MODELING FLUMEN RIVER

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WORKING STRUCTURE

1. OBJETIVES
2. STUDY AREA
3. SWAT PARAMETERS
4. MANUAL CALIBRATION
5. SENSITIVTY ANALYSIS
6. CONCLUSIONS
7. NEXT STEPS

1. OBJETIVES

flow and pollulant movements modelization

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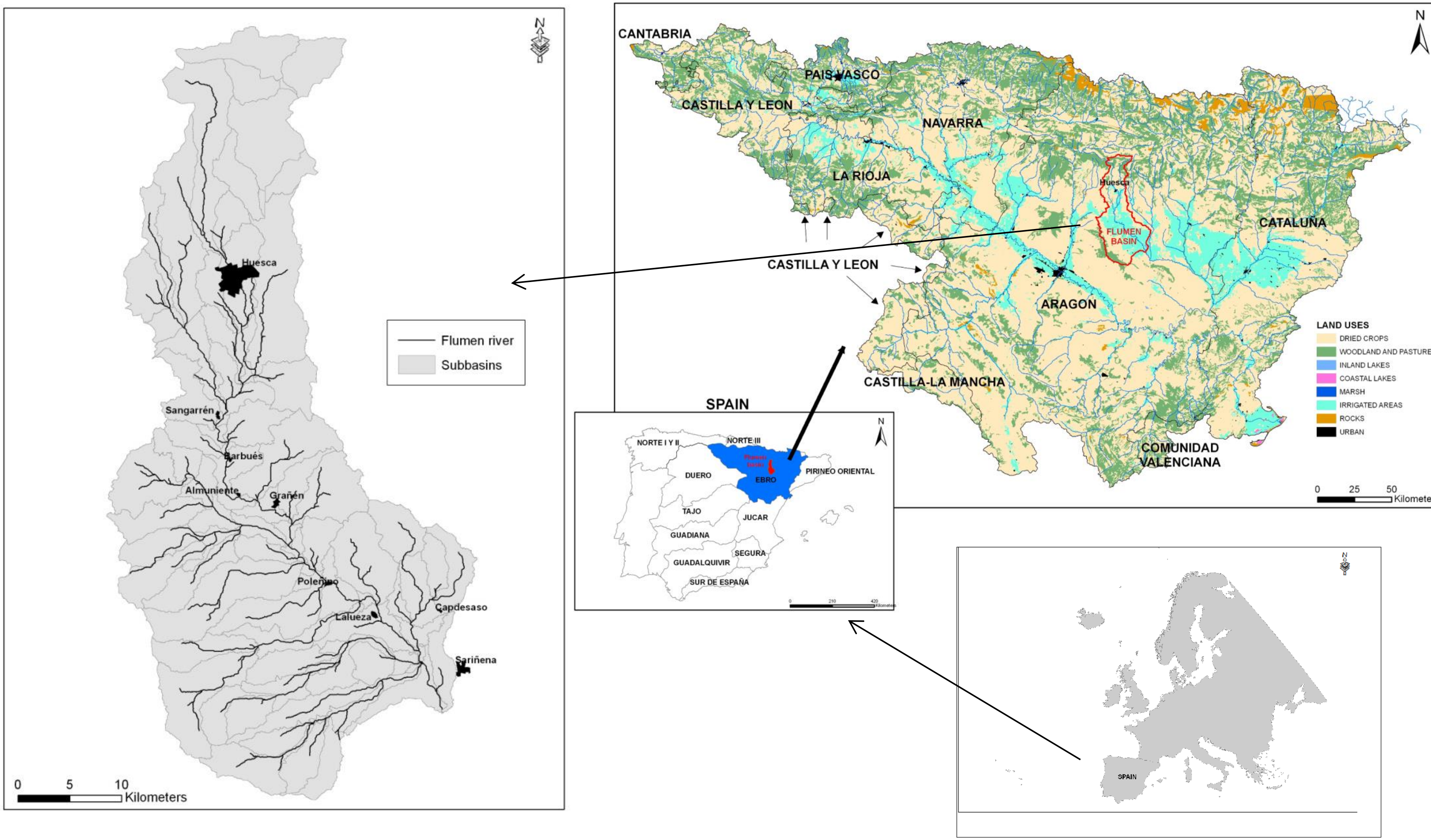
Identify risks of pollulion and flood events

2. STUDY AREA

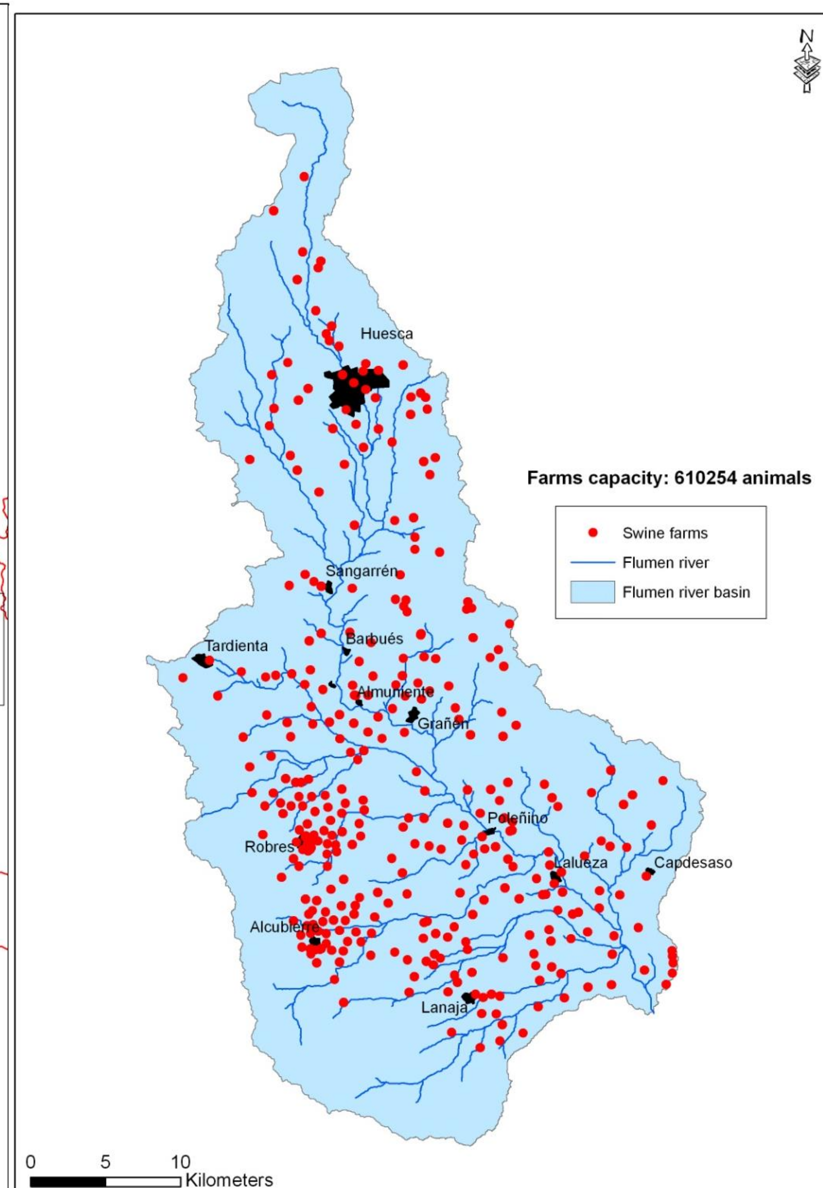

Huesca
Sangarrén
Barbués
Almuniente
Grañén
Poleñino
Lalueza
Capdesaso
Sariñena
Flumen river
Subbasins
0 5 10 Kilometers
CANTABRIA
PAIS VASCO
CASTILLA Y LEON
NAVARRA
LA RIOJA
Huesca
FLUMEN BASIN
CATALUÑA
CASTILLA Y LEON
ARAGON
CASTILLA-LA MANCHA
COMUNIDAD VALENCIANA
LAND USES
DRIED CROPS
WOODLAND AND PASTURES
INLAND LAKES
COASTAL LAKES
MARSH
IRRIGATED AREAS
ROCKS
URBAN
0 25 50 Kilometers
SPAIN
NORTE I Y II
NORTE III
DUERO
EBRO
PIRINEO ORIENTAL
TAJO
JUCAR
GUADIANA
SEGURA
GUADALQUIVIR
SUR DE ESPAÑA
SPAIN

SEMIARID REGION

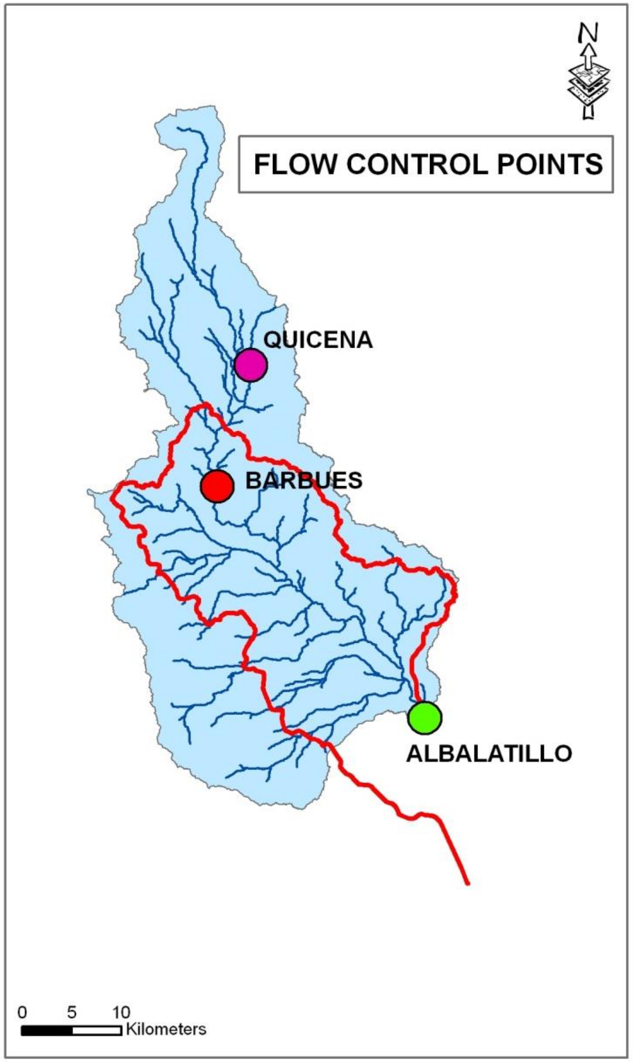
MEAN PRECIP = 378.1 mm
ET = 546.1 mm
PET = 1144.1 mm

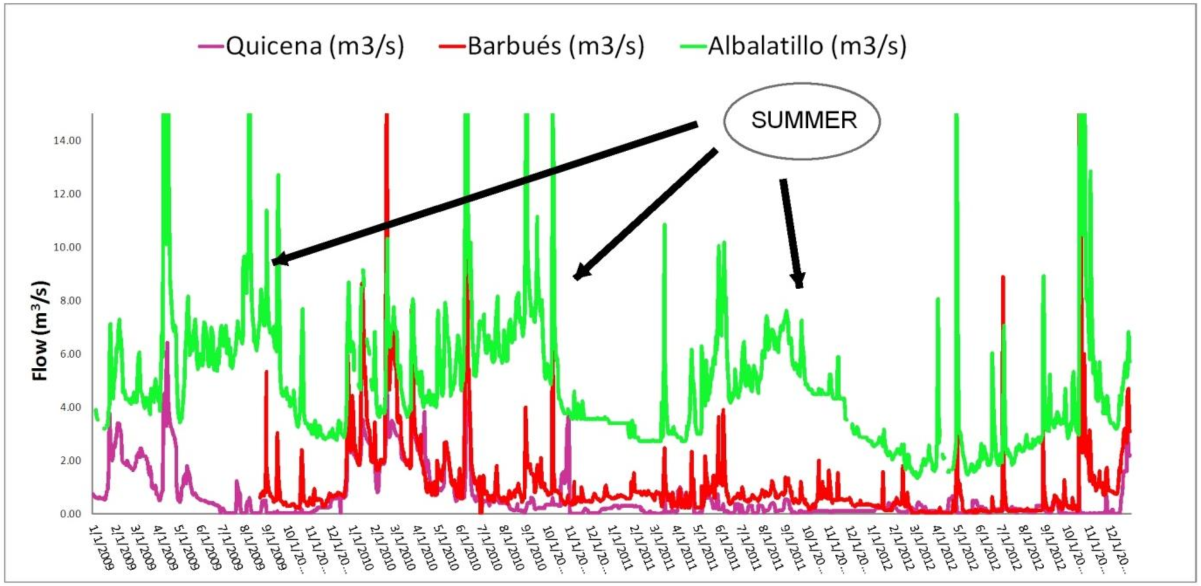
INTENSIVE AGRICULTURE AND SWINE FARMING


N
acequia del Flumen
IRRIGATED AGRICULTURE
ARTIFICIAL DRAINAGE NETWORK
Channels
Flumen river
Flumen river basin
0 5 10 Kilometers

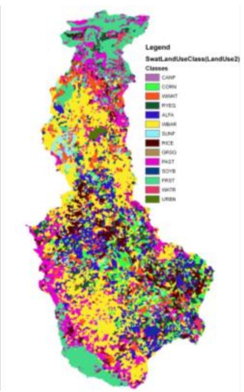

N
Farms capacity: 610254 animals
Swine farms
Flumen river
Flumen river basin
Huesca
Sangarrén
Tardienta
Barbués
Almuniente
Grañén
Poleñino
Robres
Lalueza
Capdesaso
Alcubierre
Lanaja
0 5 10 Kilometers

INVERTED FLOW

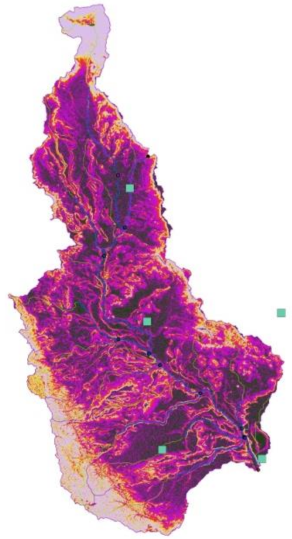




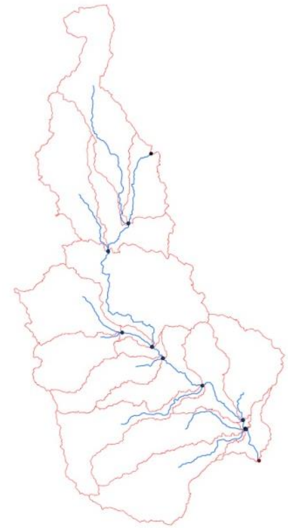
3. SWAT PARAMETERS

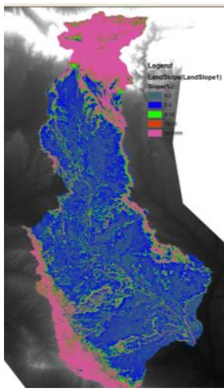


LANDUSE

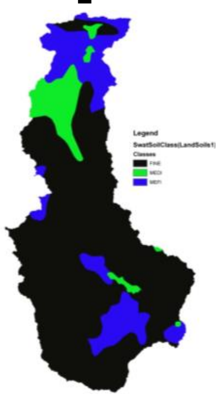


- 1271 Km^2
- 19 Subbasins
- 446 HRUs
- 5 weather stations
- 1 inlet
- 1 point source
- 1 outlet





SLOPES



SOILS

MANAGEMENT

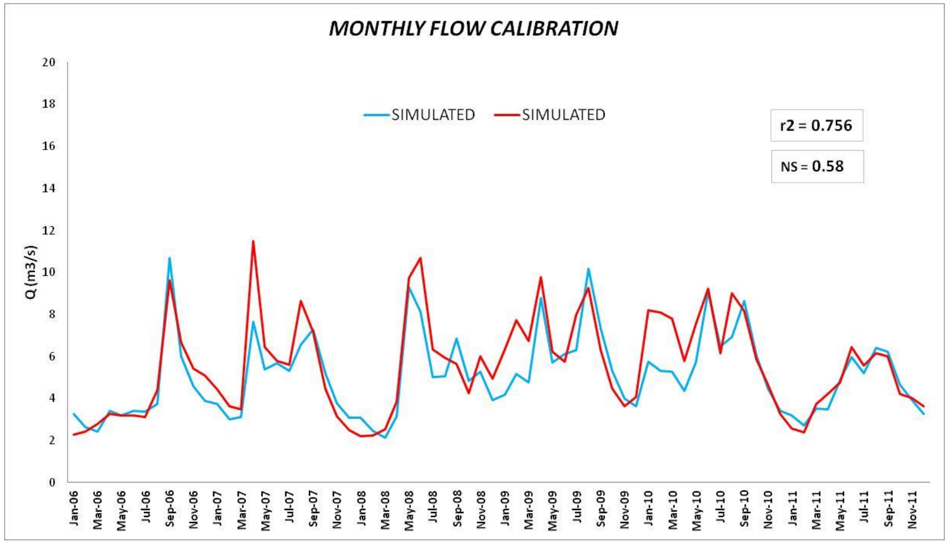
IRRIGATION	m3/Ha per year
ALFALFA	9000-12000
CORN	8000-10000
RICE	15000-16000
BARLEY*	3000-4000
WHEAT*	4000-5000

FERTILIZATION

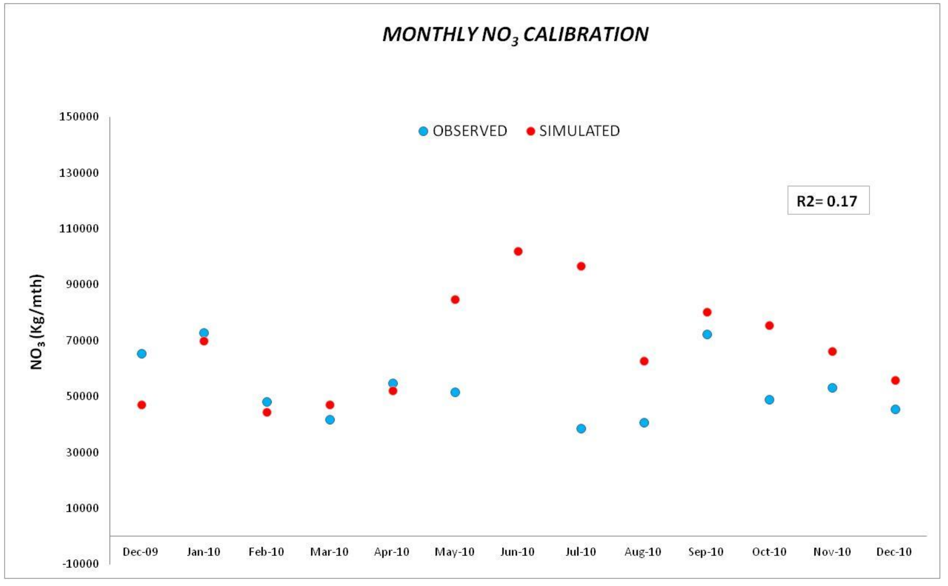
	ALFALFA		CORN		WINTER BARLEY		WINTER WHEAT		RICE	
	DATE	Kg/Ha	fecha	Kg/Ha	fecha	cantidad (Kg/Ha)	fecha	(Kg/Ha)	fecha	(Kg/Ha)
L FERTILIZATION			APRIL	1000 (8-15-15)	NOVEMBER	600 (8-15-15)	NOVEMBER	700 (8-15-15)	APRIL	300 (urea)
LANT BEGIN	APRIL-SEPTEMBERe		APRIL		NOVEMBER		NOVEMBER		APRIL	
ENT FERTILIZATION	FEBRUARY JUNE	350 (urea) 300 (urea)	MAY JUNE	400 (urea) 200 (N LIQUID)	FEBRUARY MARCH	200 (urea) 100 (N LIQUID)	FEBRUARY MARCH	250 (urea) 150 (N LIQUID		
HARVEST	SEPTEMBER(EACH 4 YEARS)		NOVEMBER		JUNE		JULY		OCTOBER	
VINE MANURE			WINTER	60 m3/Ha	WINTER	30 m3/Ha	WINTER	30 m3/Ha	WINTER	30 m3/Ha

4. CALIBRATION

8 years calibration



1 year calibration



5. SENSITIVITY ANALYSIS FLOW CALIBRATION. PARAMETERS RANKS

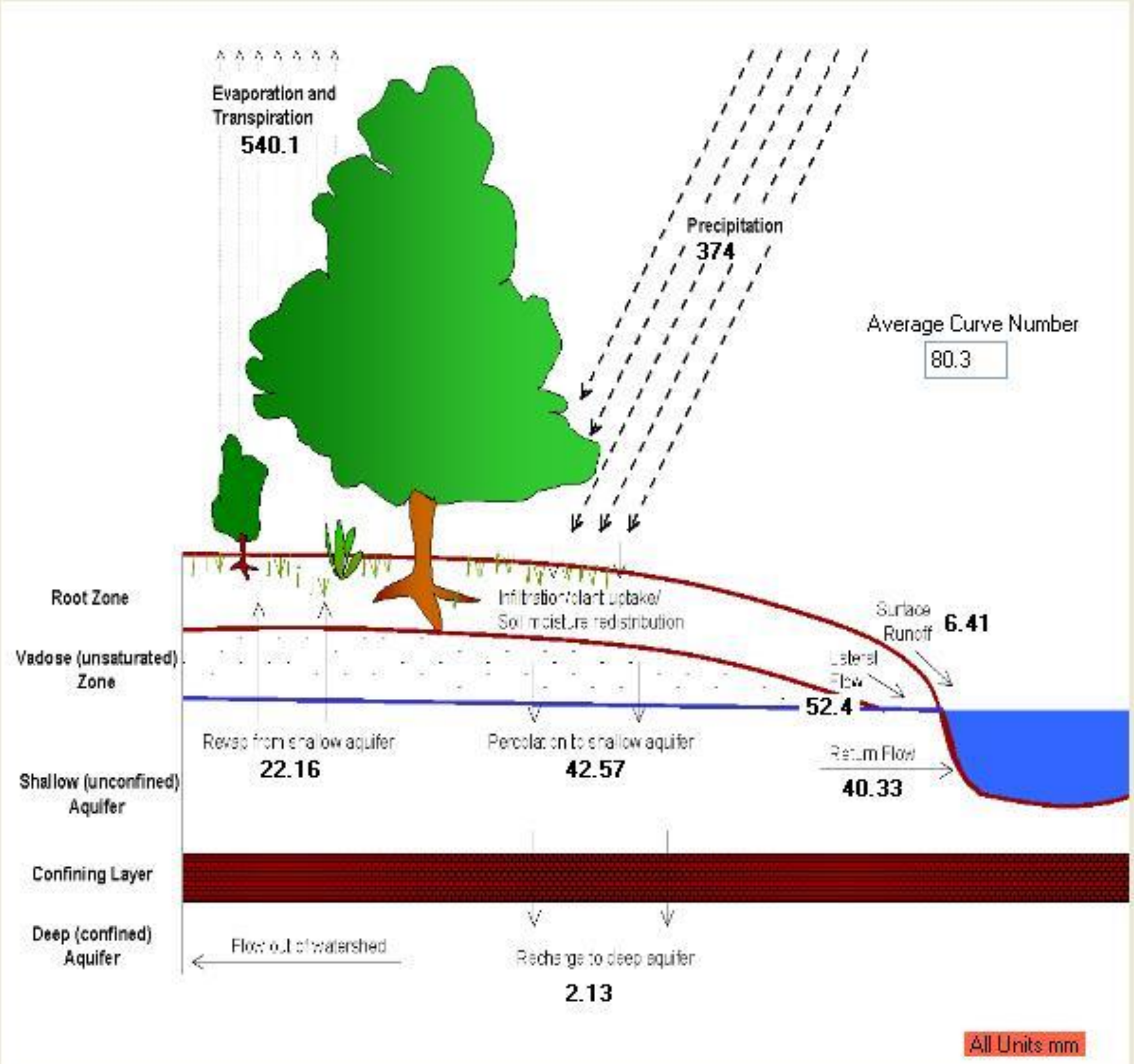
1.- SOL_Z (lack of soil information)
2.-CN2 (not modified)
3.-ESCO
4.- GWQMN
5.- EPCO
6.- SOL_K
7.- GW_DELAY
8.- SURLAG
9.- SOL_AWC
10.- ALPHA_BF

Aqua flash
INTERREG SUDOE

Contamination Crues Rivières Risque Bassins versants Modélisation Prototype

SWAT Error Checker -- Version 1.0 Released Sept 28, 2011

Setup | Hydrology | Sediment | Nitrogen Cycle | Phosphorus Cycle | Plant Growth | Landscape Nutrient Losses | Land Use Summary | Instream Processes | Point Sources | Reservoirs | About



Realistic hydrology is the foundation of any model. Pay particular attention to evapotranspiration, baseflow and surface runoff ratios. Baseflow/streamflow ratios for the US are provided by the USGS, these data are accessible via the button below. The ranges specified here are general guidelines only, and may not apply to your simulation area.

Show US Baseflow Map

Messages and Warnings

Surface runoff ratio may be low (< 0.2)
Lateral flow is greater than groundwater flow, may indicate a problem
ET Greater than precip, may indicate a problem unless irrigated
Surface Runoff may be too low

Water Balance Ratios

Streamflow/Precip	0.27
Baseflow/Total Flow	0.94
Surface Runoff/Total Flow	0.06
Perc/Precip	0.11
Deep Recharge/Precip	0.01
ET/Precipitation	1.44

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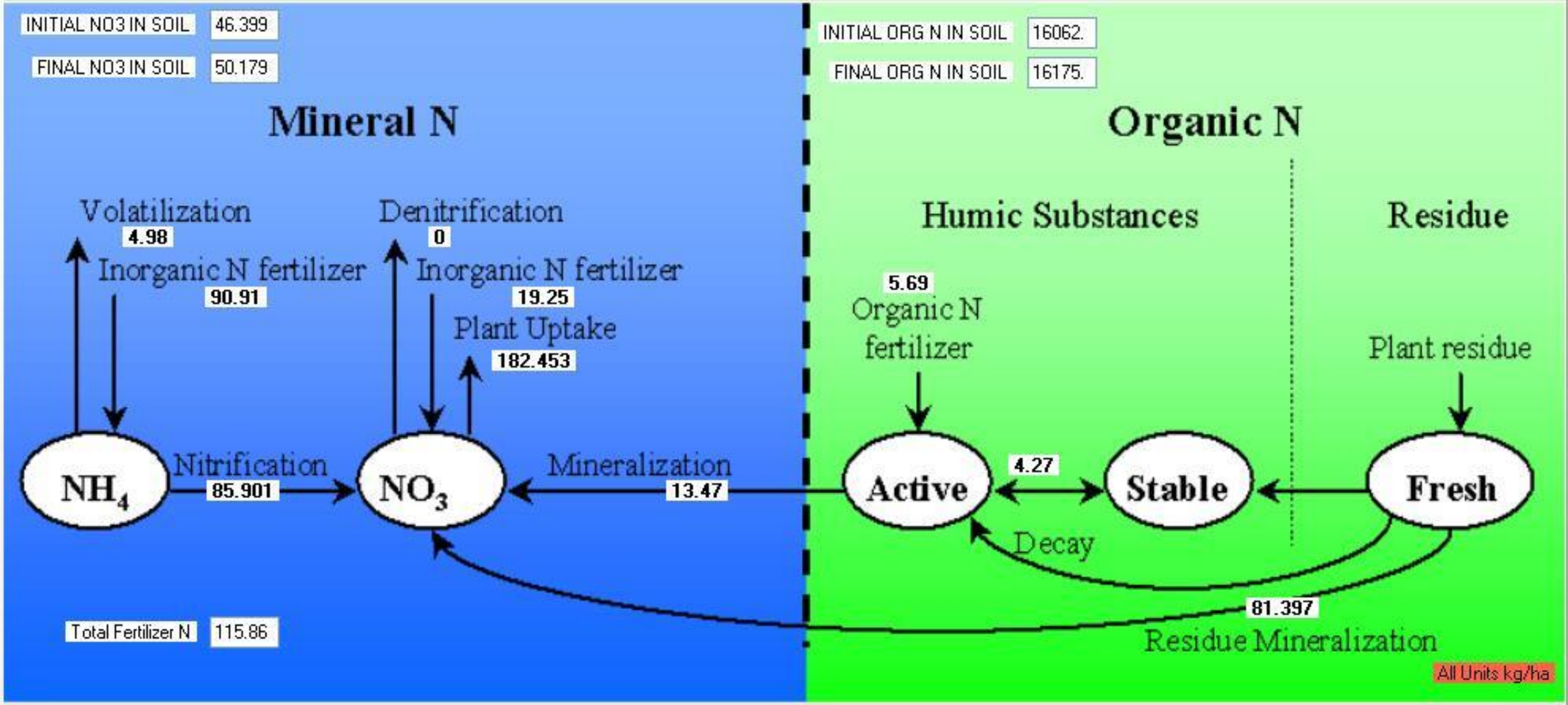
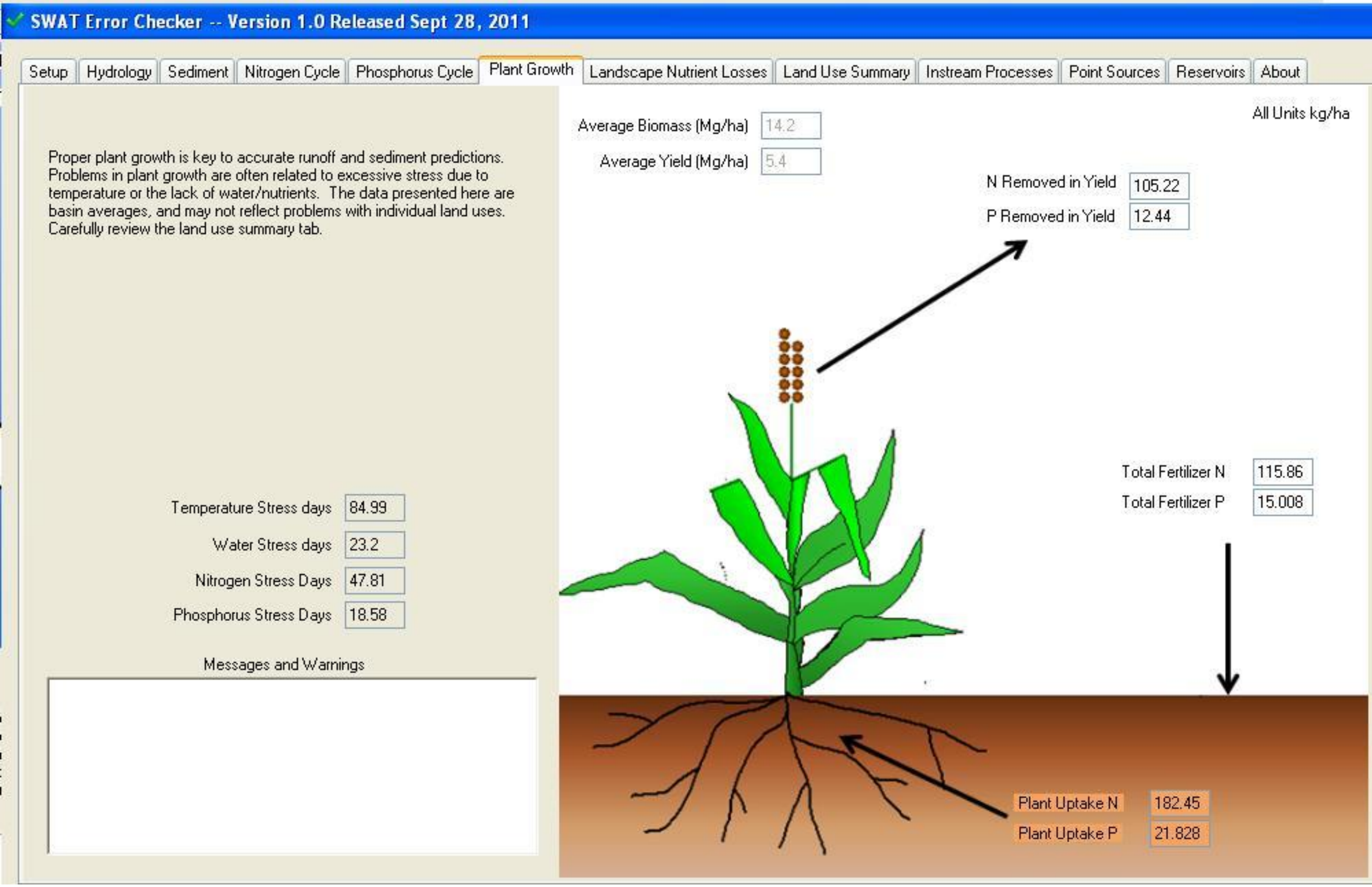


The nitrogen cycle is key to biomass production, which in turn impacts ET and sediment yield. The nitrogen cycle is complex, it is generally not possible to validate these routines outside a research setting. Of particular importance are the total applied nitrogen fertilizer and losses due to plant uptake, and volatilization and denitrification. Soils contain a large amount of organic nitrogen in the form of organic matter. Large changes in initial and final nitrogen contents (in particular organic n) may indicate under or over fertilization during the simulation.

Messages and Warnings

Denitrification is Zero, consider decreasing SDNCO: (Denitrification threshold water content)


SWAT Error Checker -- Version 1.0 Released Sept 28, 2011
Setup
Hydrology
Sediment
Nitrogen Cycle
Phosphorus Cycle
Plant Growth
Landscape Nutrient Losses
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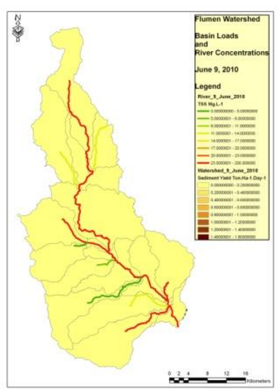
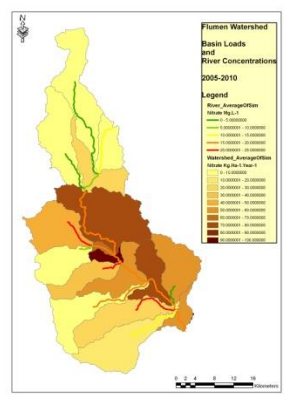
About
Proper plant growth is key to accurate runoff and sediment predictions. Problems in plant growth are often related to excessive stress due to temperature or the lack of water/nutrients. The data presented here are basin averages, and may not reflect problems with individual land uses. Carefully review the land use summary tab.
Temperature Stress days 84.99
Water Stress days 23.2
Nitrogen Stress Days 47.81
Phosphorus Stress Days 18.58
Messages and Warnings
Average Biomass (Mg/ha) 14.2
Average Yield (Mg/ha) 5.4
All Units kg/ha
N Removed in Yield 105.22
P Removed in Yield 12.44
Total Fertilizer N 115.86
Total Fertilizer P 15.008
Plant Uptake N 182.45
Plant Uptake P 21.828

6. CONCLUSIONS

- Swat model reproduces water flows in basins with high water inputs from outside (monthly scale)
- Nitrogen of manure origin is very difficult to model because of the temporal and spatial uncertainty of its application. Flood events needs more detailed information
- Swat model is a powerful management tool for basins with these characteristics to prevent flood events, pollution concentration, movement or origin, etc…)





7. NEXTS STEPS

SWAT-CUP CALIBRATION

VALIDATION. Dried condition did not let validate de project. Land uses changes because of the reduction of de available water from outside

THANKS FOR YOUR ATTENTION