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NATURAL ENVIRONMENT RESEARCH COUNCIL

Joint Services Health Unit

Developing a code of practice for the management of mosquitoes in Cyprus wetlands

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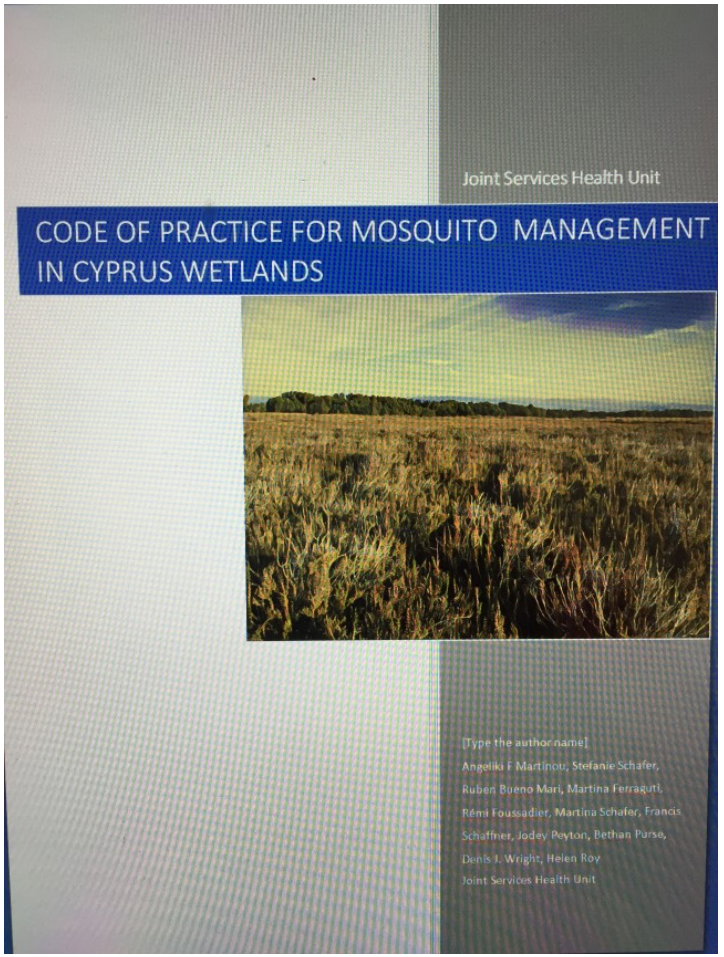
Summary

- Background
- What is a code of practice
- What is it trying to achieve?
- What should a code of practice include?
- Who should use it and how?
- What is next?



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Cyprus in the light of biodiversity

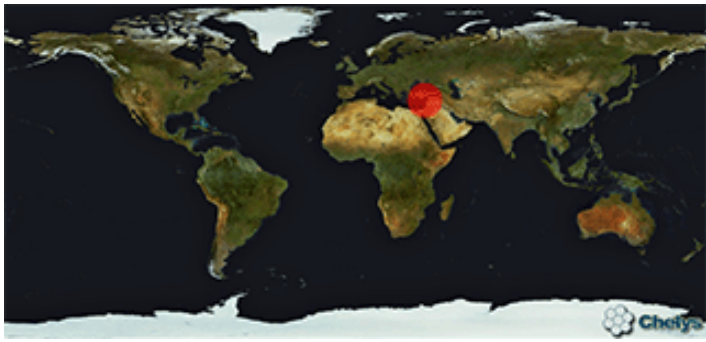
3rd largest island in the Mediterranean

S.E. corner of Europe - Levantine area

Varied topography, geology, bioclimate

Biodiversity hot spot: high level of endemism

Migratory route for bird species

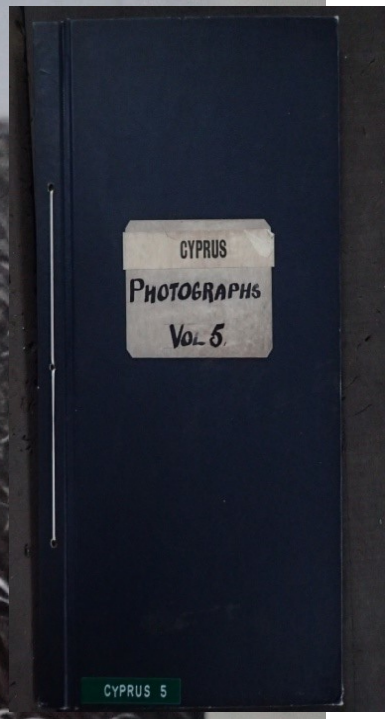


Can these threats also affect mosquito pops?

Threats to natural wetlands in Cyprus

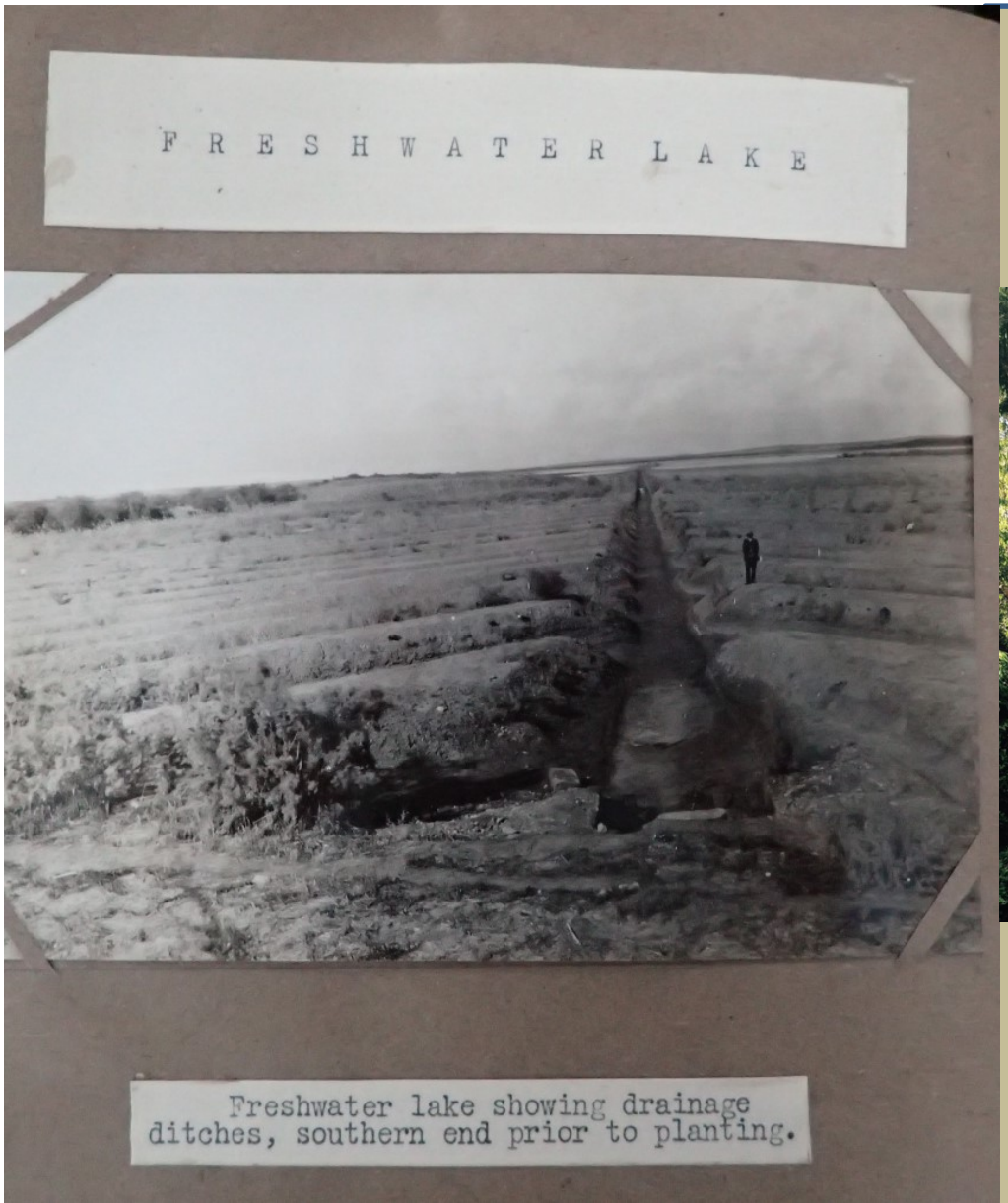
- **Biological Invasions**
- **Urbanization**
- Land abandonment
- Agricultural Intensification
- Desertification

Nowdays wetlands are more widely appreciated: this was not always the case



30. Reference para. 23. General view of the large area of unproductive Marshland at Limassol swamp capable of forest reclamation which is at present an acute malarial problem and only supports rough grazing and reed production.

In 1930s - habitat modification to wetlands in Cyprus occurred by planting of alien trees to dry the marshes



2018

Urbanization can affect mosquito populations, increase pressure for mosquito control and influence mosquito management plans

Potential conflicts between nuisance/infectious disease health risk and development: need to include vector risk assesment in urban planning

Cyprus was a malaria endemic country until the mid-1950s when malaria was eradicated

Sraying a house with DDT and kerosene

National Museum of Health & Medicine

Mosquito eradication → Mosquito suppression

Indiscriminate control

↓

Integrated Resistance Management

↓

Integrated Vector Management [IVM]

↓

Area wide & Environment friendly approaches

Potential conflicts between disease health risk and other goals: need to include vector risk assesment in environmental impact assesments

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The pillars on which IVM is based

Management

Surveillance

Control

Designation of buffer zones

Habitat modifications

Environmental Protection

Non- target species

Biodiversity

Ecosystem services

Education & Communication

Public health authorities,

Stakeholders

Public

Citizen- science

Research

Applied

Basic

Multidisciplinary

Resources, Funding, Training, Sharing responsibilities

In the present context, a **code of practice** aims at achieving compliance with the general environmental duty for any activity that causes, or is likely to cause, environmental harm

It can demonstrate that reasonable and practicable measures are taken to minimise environmental harm from selected mosquito control activities.

WHY?

Various activities of mosquito management have the potential to have an adverse impact on the environment, especially in biodiversity hotspots

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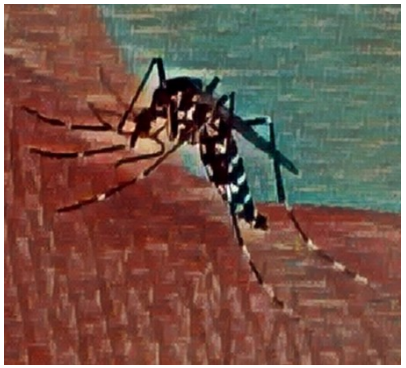
AIM

The proposed Code of Practice aims to:

Minimise the risk of introductions of non-native mosquitoes, prevent the re-emergence of malaria and any other diseases such as WNV, help towards minimising mosquito nuisance while advocate control approaches with no adverse impacts on the environment



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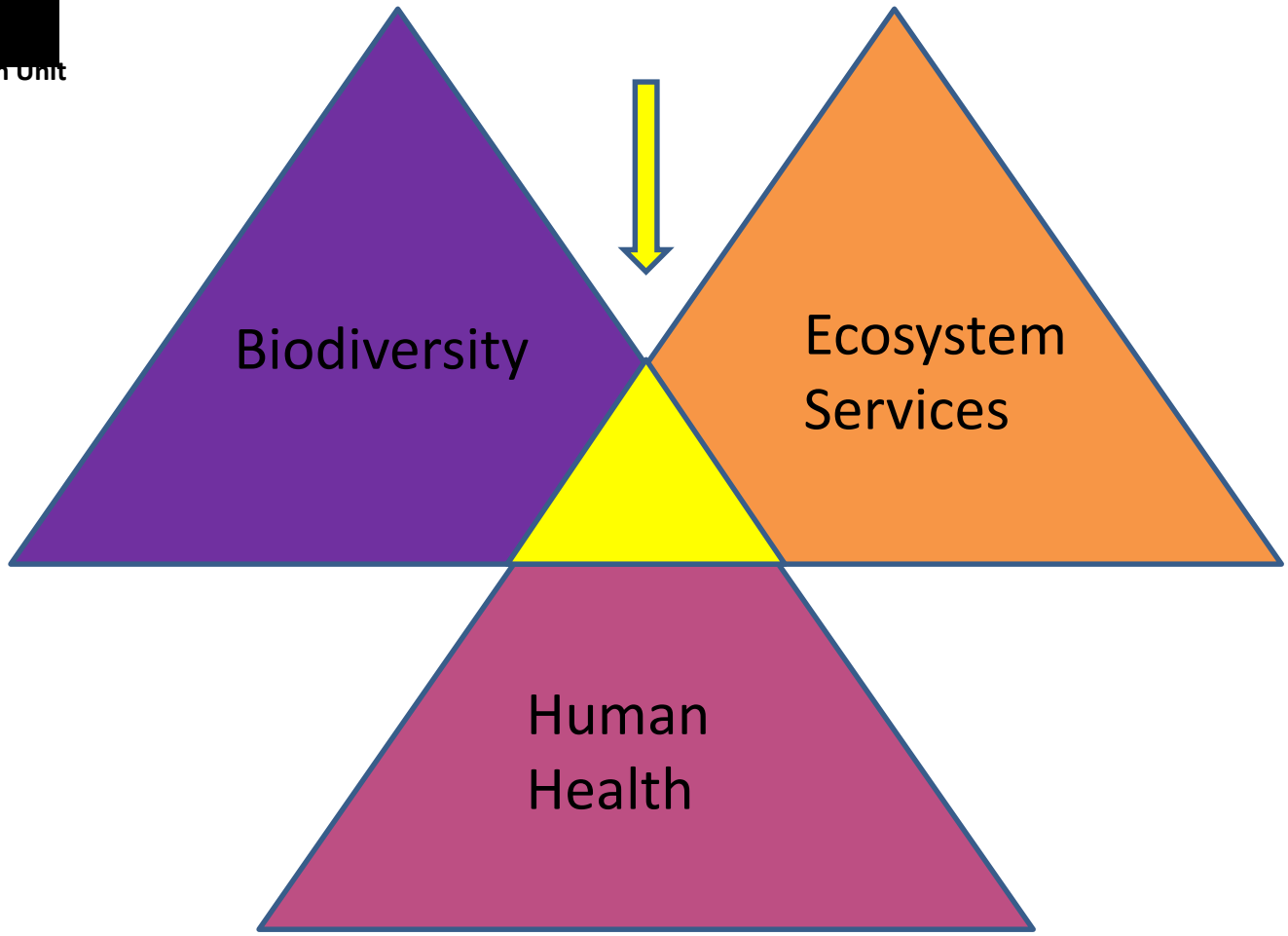

The proposed code of practice is thus a mosquito management plan, which will serve as a guideline to manage mosquitoes effectively in wetlands respecting equally human health, biodiversity and the provision of ecosystem services

10 suggested steps in a Code of Practice

1. Assessment of the site and the scale of the mosquito problem (categories: minimal, significant nuisance, disease risk, concerns about non-native species introductions)
2. Identify all relevant stakeholders as public groups affected by mosquitoes and decision makers who can have an impact on the mosquito management plan
3. Define the aim of the mosquito management plan
4. Define the desired outcomes and the desired levels of control keeping in mind feasibility and sustainability goals
5. Secure funding for resources: personnel - including environmental health technicians, entomologists and public health experts, pest controllers; research; training and outreach

6. Provide **training of pest control personnel** based on the desired outcomes of the mosquito management plan and the characteristics of the site of interest

7. Design the overall strategy based on IVM principles - larval surveillance, mapping breeding habitats, adult surveillance, habitat modification, source reduction, biological control, chemical control and resistance management

8. Ensure communication with stakeholders at all steps

9. Engage with the public, provide education and outreach regarding the mosquito management plan

10. Encourage research: monitoring effects on non-target species; monitoring resistance; identification of native biocontrol agents; vector borne disease monitoring

Public engagement, education and outreach

Communication with stakeholders at all steps

Know your site and size of mosquito problem

Case 1
Minimal or None

Case 2
Significant nuisance

Case 3
Disease risk due to native or invasive species

Case 4
Concerns for introduction of invasive species

Define the aim and desired outcomes of management plan

Monitoring
Case 1

Population suppression
Case 2 & 3

Eradication
Case 3 & 4

Secure funding

Ensure training of personnel based on the requirements of each site

Design strategy based on IVM principles

- Larval & Adult Surveillance
- Mapping of breeding sites
- Habitat modification & Source reduction
- Designation of buffer zones
- Biological Control
- Chemical Control
- Mechanical control
- Good practice

Research

- Biocontrol
- Climate change
- Resistance
- Environmental impact studies

Who should use it and how?

- Governmental Public Health agencies
- Local government agencies
- Private pest control companies that engage in mosquito control
- Possible to be implemented from initiation to elective phase
- Dynamic - should be regularly reviewed and updated

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Thank you

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What is next?

Questions/points?

Discussion - for example

- Buffer zones: do we know of any wetlands where such zones have been implemented based on mosquito biology and ecology?

- Chemical control: when and where should it be implemented?

Consensus