

# Anthropogenic effects on resident bird communities in Israel



Photo: Or Barenholtz

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# Israel

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- Continent junction
- Large variety of climate, topography and soils
- Edge of distribution for many species
- Many endemic species





# Israel

Small area

High population growth rate

Increasing standard of living ,agriculture,  
settlements, roads, etc.



increase in land use and reduction of natural  
areas & habitat diversity and quality

# Birds

- Are bioindicators – changes in habitat affect frequency and reproduction success
- Relatively easy to spot in the field

**A better understanding of the anthropogenic effects on bird communities in Israel is necessary**



# Study purposes

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- Examine the effect of land uses, such as settlements and agriculture, on the resident birds' community structure in Israel
- Examine life history traits that contribute to changes in the community structure



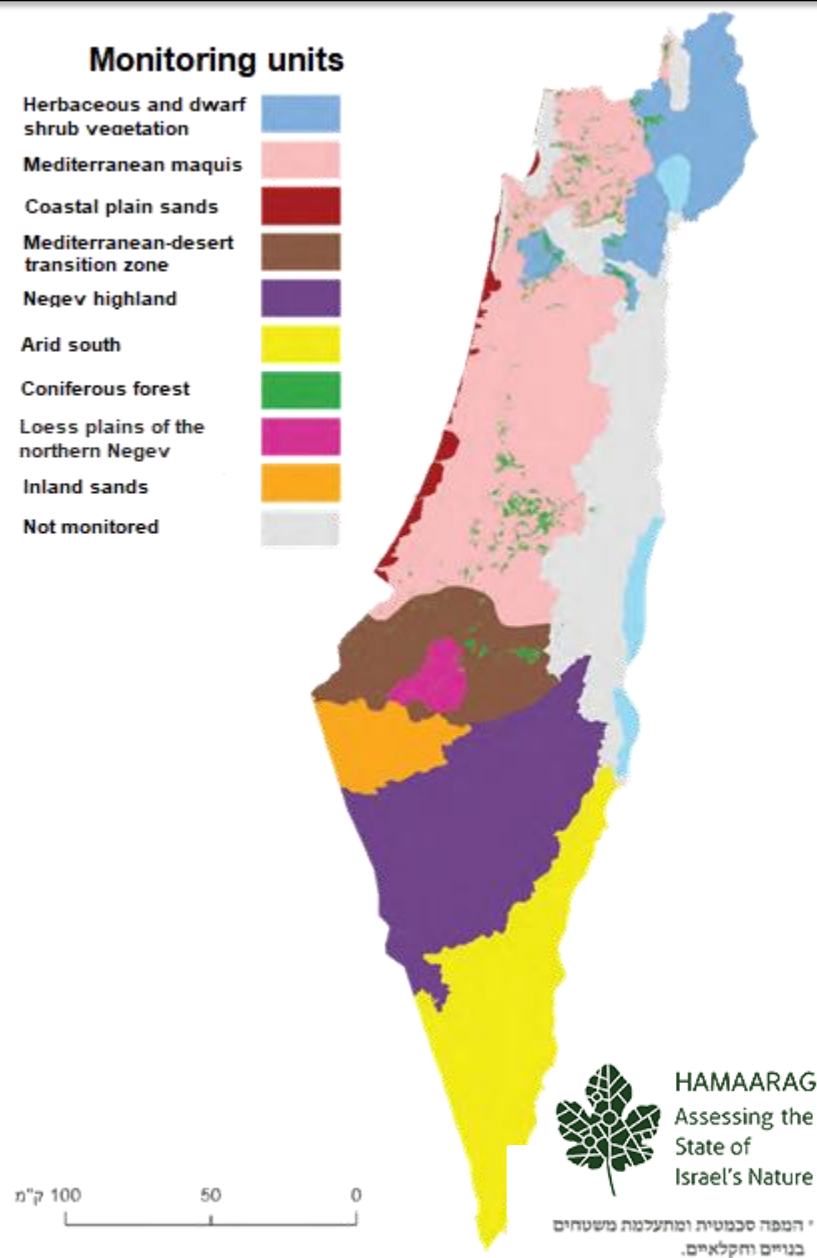
Photo: Or Barenholtz



# Study area

Hamaarag – Israel's Long Term Biodiversity Monitoring Program, divided Israel into unites according to the ecological characteristics

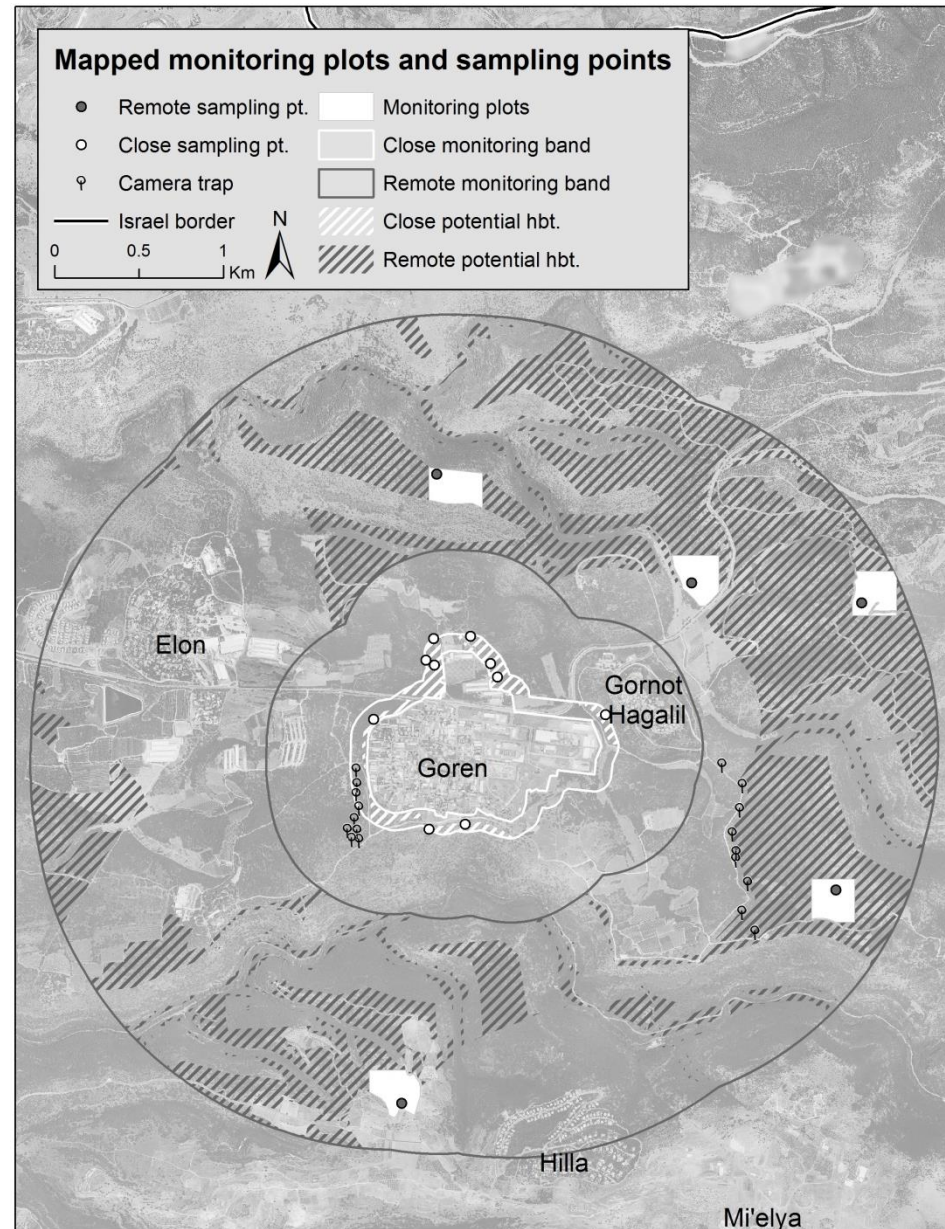
We used data from 3 rounds (2012-2018)



# Study area

Each unit/subunit included 5 sites, each site included 6 points divided between two transects:

- “Near”- from the edge of settlement/agriculture to 100m radius
- “Far” – between the radius of 500-2000m from settlement/agriculture edge



# Monitoring

- The monitor arrive to the point at morning
- Counts for 10 minutes in each point
- Writing the number of individuals from each species that were seen or heard



Photos: Ohad Sherer

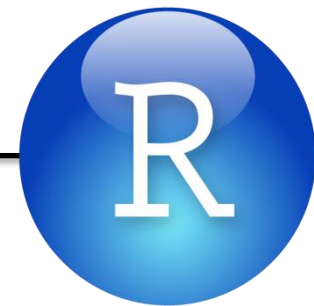


# Species traits table

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- **Tropic level** – primary consumer, primary carnivore, top carnivore
- **Feeding preferences** – carnivore, omnivore, scavenger, piscivore, invertebrate predator, granivore, frugivore, nectarivore
- **Feeding behavior** – aerial sallier, bark prober, ground gleaner, lower/upper canopy gleaner
- **Nest placement**– ground/ground cavity/shrub/tree cavity/canopy nester
- **Nest type** – close/open nest
- **Primary Habitat** – arid, hyper arid, coniferous forest, grassland, high/low dense/open shrublands
- **Invasive** – yes/no
- **Commensal** – yes/no

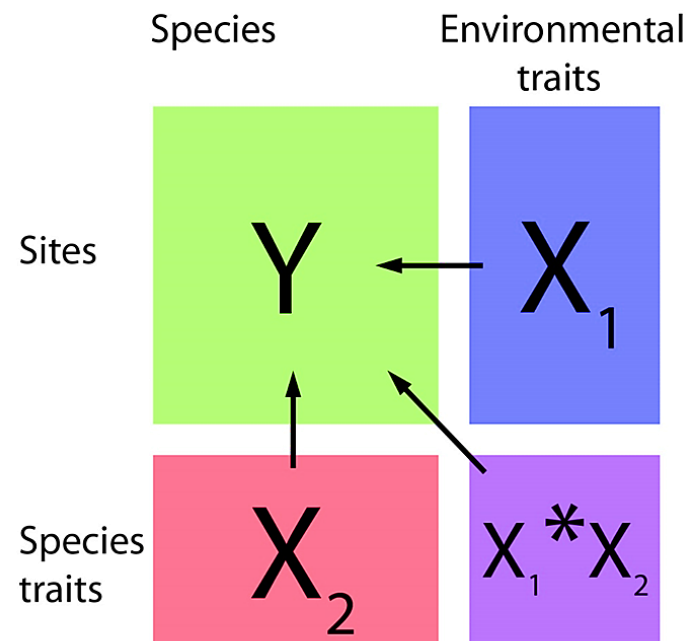
# Community structure analysis



- Function 'traitglm', under package 'mvabund' (R core team)
- generalized linear models approach for high-dimensional data, such as multivariate abundance data in ecology

## Benefits:

- Statistical power
- Coefficients
- Traits



$X_1 * X_2$  as the fourth corner in a model predicting abundance (Y) as a function of environment ( $X_1$ ), traits ( $X_2$ ) and their interaction. (Brown et al. 2014)

# Abundance & species richness

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- The number of species was not significantly different between the transects in most units.
- There were significantly more individuals in the “Near” transect in most units.





# Primary habitat

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- Species that prefers arid habitats and open shrublands tend to prefer the "Far" transects
- Species that prefers high dense shrublands prefer the "Near" transects



Little Swift  
(Herbaceous vegetation)



Black-bellied  
Sandgrouse  
(Transition zone  
& Negev highland)



Eurasian Jay  
(Transition zone)

# Feeding preferences & Trophic level

- Carnivores and invertebrate predators preferred the "Far" transects
- Primary consumers, especially Frugivores and nectarivores, prefer the "Near" transects

Photos: Ohad Sherer



Bonelli's Eagle  
(Herbaceous vegetation)



Eurasian Thick-knee  
(Mediterranean maquis)



Palestine  
Sunbird  
(Transition zone)

# Feeding behavior

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- Ground gleaners mostly preferred the "Far" transects
- Upper canopy gleaners prefer the "Near" transects



Eurasian Thick-knee  
(Mediterranean maquis)



Rock Sparrow  
(Transition zone)



Great Tit  
(Transition zone  
& Negev highland)

Photos: Ohad Sherer



# Nest placement

- Ground ,ground cavity and shrub nesters preferred the "Far" transects
- Tree cavity and canopy nesters preferred the "Near" transects



Little Swift  
(Herbaceous vegetation)



Rock Martin  
(Transition zone)



Common Myna  
(Transition zone  
& Negev highland  
& Arid south)

Photo: Jonathan Ben-simon

Photos: Ohad Sherer

# JNF's coniferous forests

## Coniferous forest



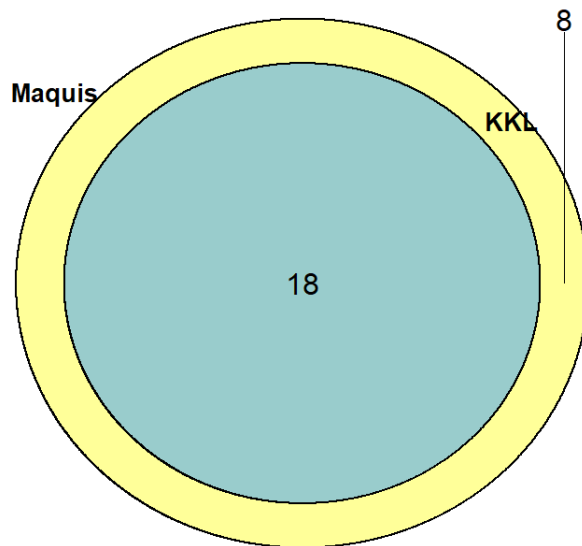
## Mediterranean maquis



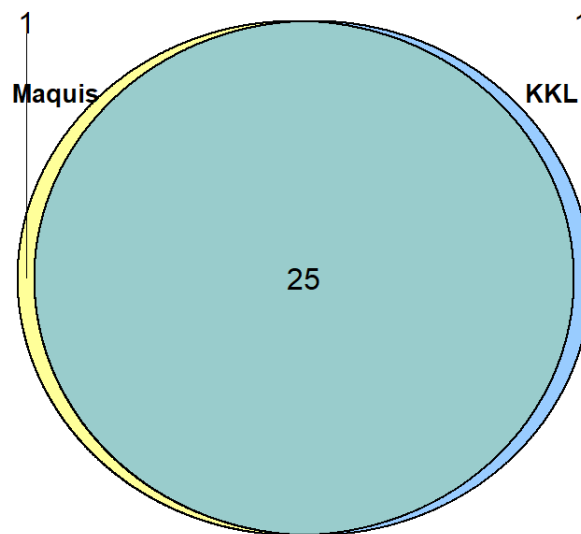


# JNF's coniferous forests

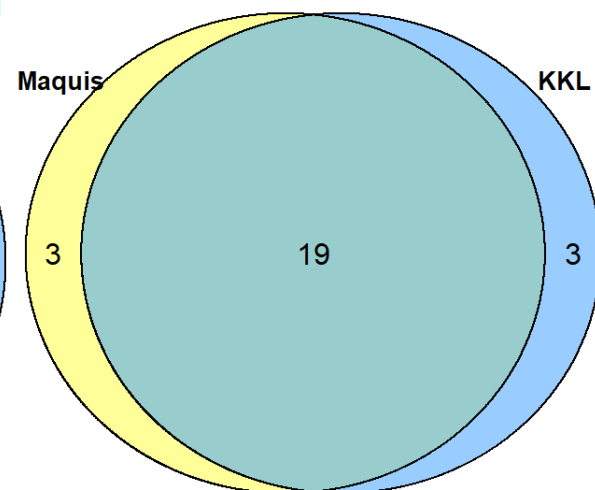
Judean  
Highlands



Carmel



Galilee



Crested lark



Eurasian Linnet

Photo: Ohad Sherer



# Loess plains in the Northern Negev

Loess



JNF's afforestation

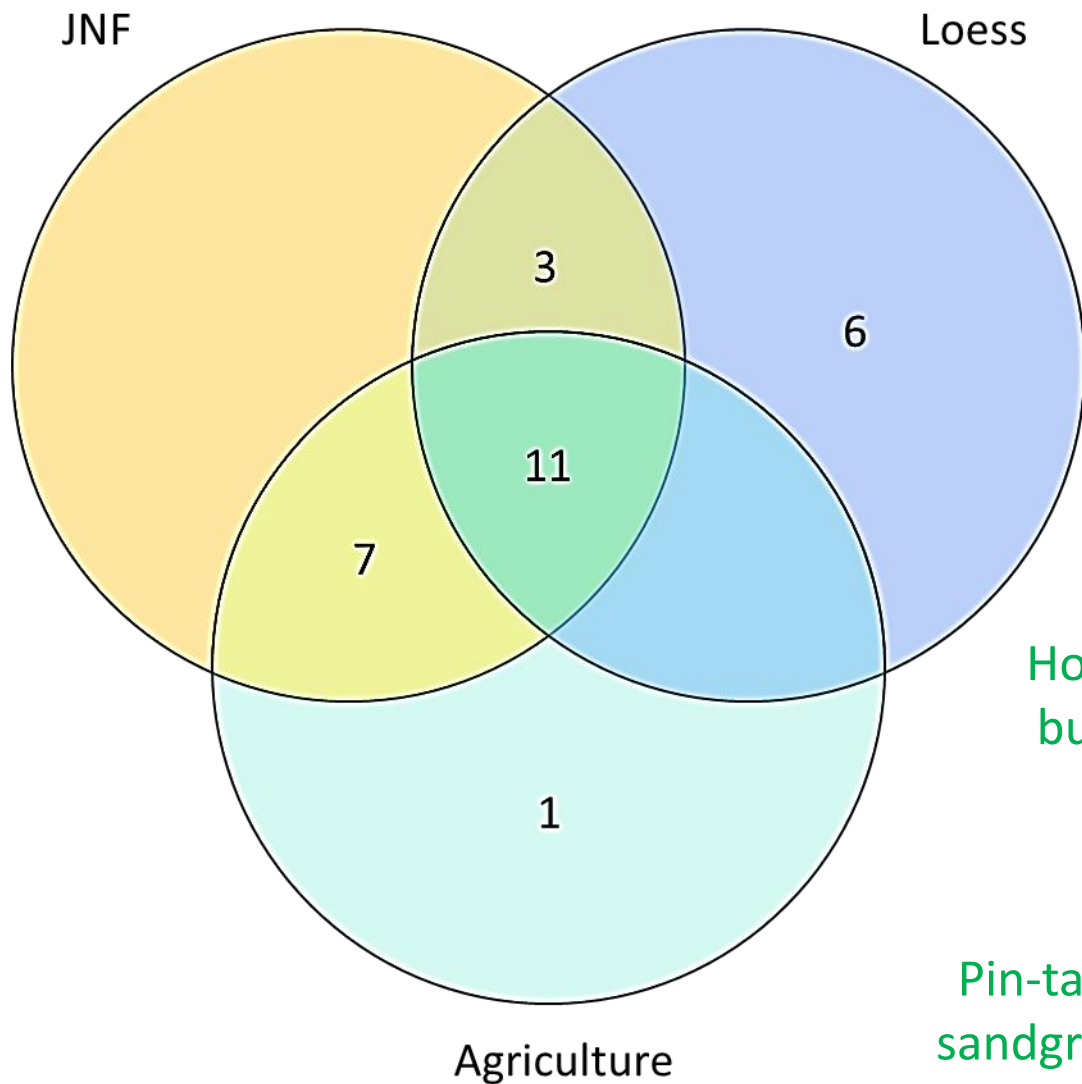


Photos: Boaz Shacham

Extensive agriculture



# Loess plains in the Northern Negev



Spectacled warbler



Photos: Ohad Sherer

Long-billed pipit



Photo: Jonathan Ben-simon

Houbara bustard



Photo: Oree Efroni Naor

Pin-tailed sandgrouse

# Discussion

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Though species numbers are similar in both transects, the composition changes:

- Altered habitats (settlements/agriculture) attracts more high dense vegetation, tree related and primary consumer species.
- Altered habitats attracts invasive and commensal species, and enable them to expand distribution
- Arid and open habitat species, especially carnivores, invertebrate predators and ground gleaners & nesters sometimes avoid the altered habitats



# Thanks

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- Noam Weiss & Re'a Shaish
- Eyal Shochat
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- Tamar Dayan's lab



HAMAARAG  
Assessing the  
State of  
Israel's Nature

THE STEINHARDT  
**museum  
& natural  
history**



**Questions?**

