



THE GOULANDRIS NATURAL HISTORY MUSEUM
GREEK BIOTOPE / WETLAND CENTRE

A structured approach for the restoration of the Black pine (*Pinus nigra*) forests for Greece

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«Restoration of *Pinus nigra* forests on Mount Parnonas (GR2520006) through a structured approach»

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Co-financier



General Directorate for the Development and Protection of Forests and Natural Environment



Management Body of Mount Parnonas and Moustos Wetland

REGION OF PELOPONNISOS

Region of Peloponnisos Forest Service of Sparti



Region of East Macedonia - Thrace

The structured approach: a step by step process

The step by step process attributes priorities to candidate areas for artificial restoration through exclusion and ranking, ecological and technical criteria.

Objectives:

- Conservation of the area covered of Black pine forests which form the priority habitat type "(Sub-)Mediterranean pine forests with endemic black pine" as before the fire.
- Restoration and improvement of the conservation status of the habitat type and of the species of flora and fauna that live in these forests.

Step 1: Selection of exclusion and ranking criteria of areas candidate for restoration

Exclusion criteria should prevent:

- a) Disruption of desirable post-fire ecological processes such as natural regeneration
- b) Selection of areas with disadvantages for artificial restoration (e.g. harsh climatic conditions)

Ranking criteria should attribute priority for restoration to areas with the best opportunities for:

- a) Successful re-establishment of the Black pine trees
- b) Achievement of the favourable conservation status of the Black pine forests.

Selection and significance of criteria takes into account the assessment of impacts.

Step 2: Exclusion and ranking of areas candidate for restoration

Ranking is applied by subsequent ordering for each criteria. Criteria are also ordered depending on their significance. Ordering may change depending on the particularities of each forest.

Candidate areas for restoration are summarised to the pre-fire stand division for the continuity of the management

Exclusion criteria:

- High possibility of natural regeneration
- Unsuitable climatic or soil conditions
- Biotic factors

Ranking criteria:

- Representativity of habitat type typical vegetation
- Inclusion in Natura 2000 sites or protected areas
- Contribution to the conservation of protected, endemic or threatened species
- Re-establishing forest connectivity
- Abiotic features (soil depth, geology, aspect etc)

Step 3: Preliminary selection of areas for artificial restoration and Step 4: Verification

Preliminary selection is taking place between the higher ranked candidate areas. Criteria for selection are technical:

- Areas that are close to each other in order to create compact restoration patches and minimise restoration costs.
- Areas close to existing forest road network.

Verification is conducted in the field and safeguards that:

- Soil depth of each area is suitable for artificial restoration (seeding or planting).
- Access to the area from the road network has no obstacles such as fallen trees, rocks etc.
- There are no other issues making artificial restoration problematic.

Step 5: Selection of restoration or management measures

Restoration measures :

- Burnt trees management
- Plantings
- Seeding (broadcast or spot)
- Grazing control and management
- Implementation of small scale water harvest measures

Supplementary measures

- Monitoring for restoration process and species
- Protection against fires
- Dissemination of restoration progress

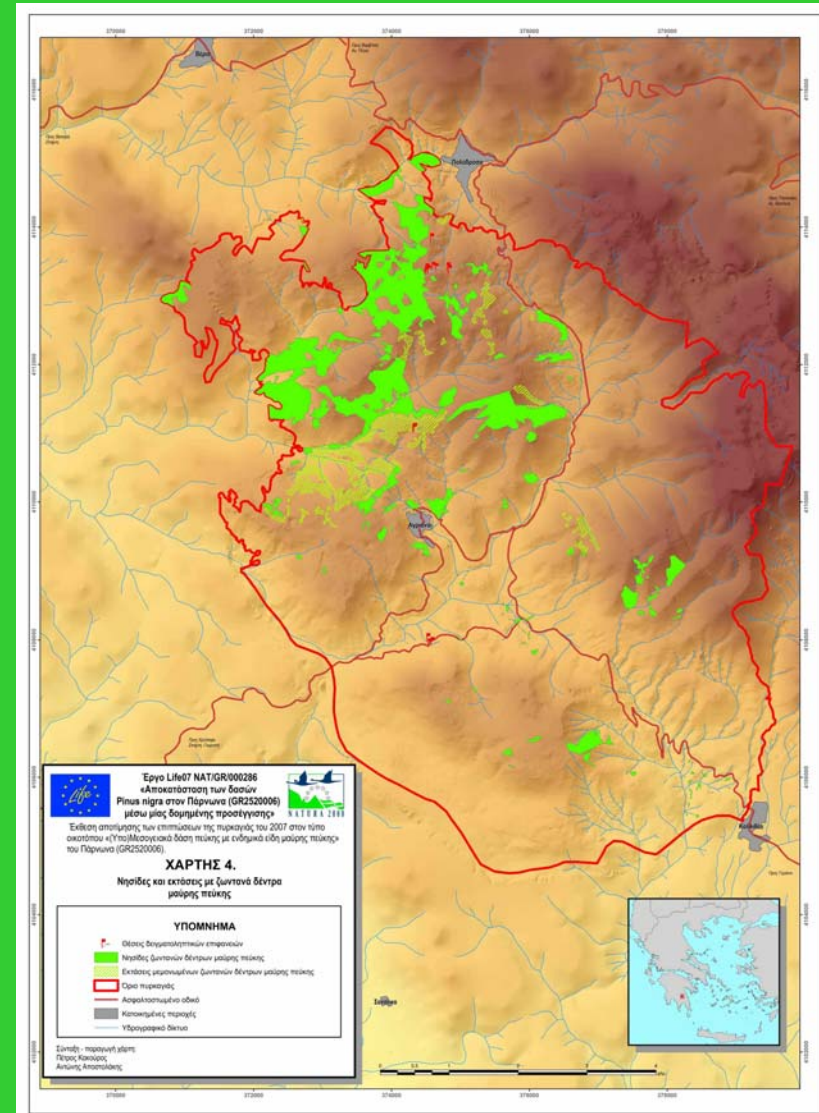
Supplementary components of the approach

Rapid assessment for emergency soil protection actions

Assessment of the impacts to the habitat type with emphasis on detection of alive trees

The approach also call for:

- Maintenance of permanent seed stock.
- Continuous update of vegetation, flora and fauna distribution data.
- Mapping of soil quality.
- Use of nurseries not far from the area under restoration.
- Updated mapping of road network.
- Launch of the process immediately after the fire.



Implementation data for Parnonas, Greece

Time needed: 6 months for ~ 5.500 ha including detailed ecological assessment of the fire. This time does not include the time for the development of the method.

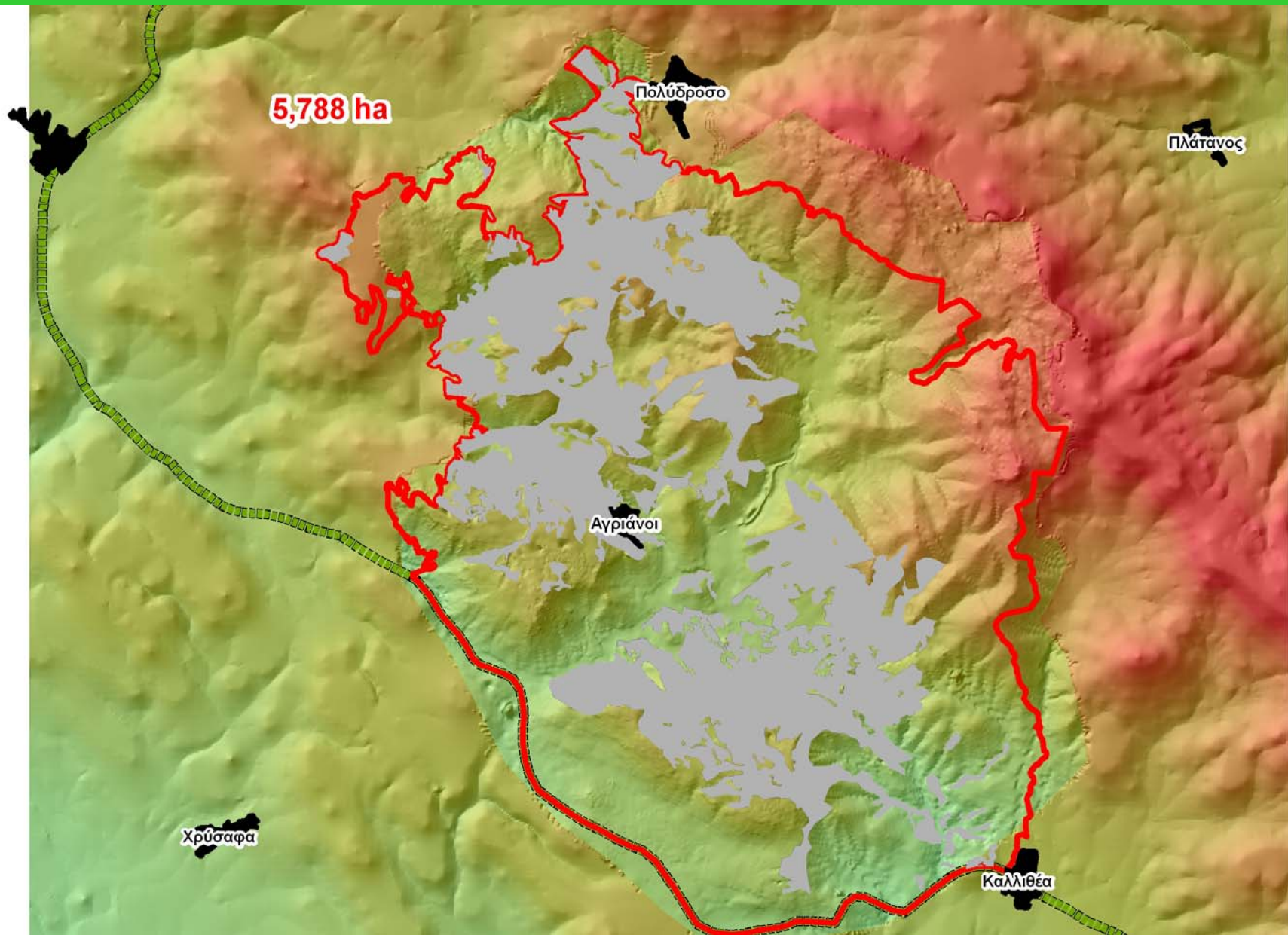
Resources: A forester, a GIS specialist and limited time consultancy for species depending on the forest. The approach can be implemented without the use of GIS but this may affect the accuracy of step 2 and 3.

Data: Lack of site index mapping and distribution maps of the species. These did not allowed the use the criteria of representativity and contribution to species conservation.

A preliminary evaluation of the implementation in Parnonas, Greece

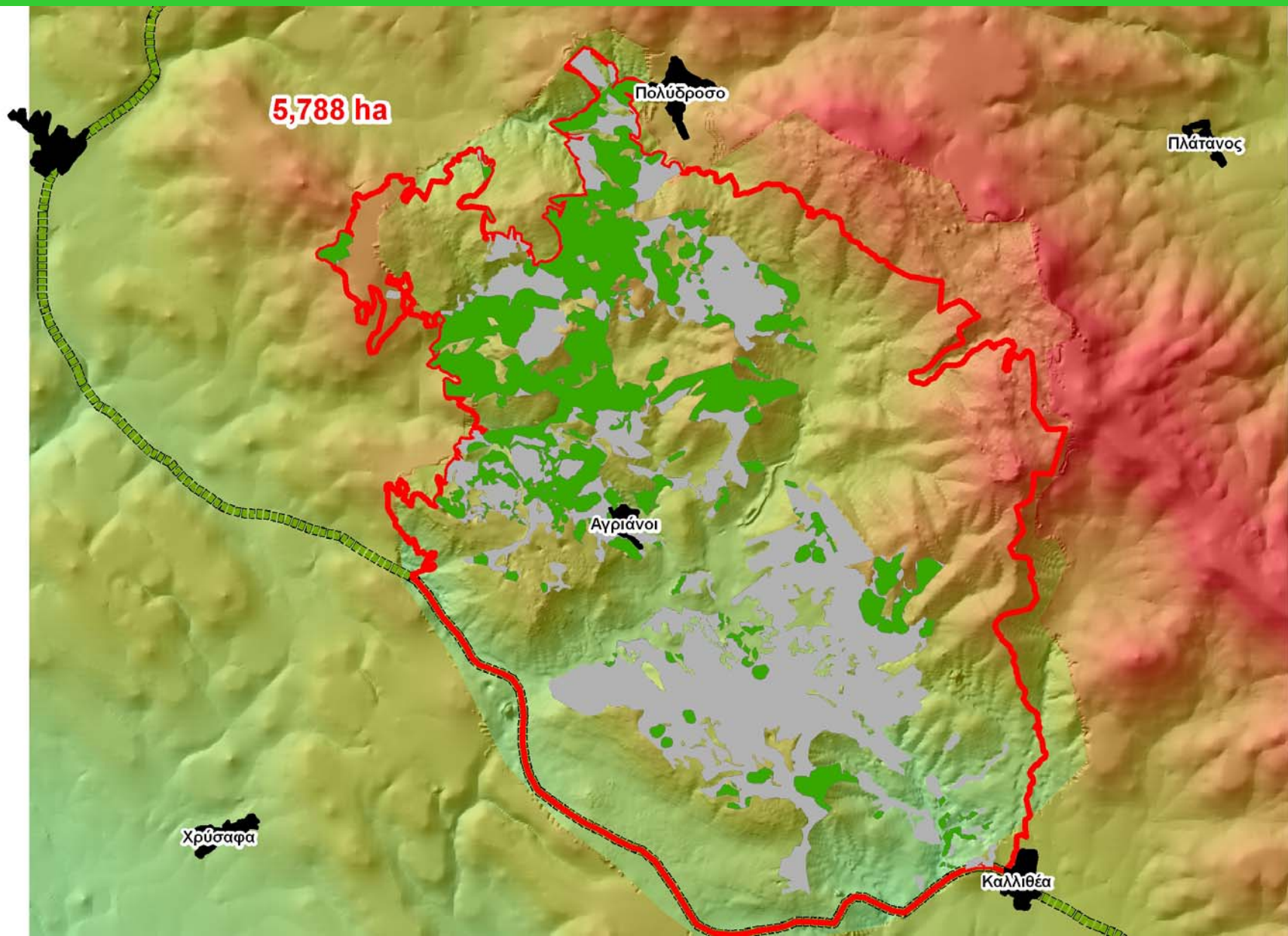
As a first evaluation the following comments can be drawn::

- The time and the labor needed are within the potential of the Greek forest authorities.
- Supposing that these fires occur until the end of August the approach allows for the first restoration measures to be implemented early next spring.
- Lack of site index data and species data are important but can be resolved.
- If availability of GIS systems increases, capabilities for implementation of more sophisticated planning techniques are enhanced.



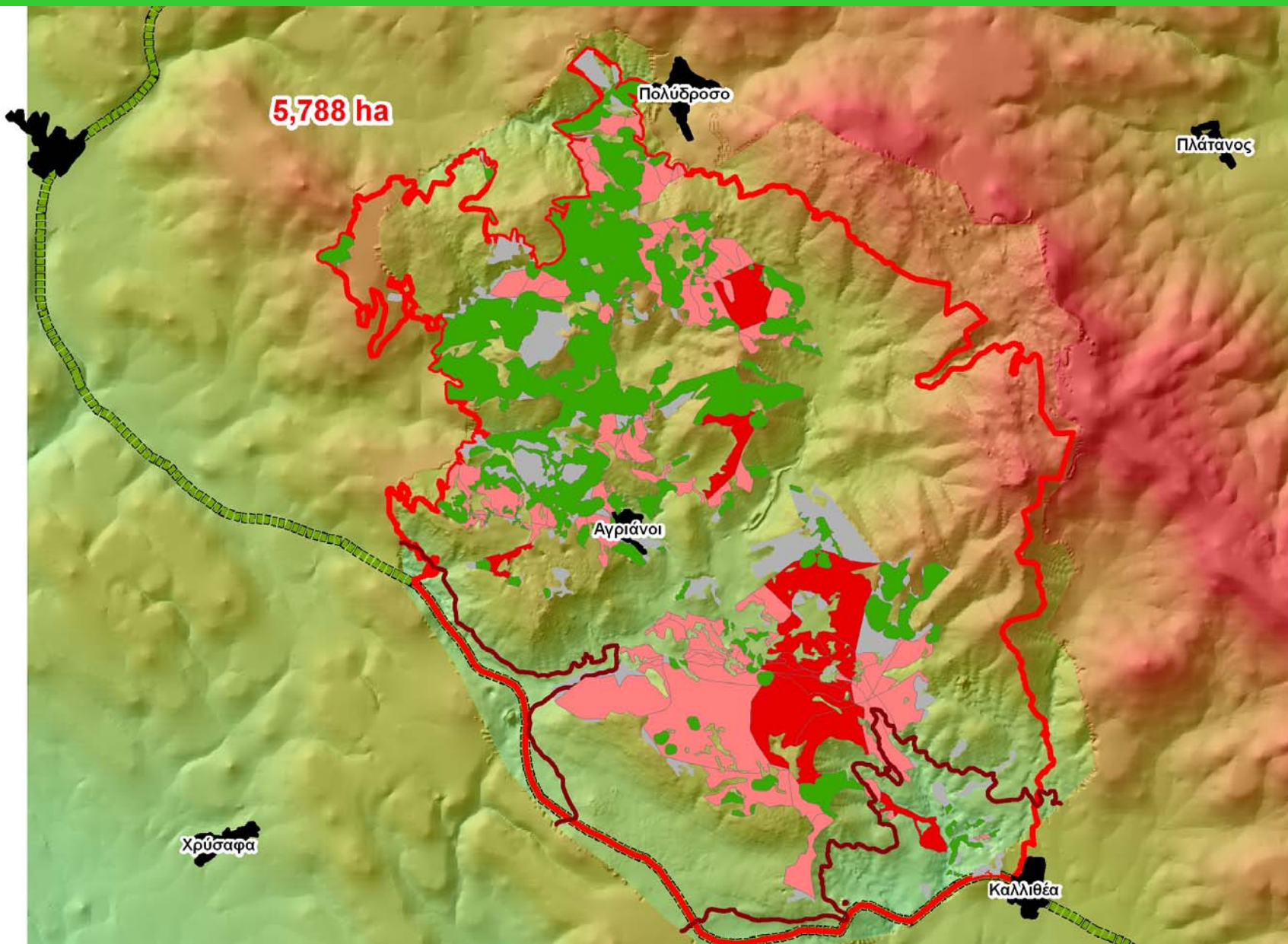
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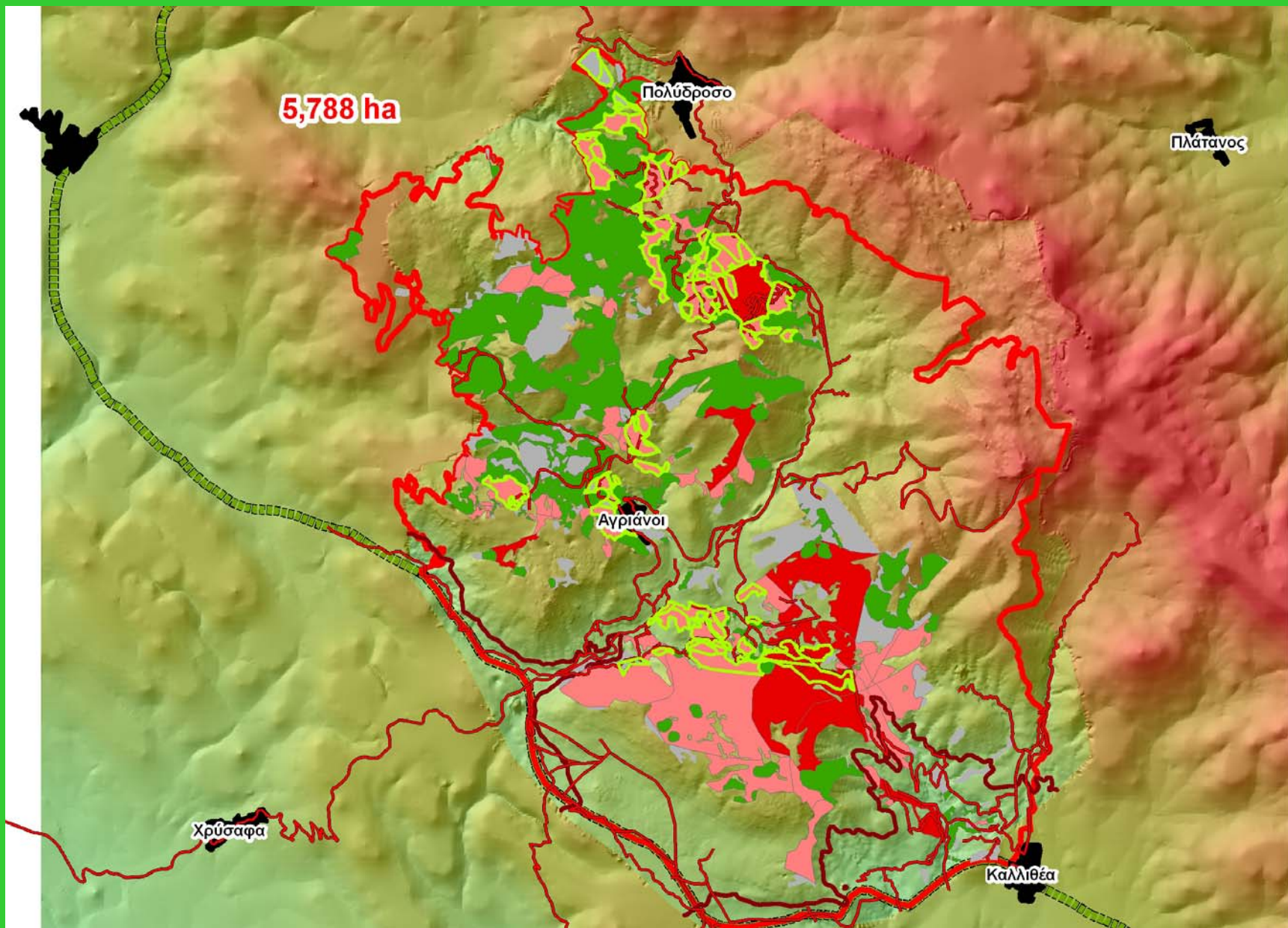
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