



ADAPTATION OF FOREST ECOSYSTEMS TO CLIMATE CHANGE IN SEYHAN WATERSHED, TURKEY

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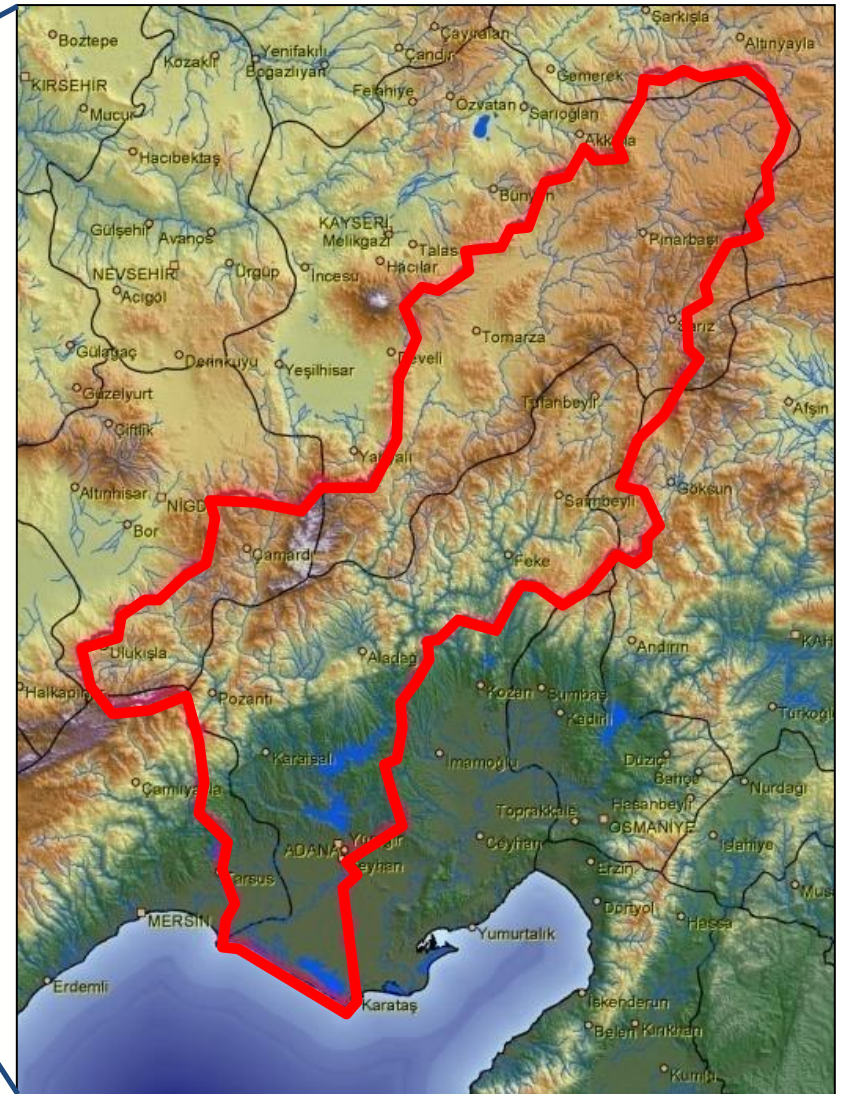
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INTRODUCTION

- Seyhan Watershed is identified as one of the most sensitive watershed to climate change in the Mediterranean Region.
- A 25-30% percent decrease in annual precipitation and 2-4 °C increase in temperature are expected in the watershed with climate change in 2050.
- The watershed is one of the most fertile watershed of the Turkey.
- Cotton, corn and wheat are the main crops of the watershed.





Seyhan Watershed

Area: ~ 20.000 km²

Population: 2.4 million

Source: N. Ozbagdatli



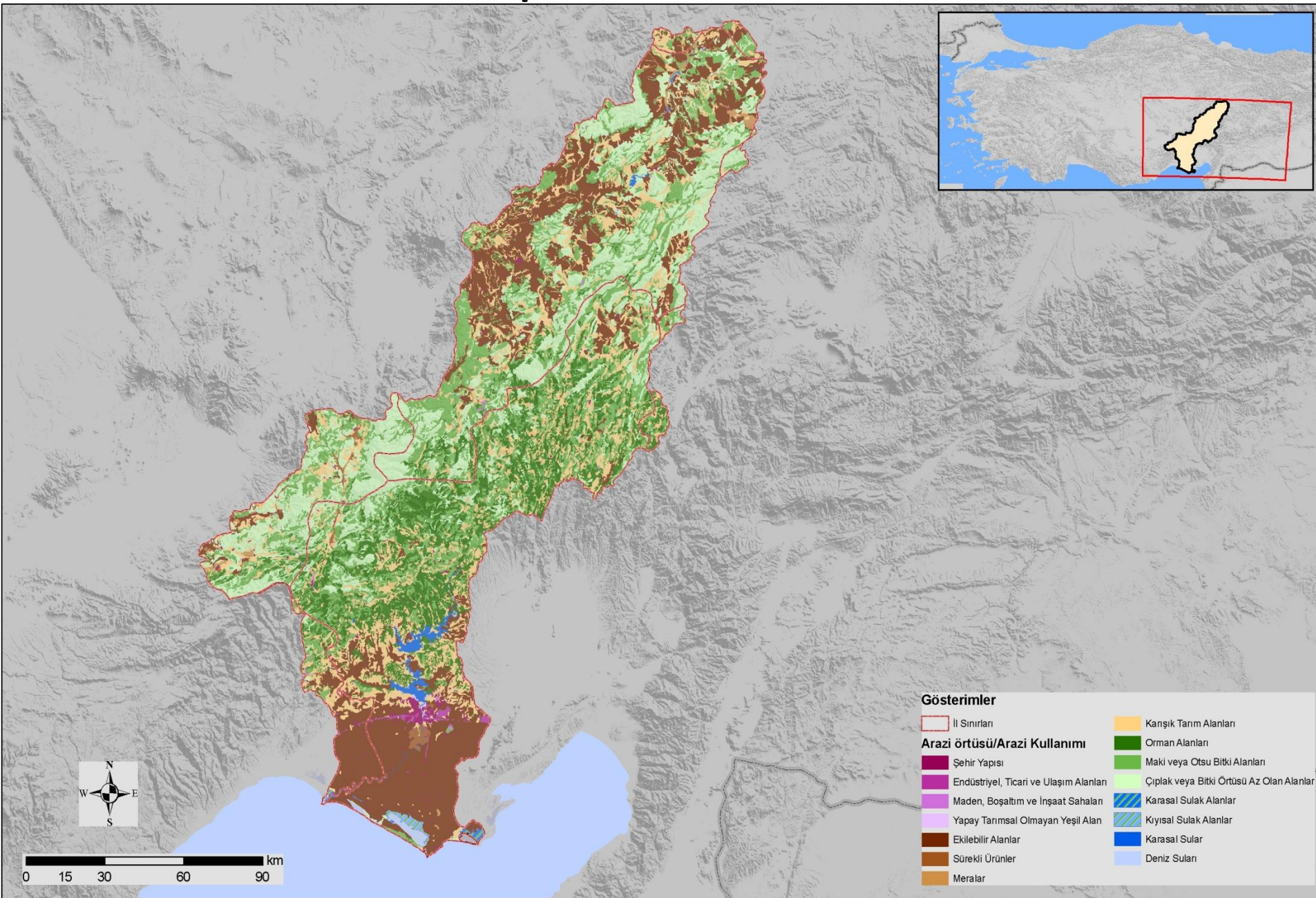
III SFM
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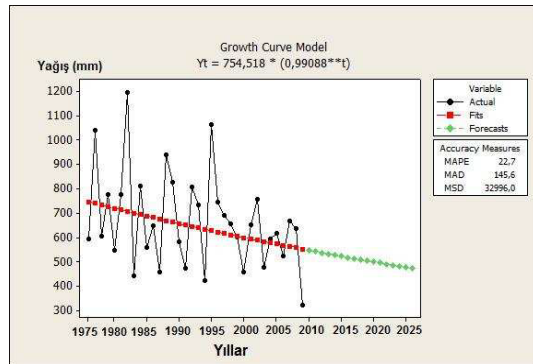
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Land use map of the watershed

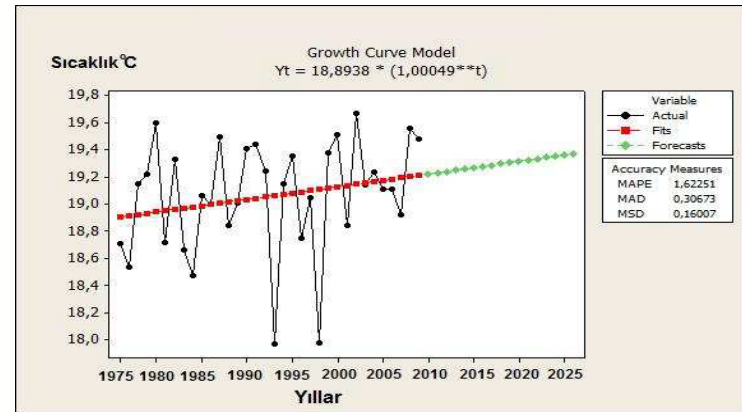


Current Climate Change Signals in the Watershed!!!!

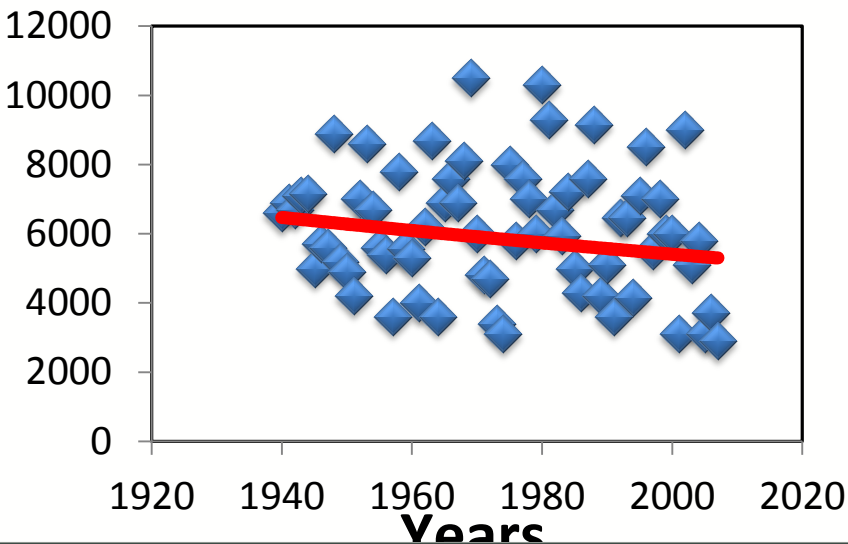
Precipitation decreasing!



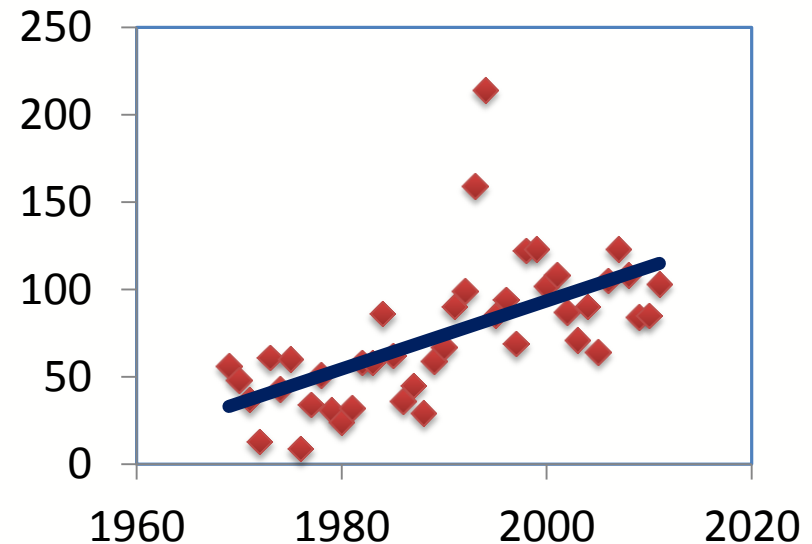
Temperature increasing!



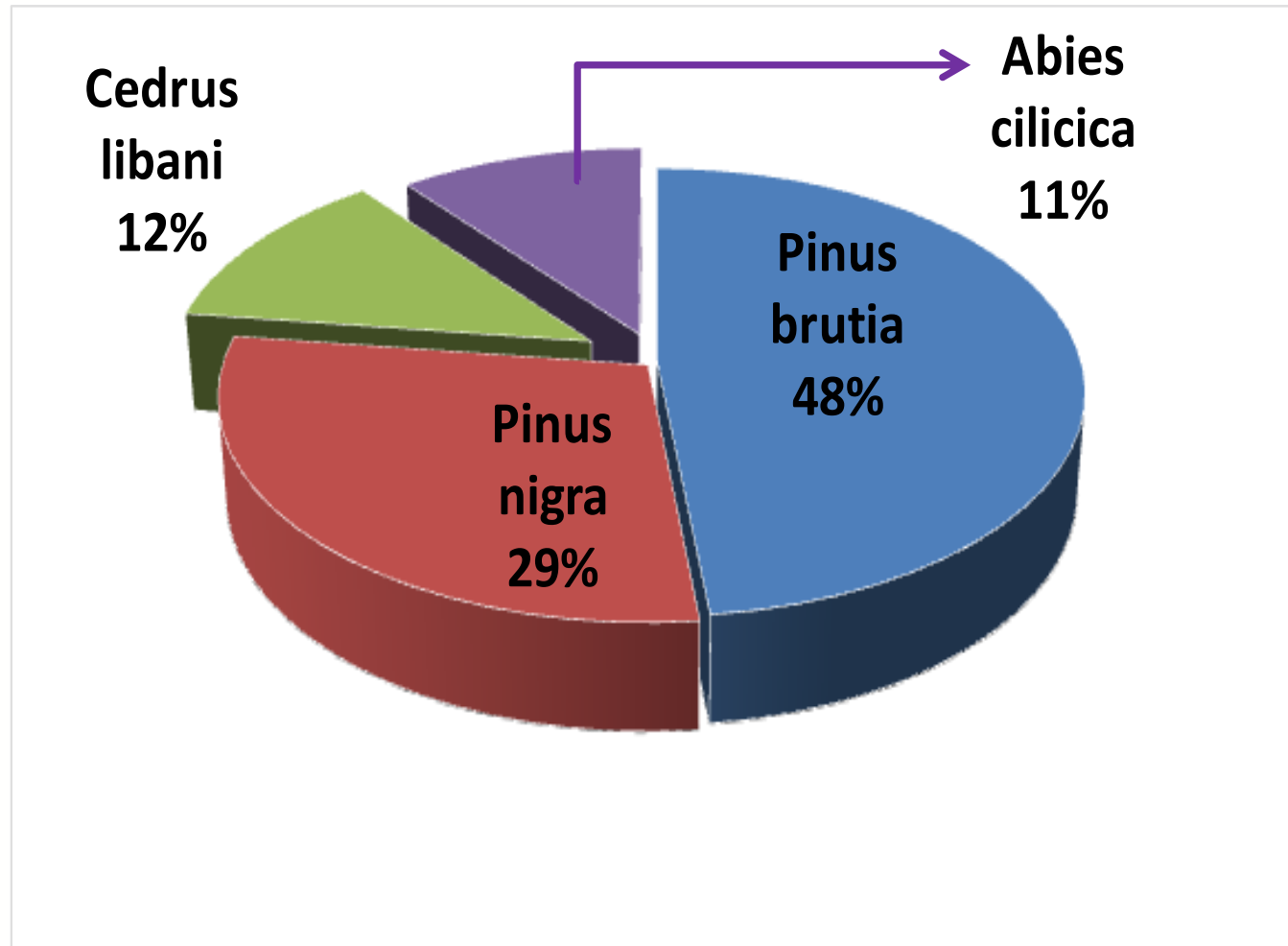
Stream flow decreasing!



Number of forest fires increasing!



Distribution of main tree species in the watershed



Climate change adaptation projects in Seyhan watershed:

- Projects supported by the framework of the UN Joint Programme *“Enhancing the Capacity of Turkey to Adapt to Climate Change in Turkey: the Adaptation to Climate Change in the Seyhan River Basin Grant Programme”*
- 18 out of the 150 project proposals were selected for the implementation that will improve the capacity of inhabitants and institutions of the river basin in adapting to climate change.
- The total budget of the projects was 1.9 million dollars
- Selected proposals were aimed to enhance the capacity to adapt to climate change and awareness raising, to improve agricultural techniques, to secure food supplies, to determine flood risks, to use alternative irrigation techniques and prevent sea levels from rising.



- One of the project was “Adaptation of Forest Ecosystems and Forestry to Climate Change in Seyhan Basin”
- It has been carried out by the Nature Conservation Center and General Directorate of the Forestry
- Maximum Entropy Method (Maxent) was used in the study to model existing and future distributions of four main tree species (*Pinus brutia*, *P. nigra*, *Cedrus libani*, *Abies cilicica*).
- Environmental variables such as altitude, slope, annual rainfall, mean temperature, humidity etc were used to develop distribution models of tree species with this method.
- The modelling success was tested using the stand maps with the scale: 1/25000 and the success was in between 70-90%

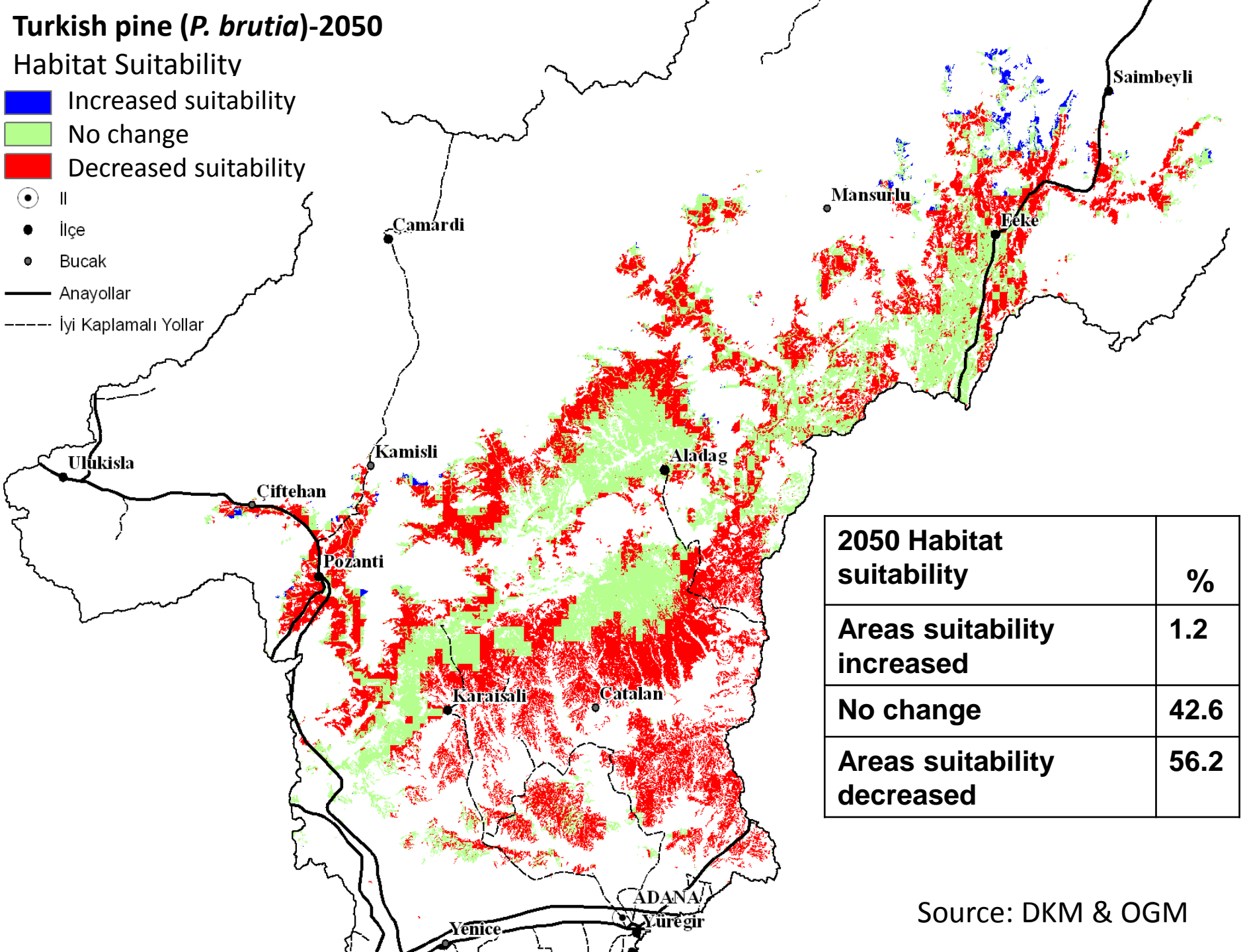


Turkish pine (*P. brutia*)-2050

Habitat Suitability

- Increased suitability
- No change
- Decreased suitability

- İl
- İlçe
- Bucak
- Anayollar
- İyi Kaplamalı Yollar



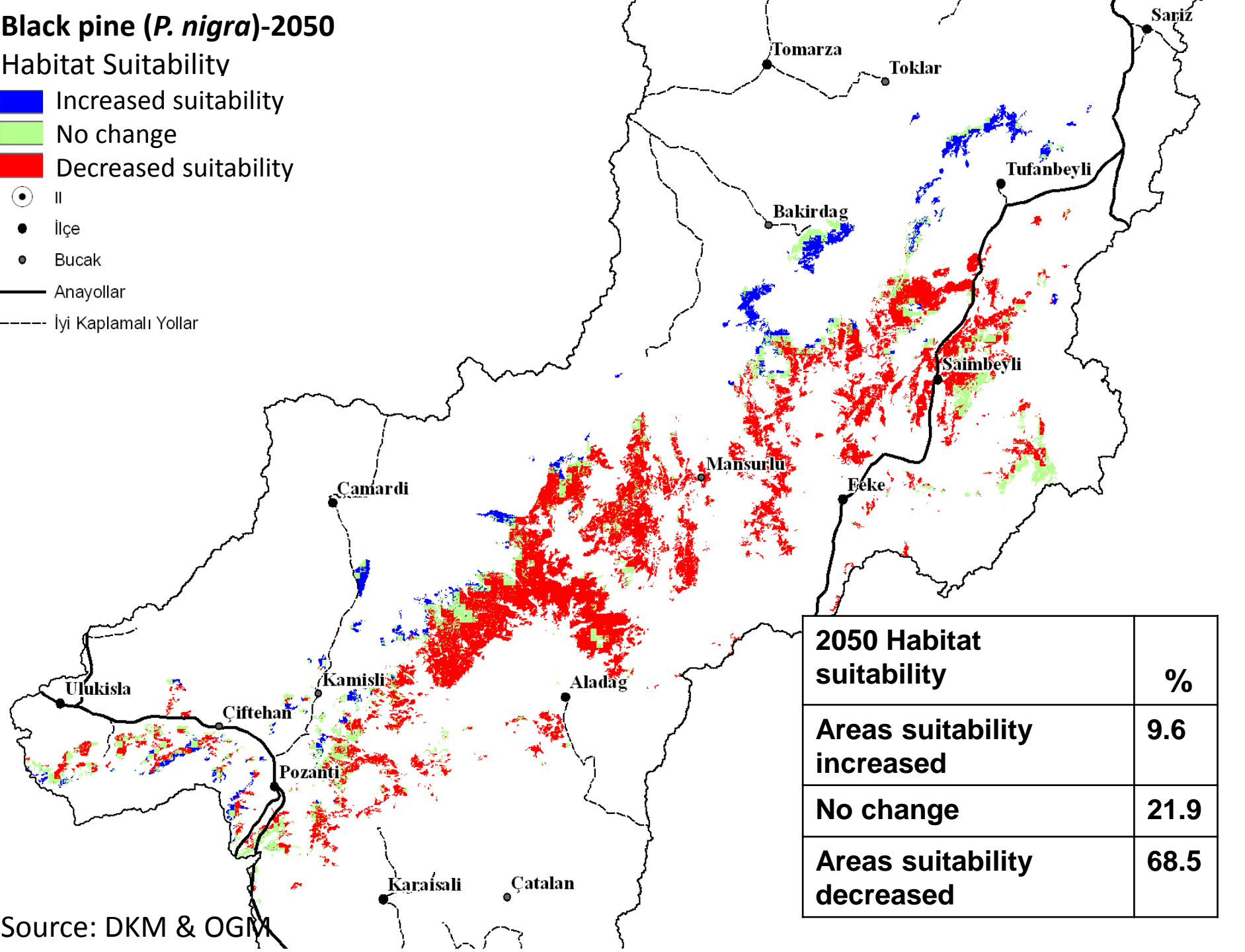
Source: DKM & OGM

Black pine (*P. nigra*)-2050

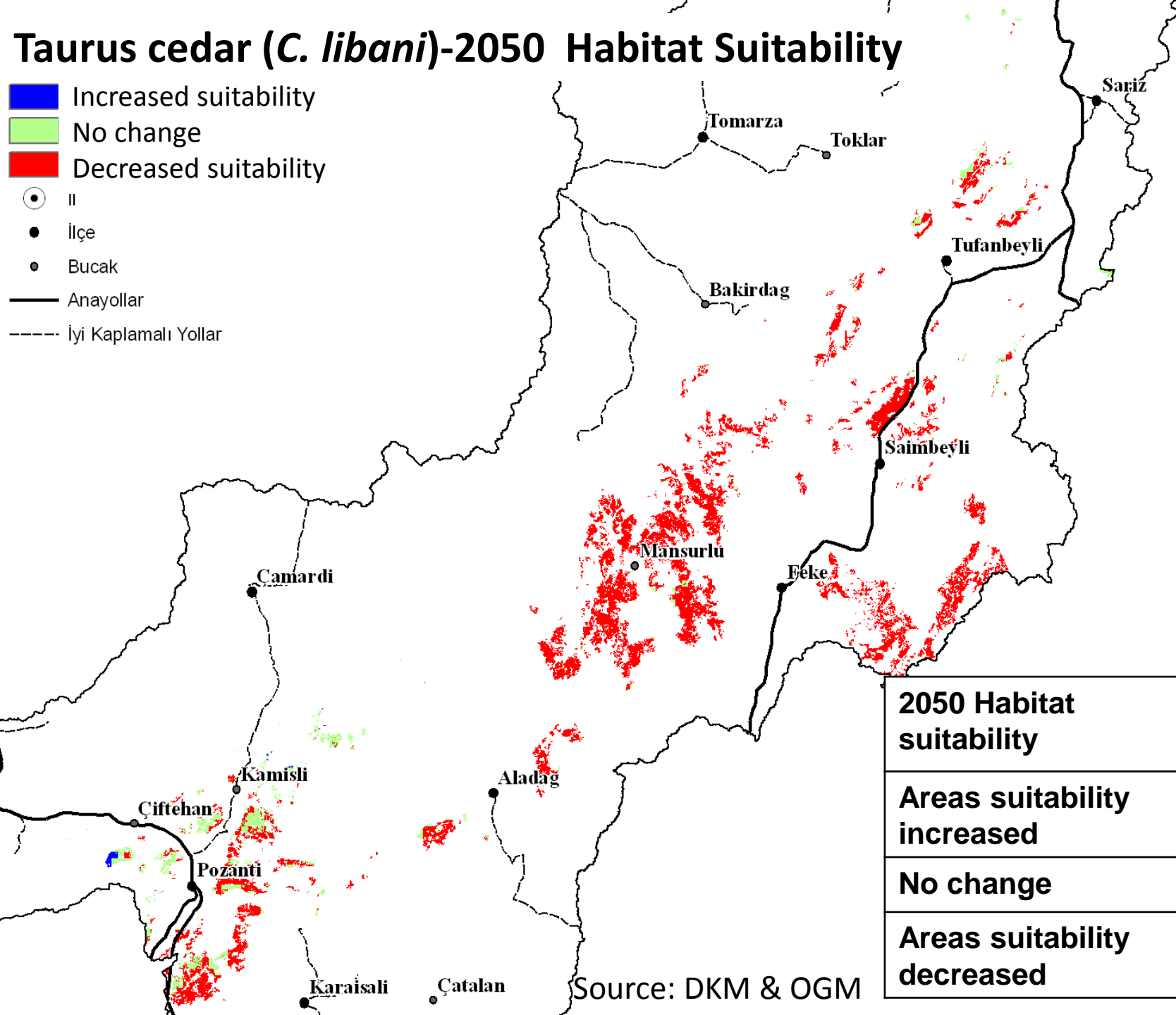
Habitat Suitability

- Increased suitability
- No change
- Decreased suitability

- İl
- İlçe
- Bucak
- Anayollar
- İyi Kaplımalı Yollar

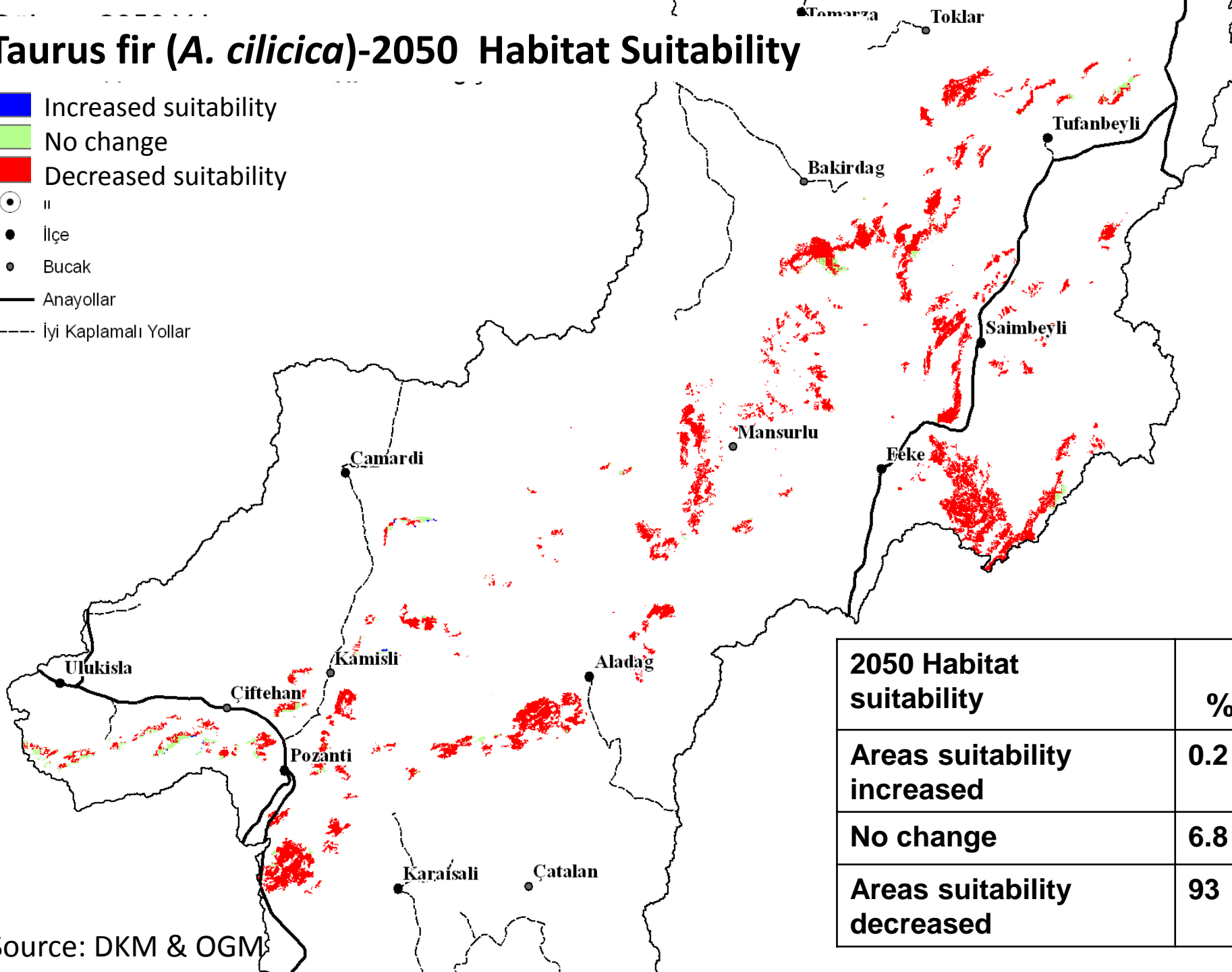


2050 Habitat suitability	%
Areas suitability increased	9.6
No change	21.9
Areas suitability decreased	68.5



Taurus fir (*A. cilicica*)-2050 Habitat Suitability

- Increased suitability
- No change
- Decreased suitability
- II
- İlçe
- Bucak
- Anayollar
- İyi Kaplımalı Yollar



2050 Habitat suitability	%
Areas suitability increased	0.2
No change	6.8
Areas suitability decreased	93



Saimbeyli,
Elevation: 1370 mt. Çz-Çk regeneration area
Suitability of black pine decrease while Turkish pine increases

Source: DKM & OGM



Saimbeyli, Elevation 1700m, cedar regeneration area
Suitability for cedar increases in this area

Source: DKM & OGM



**Karaisali, suitability for Turkish pine decreases,
shrub vegetation will be dominant in the future**

Source: DKM & OGM



Feke, Gedikli Suitabilty for fir decreases in this area

Source: DKM & OGM

Conclusions

- Climate change will seriously threaten the distributions of taurus fir and cedar stands of Seyhan watershed.
- 93% of taurus fir and 85% of taurus cedar stands will be under climate change risk.
- Results of this study need to be incorporated into Forest Management Plans of the Forest Districts located in Seyhan watershed.
- Suitability areas of each species need to be taken into consideration in afforestation, regeneration and maintenance works
- Seeds need to be taken from more southern origins in nurseries when growing seedlings of these trees.
- More seed stands need to be established in low elevations.
- Similar studies should be done in the other watersheds.



Thank you!

