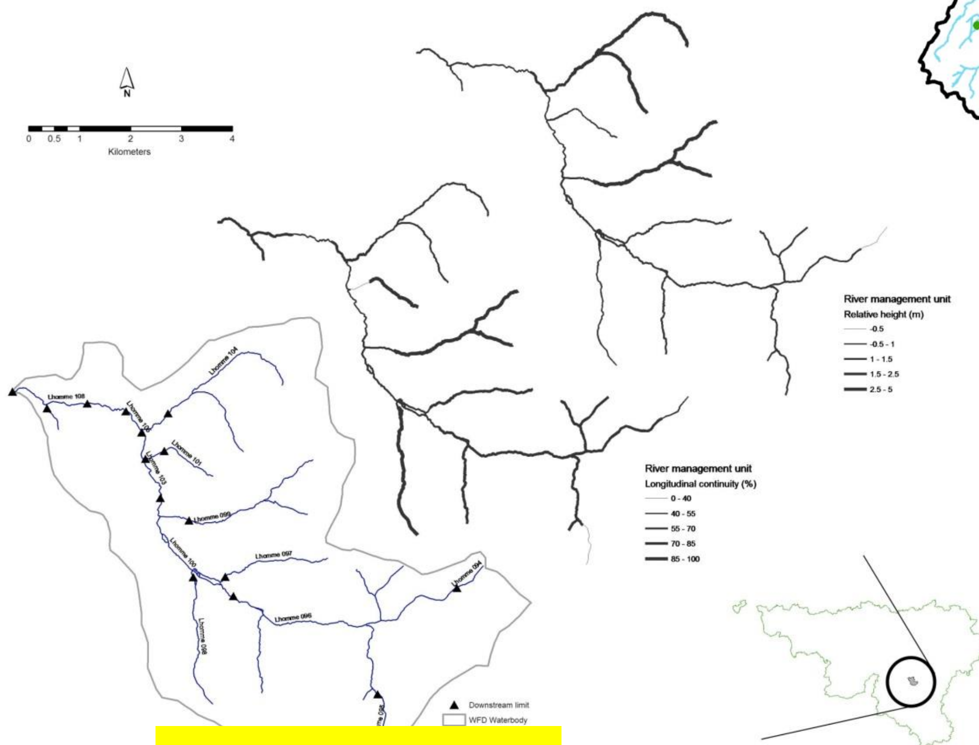
Objective : integration of useful indicators in online platform for river managers

- Workshops with field river managers
- Multiscale synthesis (maps, graph, diagrams, …)



Watershed
(e.g. Lesse, 500 km)





Management unit (ca. 2km)

Water Body (40 km)

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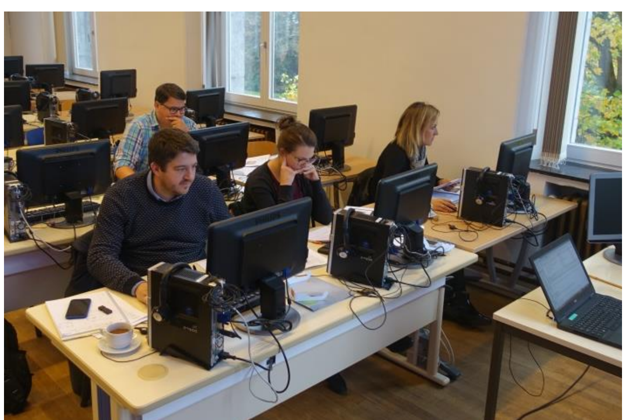
WP4: organization of transfer and exchange

Objective: train the administration to reproduce the project outputs

3 Skills transfer sessions (yearly basis)

- Structure from motion photogrammetry
- Aerial LiDAR and river management
- Integrating and updating the RiReMo management indicators for the PARIS webgis platform



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All results available on FTP server:

- E-mail for access
- CHM/DSM (Soon available on geoportail.wallonie.be)
- Training sessions

Successful project:

- Fruitful exchanges between research team and river managers
- Results of the project used by managers for next management planning cycle
  - Indicators and supporting materials (maps, diagrams, …) included in online platform within a year
  - Administration independent of the research partner to carry out the next update of the indicators.

Belgian Science Policy Office belspo

Gembloux Agro-Bio Tech
Université de Liège

Wallonie | SPW Service public de Wallonie

Thanks for your attention!

Questions?

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