

Rufford Small Grant

(for Nature Conservation)

INTERMEDIATE REPORT

PROJECT TITLE

RESTORATION OF SMALL HEADWATER WETLANDS IN
BULGARIA

NAME OF APPLICANT AND/OR ORGANISATION

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The aim of this project is the restoration of three small headwater wetlands in Bulgaria and increasing their water tables to the levels recorded in the past. The wetlands are situated on the mountains surrounding Sofia: Lijulin Mt., Vitosha Mt. and Lozenska Mt.

The major tasks and the subtasks of the project are listed in the table below:

TASK/SUBTASK	DURATION - 18 MONTHS							
I. DATA COLLATION	ONE BOX = TWO MONTHS							
ASSESS EXISTING ENVIRONMENTAL DATA	■	■	■					
IDENTIFY/FILL GAPS IN EXISTING DATA SETS		■	■					
CONDUCT PRELIMINARY MONITORING OF THE LAKES		■	■	■				
II. APPLY RESTORATION MEASURES								
SPECIFY POTENTIAL RESTORATION TECHNIQUES			■					
CONDUCT SELECTED RESTORATION MEASURES				■				
III. EVALUATE AND MONITOR RESTORATION								
CONDUCT MONITORING OF THE RESTORATION EFFECT					■	■	■	■
PUBLISH INFORMATION BROCHURES			X					X
PREPARE INTERMEDIATE AND FINAL REPORTS						X		X

TASK I: DATA COLLATION

- Dragichevo landslide lakes: In addition to the previously collected data (since 2000) a map of the landslide area has been supplied and a precise mapping of the wetlands on the landslide area has been done. The total of 33 wetlands have been found, situated from 896m.a.s.l. to 983 m.a.s.l. The coordinates of the ponds and some basic information are listed in [Table 1](#). In addition, [data on the origin of the landslide](#) has been collected by questioning the elder people in the region and the literature review. Throughout of the summer we have continued the basic monitoring of the biggest pond of the landslide wetland system.
- Boyana Lake: We have collected the available historical data for the lake, including: ancient usage as water supply, construction of the main dike, usage for hydropower production (for the first HPP in BG), introduction of exotic fishes, etc. Mapping of the surface area of the lake has been undertaken and compared to the existing data. Vegetation mapping of the lake has not been done as more than 98% of the lake surface has been covered by pondweed. Since November 2004 we have conducted regular (monthly/ to twice per month) monitoring of the lake, which includes basic chemistry, phytoplankton and zooplankton. Parts of the data were used to supply two MSc theses.
- Lozen Lake: We have collected data about the lakes usage in the past and in the present. We provided map of the region and collected preliminary monitoring data.

TASK II. APPLY RESTORATION MEASURES

- [Dragichevo landslide lakes](#): In the beginning of the project we had the chance to discuss the restoration approaches and the overall work on the project with [Dr. Andrew Miller \(which is one of the referees of this project\)](#), [Dr. Robert Kennedy \(US Army Corps of Engineers\)](#) and [Dr. Boyan Boyanovsky \(Sofia University\)](#). Because of the heavy rainfalls in the summer of 2005 (three times higher than the average) we were not able to start the filling up of the ditches/canals and the construction of the dikes. The lakes remained interconnected throughout the summer. This part of the work will be done in the summer of 2006. We have a [team of German students](#) working on the landslide area – collecting data for water and soil analysis, origin and evolution of the landslide. We have started with the [removal](#) of the pondweed, but we left this part of the work for the summer of 2006.
- [Boyana Lake](#): As we could not start the reinforcement of the main outlet of the lake (because of the rains), most of our efforts in the last year have been concentrated on the [manual removal](#) of the pondweed. We have succeeded to remove [more than 70%](#) of the pondweed from the deep portion of the lake. In addition to the pondweed we have removed a huge amount of tree trunks and smaller debris, including parts of furniture from the near by hut (partly destroyed). In May 2006 we will continue the work and we will remove additional 20 % of the vegetation. At this time we will also reintroduce the grass carp to the lake. The fish has been first introduced to the lake in the mid 50's and the last catches have been reported in the mid 90's. The grass carp has proven to be very efficient in controlling the amount of the pondweed in the lake, so we hope to achieve a good sustainable result in the future (after the vegetation harvesting). The vegetation control was accomplished by [volunteers](#) (mostly students and on one occasion we had a team of international students – Spanish team – helping us).
- [Lozen Lake](#): So far no restoration measures have been undertaken on the lake. This part of the work is left for the summer of 2006.

TASK III. EVALUATE AND MONITOR RESTORATION

- Dragichevo landslide lakes: We continue with the [regular monitoring](#) (still to be considered preliminary). An information brochure is being prepared about the project and the wetlands (to be ready by the end of April).
- Boyana Lake: Throughout and after the end of the field work we have been conducting a regular monitoring of the lake. The results are to be used in an MSc thesis in 2006 in a comparison with the results from the previous year.
- Lozen Lake: Only preliminary monitoring.



Pic 1. Dragichevo Lake



Pic. 2: On the left image – from left to right: Dr. Andrew Miller, Dr. Boyan Boyanovsky and Dr. Robert Kennedy.



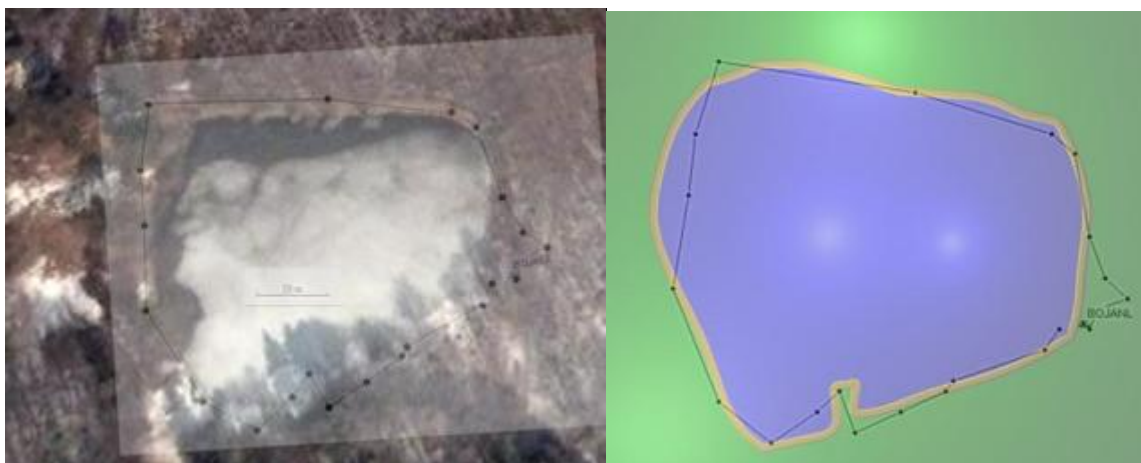
Pic 3. Soil and water sampling – the German team (Dresden Technical University)



Pic.3a: Electro-fishing – November 2005



Pic. 4. Removal of pondweed in the Dragichevo Lake – August 2005.



Pic 5. Boyana Lake: satellite image (left) and the surface map constructed in 2005 (right). Doted line – GPS tracking of the shore line.



Pic. 6: A deer grazing on the pondweed in the Boyana Lake – June 2005



Pic 7 Boyana Lake – before the removal of the pondweed – June 2005.



Pic. 8. Removal of debris and pondweed from the Boyana Lake – July/ September 2005.





Pic. 8a. Removal of debris and pondweed from the Boyana Lake July/ September 2005.

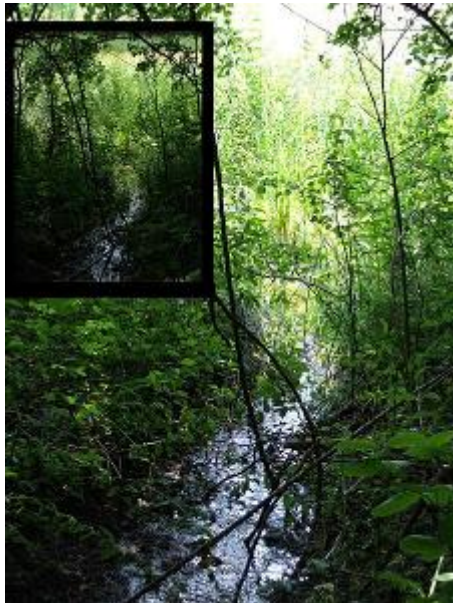


Pic 9: General view at the end of the summer – September 2005.





Pic. 10: Boyana Lake – December 2005 (up) and March 2006 (down)



Pic. 11: The Lozen Lake – general view (up) and the ditch draining the lake (bottom) – July 2006.



Pic. 12: The project team

The first data on the Dragichevo Lake could be found in Petkov (1922), but the first detailed description on the morphometry and water level changes are given by Vodenicharov (1958). In 1946 after an unsuccessful melioration activity a permanent decrease of the water level by 1.5m and of the surface area to 8000m² took place. A second dramatic decrease happened in 1962 when after a clear cutting of the hill and plough up of the land the old landslide got activated again. As a result the surface area of the lake was decreased approximately two times. As a consequence of this a rapid invasion of macrophytes, both submerged and emerged, took place. The accelerated aging of the lake led to further reduction of the surface area and depth - 50cm since the 60s. Through out this chain of events one of the biggest landslide lakes in Bulgaria was strongly diminished in size and depth – from approximately 10m to 3m for less than a century.