

Case study name and location	Strymonas valley, Regional Unit of Serres, Central Macedonia, Greece
Author	Ioannis Tsolakidis
GENERAL INFORMATION	
area size (ha)	- Catchment area of Strymonas river is about 6759Km². The existing area along the Strymonas river that flooded in 2015 was about 7400ha. The designated agricultural areas that can serve as flooded areas should be located in this area (Fig. 2). - A valley with main river Strymonas (enters Greece from Bulgaria) in the middle and its tributaries (Aggitis, Kerkinitis, Krousovitis and other.) coming from surrounding mountain crests. The natural route most of the rivers have been regulated through land improvement projects of the early twentieth century. - The climate of the area is continental and the geographical distribution of rainfall is not uniform due to geomorphological characteristics. There are two climatic zones a) zone of the northern mountainous part and b) zone of the south-southeastern part. The second lowland climate zone is characterized by lower rainfall heights than the first with an annual average precipitation of 458.4mm. In the past decade both storms and snowmelt from the Bulgarian mountains had as a result flood events with a major event the flood of 2015.
topography / describe the shape	
climate – yearly? Period? Precipitation (amount and distribution, appearance of the storms)	

TECHNICAL CHALLENGES

Source of flood
water surface
water (streams
torrential
stream), salt (sea
water)

- Torrential tributaries to the main river Strymonas
- Fragmented land use (agricultural areas, settlements, roads, railway, drainage systems)
- Particularly problematic are certain villages near the route of Strymonas river (Paralimni and Achinos villages), as well as infrastructures and farms that were built in the boundaries of the former lake Achinos. At 1920-1930 decade a land improvement project took place at the Serres plain, with the drainage of the lake Achinos, the built of a dam at the north-west part of Serres Regional Unit and the construction of Kerkini reservoir and the final regulation of Strymonas river until its mouth to Strymonikos Gulf (Aegean Sea).

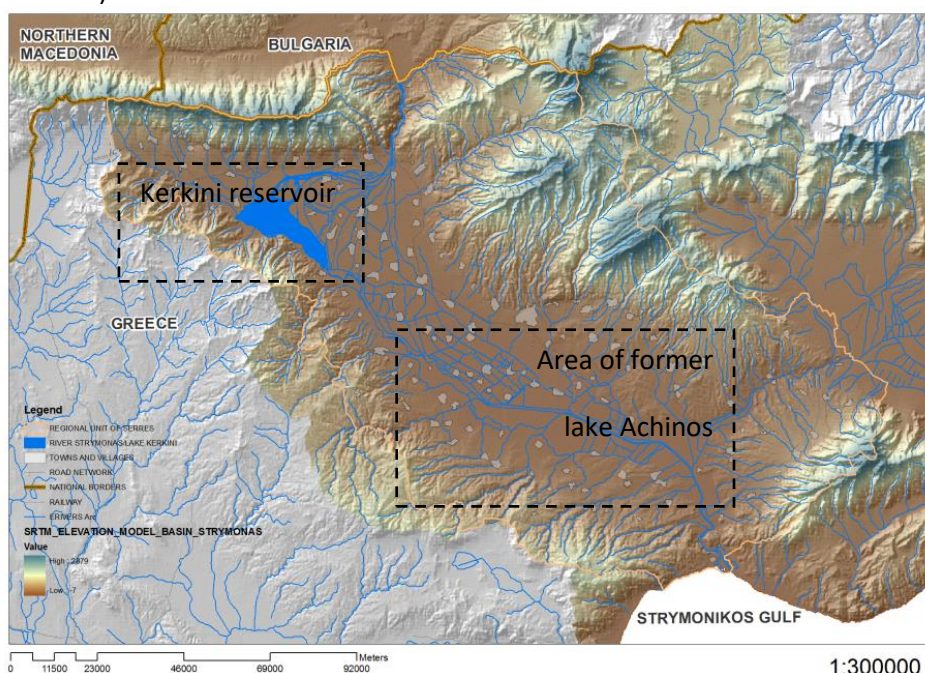


Figure 1. Map of the Serres plain with the location of kerkini reservoir

- In 2015 an extreme flood event had as a result a levee failure, at the downstream part of Strymonas river. The flooded areas covered the exact boundaries of the former lake Achinos. Almost 7400 ha of agricultural land were flooded (Fig. 2).
- Today it seems viable to re-flood a part of the former lake Achinos, for flood control and protection and one measure could be the testing of dry detention ponds.

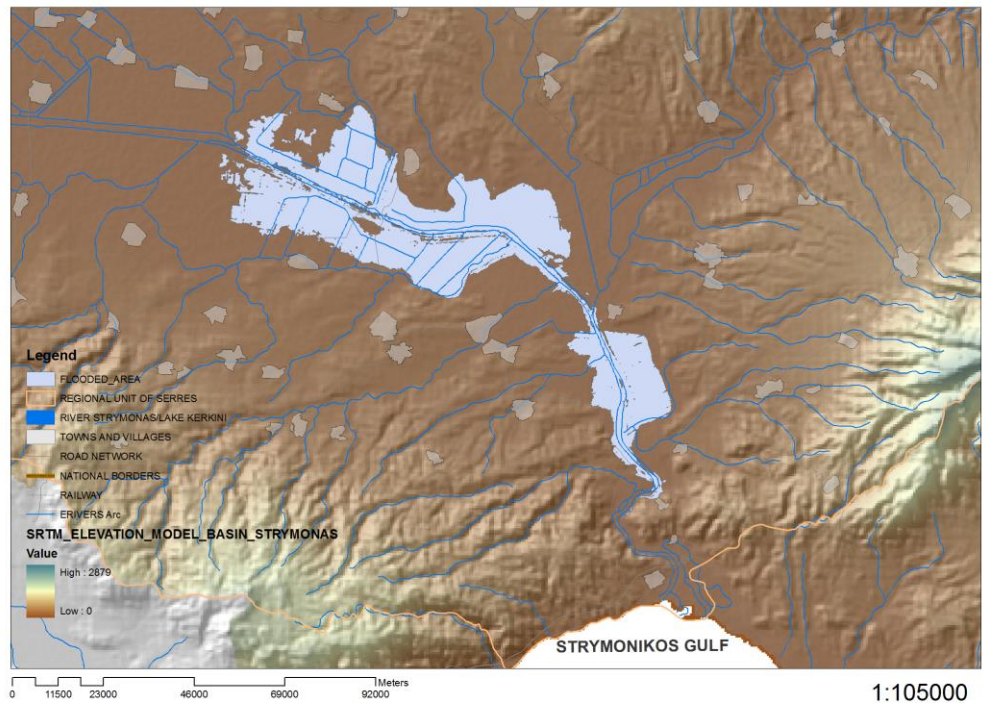


Figure 2. Flooded areas from 2015 extreme event

1:105000



Figure 3. Flooded agricultural areas (east view) with Paggaion mountain at the back (12/04/2015)

- Mostly Deep Fluvisols (blue polygons) (highly permeable), and small areas with Vertisols/Regasols. Below is a map of soil clustering (Fig. 4).

[illegible]

Figure 4. Soil clustering map for the area of interest

- Dry detention ponds (with gates for retention of flood water) on several locations of the drainage lake (approximately 100 ha), (floodplain retention areas) that are now used for agriculture production.

Dry detention ponds

Legend

- FLOODED AREAS
- Rural network
- REGIONAL UNIT OF SERRES
- RIVER STRYMONAS/LAKE KERKIRA
- TOWNS AND VILLAGES
- ROAD NETWORK
- NATIONAL BORDERS
- RAILWAY
- ERIVRIS AVE

SRTM_ELEVATION_MODEL_BASIN_STRYMONAS

Value

High: 2879

Low: -7

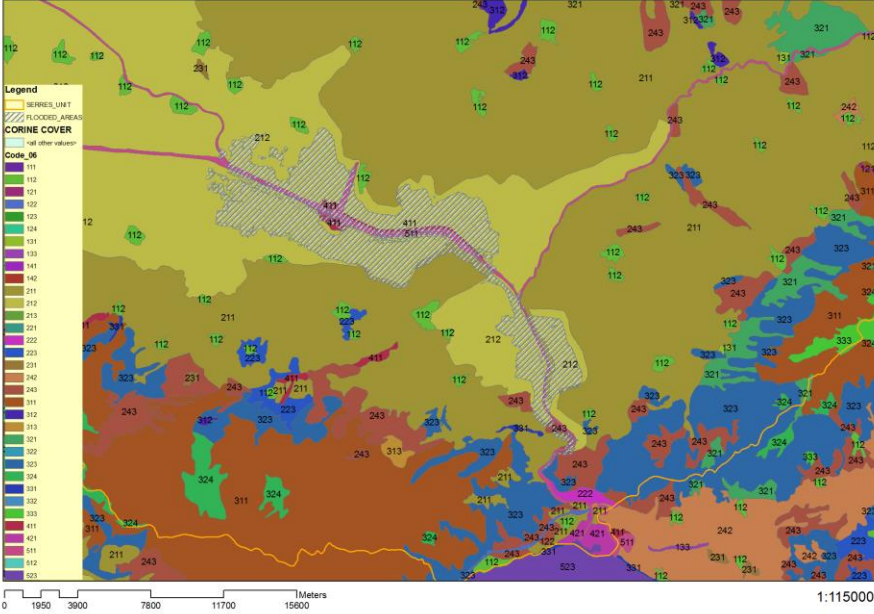
0 11500 23000 46000 69000 92000 Meters

1:57600

Figure 5. Dry detention ponds location at the boundaries of flooded areas

ECONOMICAL AND LEGAL ASPECT	
Compensation mechanisms Has there been a cost benefit analysis of using this piece of land for flood retention? If yes, what is the approximate level of costs and benefits? Do land owners / farmers receive a compensation for their service? What kind (one-time up-front payment, annual payment, flood damage-based compensation etc.)? Does it cover their loss? Which players finance this compensation?	• Most of the land in the planned dry retention is private owned, or under long-term rent contracts from the state • There has never been a cost benefit analysis for using these pieces of land for flood retention. • If dry detention ponds were installed, all farmers would get on-time upfront payment, and be expected to use the land for agricultural production • From the extreme flood event of 2015, farmers got their compensations from Hellenic Agricultural Insurance Organization, in about 2 months and only those who had managed to plant their fields.
POTENTIAL LAND DEGRADATION	
Expected challenges e.g. change in land use if nature base solutions are planned to be implemented (for example Savinja valley, Slovenia), etc or challenges with existing NBS (for example the Lake Kerkini, Greece) Hydrotechnical infrastructure (e.g. drainage or irrigation systems, dykes, dams, channels)	Permanent soil loss on the areas of gate and dam construction Potential soil pollution through sediments, containing organic substances and heavy metals originating from flooded sites up-stream Erosion of the surface within the detention pond area through inflow and outflow.

--	--

STAKEHOLDERS PERSPECTIVE	
GIS analysis of land use within the designated (or existing area) of dry reservoir if available or just a rough description of land use (Briefly describe information on surface area (ha, %) of land use by categories within and outside the designated area). Social aspect, as in are these changes threats to the livelihoods of the private land owners or private land users, for agricultural or other land use: Information of land-owners perspective on the NBS.	- The land use in the designated area is mainly agricultural land (212 code-permanently irrigated land-Corine Land Cover program) and more precise production of corn, cereals, cotton, sunflowers, Lucerne etc.  Figure 6. Land use/land cover map and the flooded areas of 2015 Disadvantages: Loss of land use autonomy. flooding water would change the quality of the soil. Possible advantages: Alternative locations for dry detention ponds. Construction of wet reservoirs for irrigation, water source, Flood protection of the remaining farm land