

# “The measures taken to control the diffusion of Chironomidae in Lake Trasimeno”



From the experimental phase to the maintenance of the project April 2007

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# The Trasimeno Lake

## General Features

Location: **Central Italy Regione Umbria**

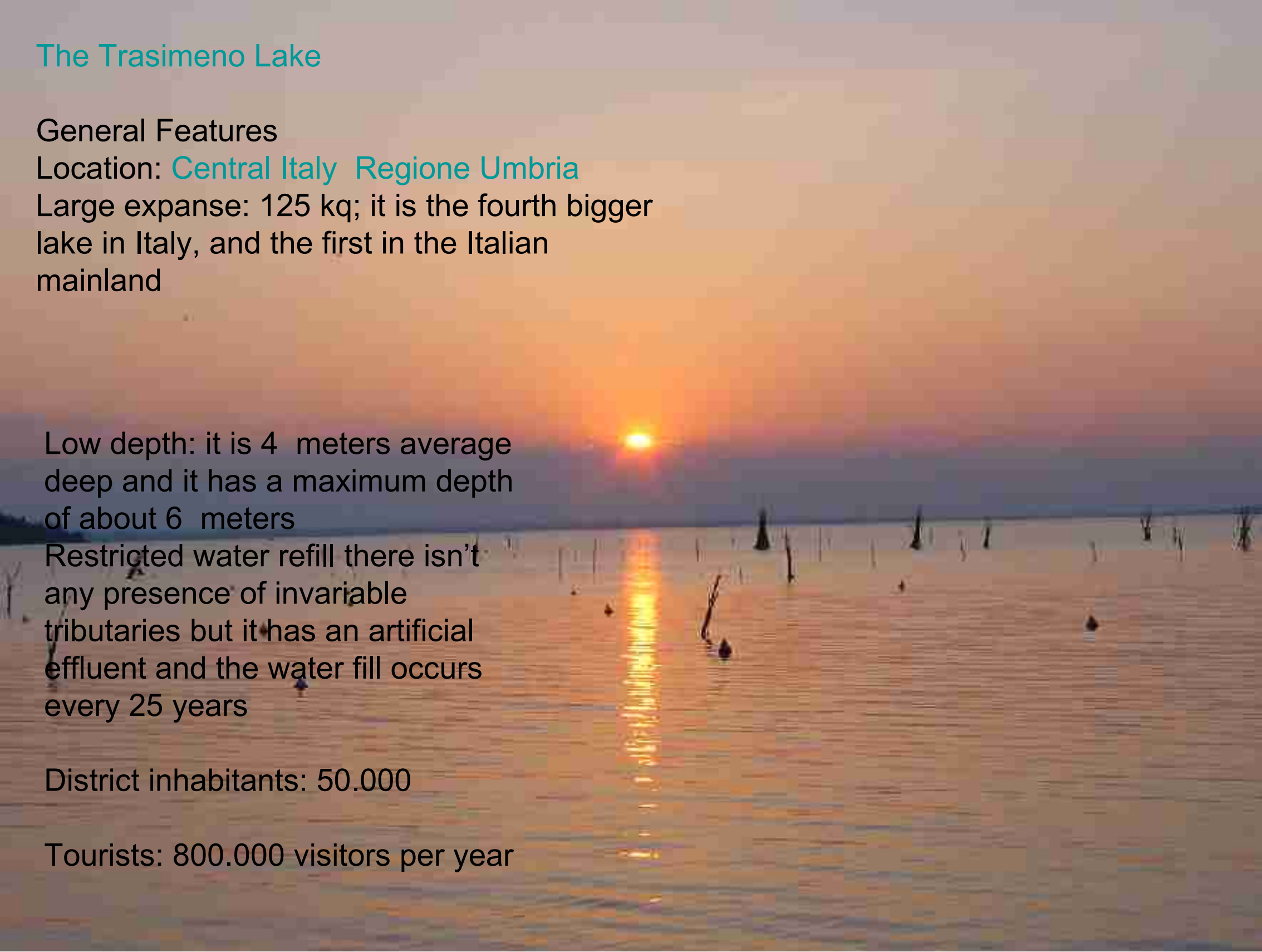
Large expanse: 125 sq km; it is the fourth biggest lake in Italy, and the first in the Italian mainland

Low depth: it is 4 meters average deep and it has a maximum depth of about 6 meters

Restricted water refill there isn't any presence of invariable tributaries but it has an artificial effluent and the water fill occurs every 25 years

District inhabitants: 50.000

Tourists: 800.000 visitors per year



## The Chironomidae

They represent a basic component of the biological communities living at the bottom of shoals of all fresh water environments.

Inside the Trasimeno lake they give a really determinant contribution to the bio-diversity and turning out to be essential specie of such ecosystems

### Causes of infestation

Hudge organic presence inside the water  
due to the drainage waste

Inorganic pollution due to the agricultural  
fertilizations

Algae increase and environment  
development with high concentration of  
organic substance that is melted and  
present at the bottom of shoals

Development of a low level of oxygen  
environment



**The reason that has determined the project of Chironomidae control**

**During the last years of XX century the problem of the Chironomidae large infestation has created relevant problems to the population as regard the night life and tourism.**

**Date of the largest midges**

**1987**

**1990**

**1991**

**1992 – First attempted to find out the causes of this problem with the Prof. Arshad Ali.**

**Result: discovery of high presence of larvae at the bottom of shoals and experimentation using white spread light at high intensity.**

**Until 2003 any kind of specific activity has been proposed because of a lack of general project**

## Summer 2003 High intensity infestation

**Population alarmism and crisis of the lake tourism**

**November 2003- Assignment of Regione of Umbria to Dr. A.M. Di Giulio in order to created a general project for the Chironomidae control**

**Drawing up the project in collaboration with the administration of the Provincia and Health and Social Service and the Department of Civil Protection of the Regione of Umbria and validated by the Ente Parco of Lake Trasimeno, University and other administration**

**6 th July 2004- Approval of the project “The Chironomidae control in Lake Trasimeno”**

**with decree n° 95 of President of Regional Committee of Umbria**

**26 November 2004 – Assignment to Dr. Di Giulio as Person in charge of the project with decree Administration n° 1235 of General Doctor of AUSL n.2**

## Project structure

### General actions

**To help the flow of more water quantities to improve the quality of chemical and physical criteria.**

**Water conveyance not connection of two artificial lakes with Trasimeno lake**

**Reduction of maize cultivations that need azotes high fertilization**

**Greater control of the urban waste and of breedings of animals**

**Cleaning of drains water**

**Dredging and cleaning of the shoals**



## Specific actions

**Monitoring of shoals in order to verify the quantity and the situation of the chironomidae larvae and of the biological components**

**Treatment of the coast side until 1 meter depth using *Bacillus thuringensis* var. *israelensis***

**Placing of lamps in order to attract swarms away from tourist areas.**

**Insecticides treatment in order to control the highest peak of annoyance**



## Monitoring

The monitoring has been performed using dredge monthly by the Perugia University in collaboration with Disinfestations Service of AUSL n.2

Each investigation consists of 30 testing performed along a sample zone of 350 meters long at 1,5 meter depth.

The investigation are performed with the help an hovercraft in situation of extremely high security and efficacy



## Larvae treatments

The larvae treatments have started when the monitoring points out the high presence of chironomidae larvae.

The treatments are performed with hovercraft having a distribution plant for larvicide's product with wings and a little pipes.



## Attractives lamps

Placing of 150 high intensity light lamps

Creation of lamps called “Tofolamp” with a characteristic external cover that reminds the net for fishing used in the Trasimeno lake.

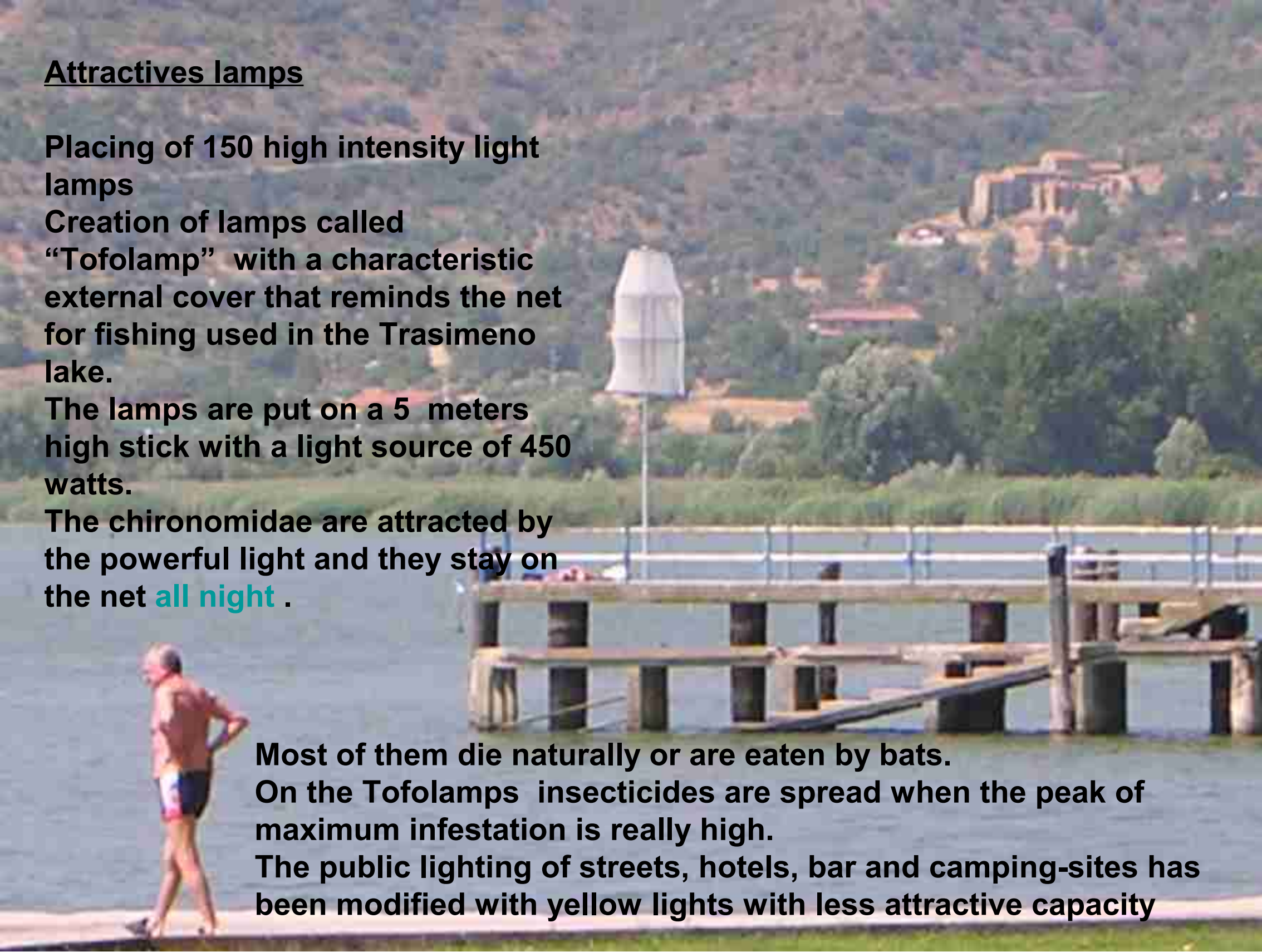
The lamps are put on a 5 meters high stick with a light source of 450 watts.

The chironomidae are attracted by the powerful light and they stay on the net **all night** .

Most of them die naturally or are eaten by bats.

On the Tofolamps insecticides are spread when the peak of maximum infestation is really high.

The public lighting of streets, hotels, bar and camping-sites has been modified with yellow lights with less attractive capacity



## Insecticide treatments

**When the peak of infestation is really high, special insecticide treatments are carried out with pyrethrum or pyrethroids product spread with low volume equipment.**



**Treatment using insecticide against larvae and adult insects during the period 01/06/2004 – 30/09/06.**

	2004	2004	2005	2005	2006	2006
	Adult insect. Treat.	Larvae insect. Treat.	Adult insect. treat.	Larvae insect. treat.	Adult insect. treat.	Larvae insect. treat.
<b>Passignano</b>	<b>6</b>	<b>0</b>	<b>12</b>	<b>4</b>	<b>15</b>	<b>5</b>
<b>Tuoro</b>	<b>5</b>	<b>0</b>	<b>10</b>	<b>4</b>	<b>13</b>	<b>5</b>
<b>Castiglione</b>	<b>8</b>	<b>0</b>	<b>15</b>	<b>4</b>	<b>19</b>	<b>5</b>
<b>Magione</b>	<b>6</b>	<b>0</b>	<b>9</b>	<b>4</b>	<b>12</b>	<b>5</b>
<b>totale</b>	<b>25</b>	<b>0</b>	<b>46</b>	<b>16</b>	<b>59</b>	<b>20</b>
<b>Amount of adult insecticide used in kg</b>	<b>150</b>		<b>276</b>		<b>354</b>	
<b>Amount of larvae insecticide used in kg</b>		<b>0</b>		<b>2800</b>		<b>4000</b>



## **Information and explanation activities for the population**

**One of the objectives was to supply clear information regarding the insects, which although they don't bite cause problems and annoyance –and irritation to those who are allergic.**

**There is also the need to clearly communicate that the Regione of Umbria, the Provincia of Perugia and the ASL n.2 are involved in carrying out this project using a number of different methods, as seen.**

**Along with this it is also important to impart information to the private sector explaining the measures that can be taken to reduce the level of irritation caused by the insects.**

**The first is the production of pamphlets /publications in English and Italian to explain the aims of the project and the characteristics of the insects.**

**The second concerns the production of t-shirts, bandanas etc bearing the projects logos, aims and achievements as a visible way of spreading the message to and raising awareness of the project.**

## Results Obtained.

**During the experimental phase of the project it became apparent that using the action already listed, dredging operations carried out by the Provincial Administration and also efforts to raise the level of the lake, the numbers of chironomidae can be kept under control.**

**Using data collected from around the lake, we can see that during Summer 2005 the level of “very high” irritation (more than four consecutive days of infestation) was reached only at the end of August, and the first ten days of September, and that during July the level of irritation reached the “very high” level for brief periods.**

**The worst point at the end of Summer 2005, was not however repeated during Summer 2006 so we can concluded that the level of irritation has been reduced.**

**The areas particularly affected by swarms during August 2005 were those around Castiglione del Lago, Tuoro and Passignano, while the area around Magione was less affected. In 2006 the worst hit areas were around Castiglione del Lago, S. Arcangelo, and sporadically also around Tuoro. Passignano however was largely unaffected.....**

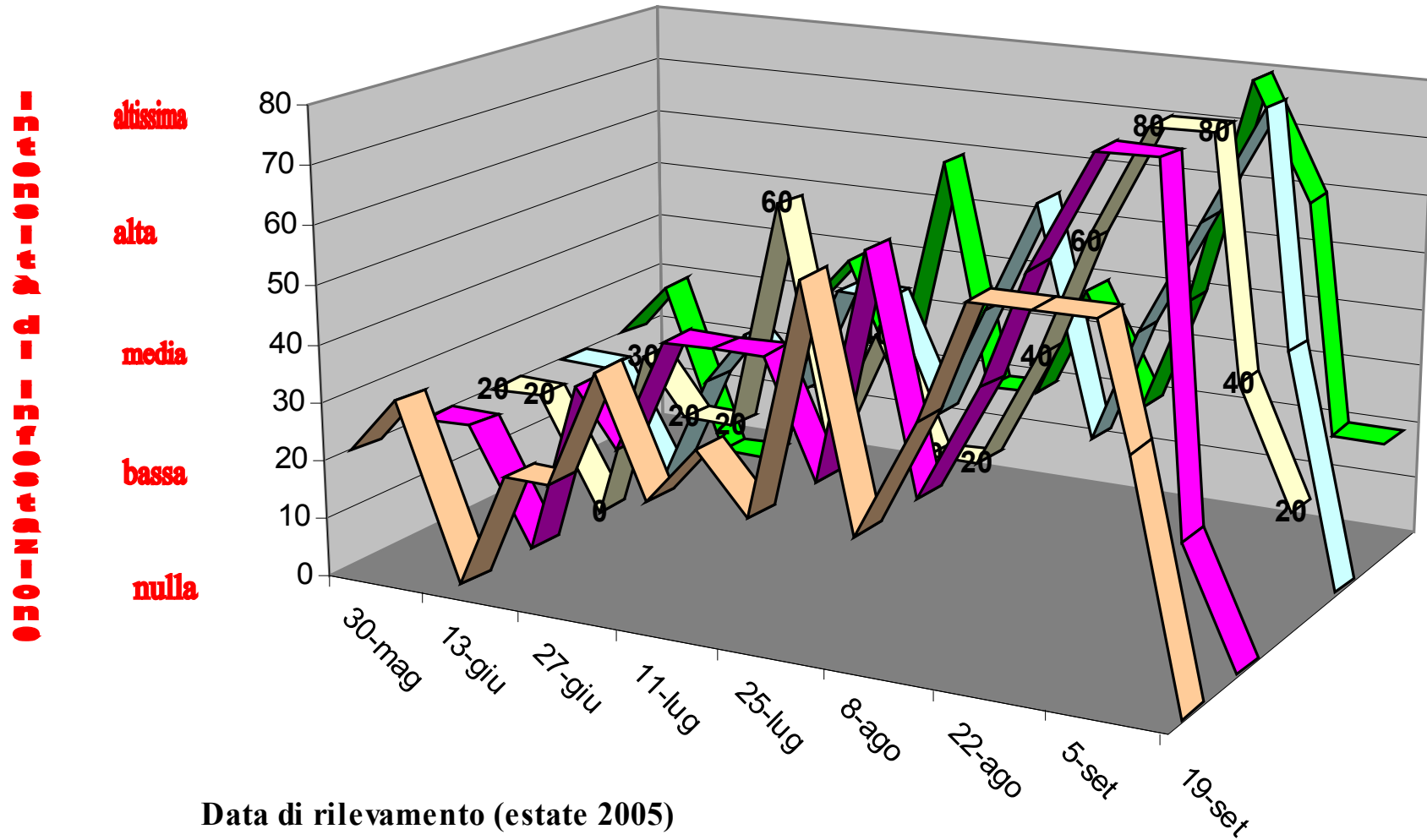
**.....Collaboration with tourist operators around the lake has allowed for improvements that mean tourists were not forced to abandon certain lakeside areas because of excessive insect numbers, as had happened in the past.**

**Regarding the methods used, the purchase of a hovercraft and pick up truck have allowed for a rapid and safe deployment of the insecticide against larvae in the lake, and against adult insects, and the collection of samples from around the lake to check the effectiveness of the operation.**

**The use of “Tofolamps” has also been a success – helping to attract swarms away from tourist areas and inhabitations and also being resistant to the elements.**

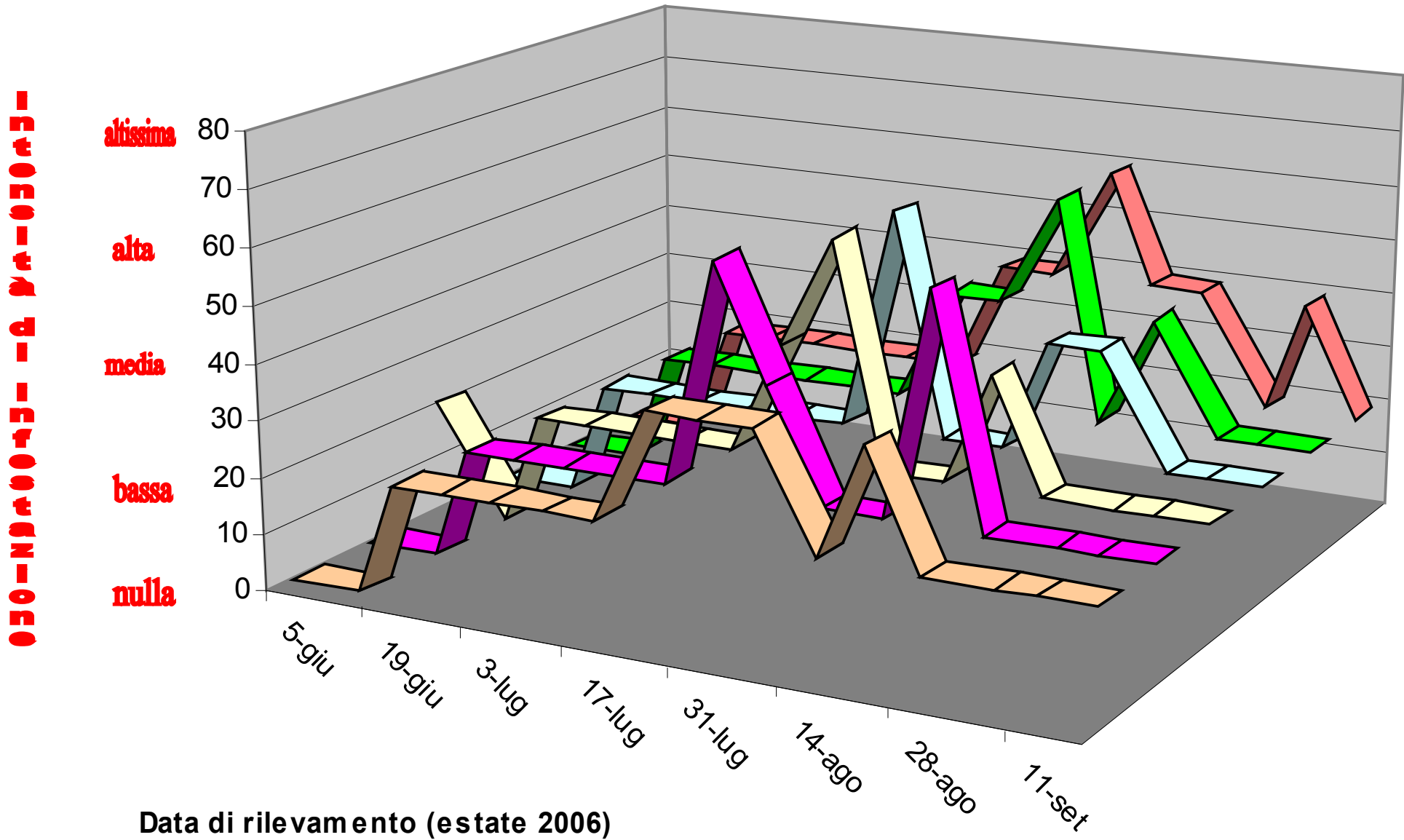
**The effectiveness of these lamps has also been helped by the replacement of “white” lamps in tourist areas /inhabitations with yellow ones, which attract the insects less, as indicated by the project.**

## Trend popolazione chironomidi adulti



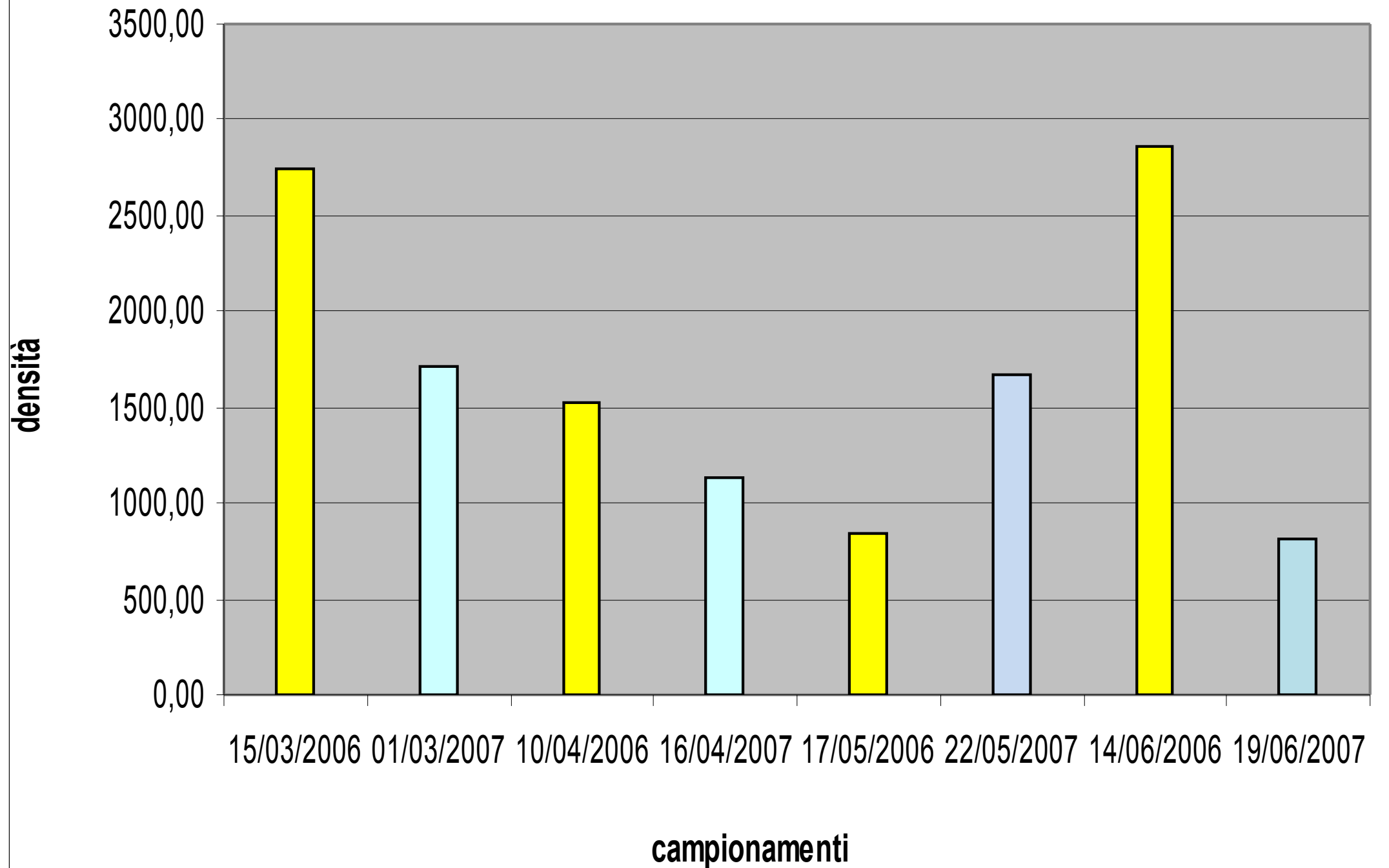
■ Tuoro 
 ■ Castiglione del Lago - Badiaccia 
 ■ Castiglione del Lago - Listro 
 ■ S. Arcangelo 
 ■ Passignano

# Trend popolazione chironomidi adulti



camping punta navaccia	camping Badiaccia	camping Listro
camping Polvese	camping Kursal-La spiaggia	campeggio Europa

# Densità chironomidi - marzo aprile 2006-2007



## Insecticide treatment against larvae

**It has proved successful in preventing the hatching of larvae without damaging other aspects of the eco-system.**

**For 2007 the measures taken to control insect numbers has began in May, and will continue until the end of August, using a total of 5000 kg of anti-chironomidae products.**



## Insecticide treatment against adult insects

**Reduce the need for this type of treatment, using it only when the infestations are acute**  
**Pick-up truck with a distribution system that aims to use the minimum necessary amount of insecticide.**





## The Provincia of Perugia

**Maintenance and upkeep of the  
“Tofolamps”**

**Experimenting with lamps of  
different power / brightness,  
and using strip lights and  
fluorescent tubes with white  
and black light emissions.**

## University

Film

**Continuation of monitoring of larvae in the lake  
Collaboration of the Department of Cellular Biology regarding  
the use of the “Tofolamps”.**



**There are two ways to live your life.  
One is thinking nothing is a miracle.  
The other one is thinking all is a miracle  
Albert Einstein**

**See you soon at Trasimeno Lake!!  
Thank you**

