WIND FARMS AND PREVENTIVE EVALUATION OF IMPACTS ON BATS: A CASE STUDY

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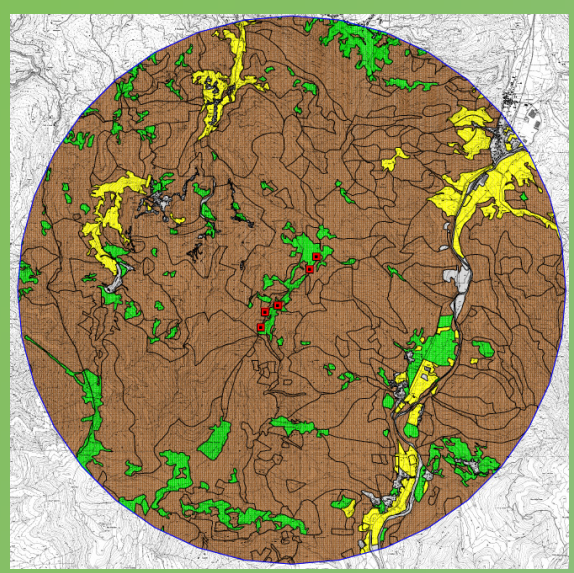
INTRODUCTION

Wind farm projects are rapidly increasing in number. It is necessary to objectively and correctly evaluate their impact on natural environment, with standard and comparable methods. In Regione Piemonte an *ante-operam* monitoring on bats and birds is to be realized for at least 1 year.

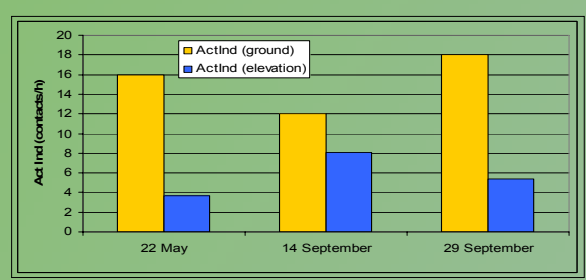
D.G.R. 20-11717, 6 July 2009

- identify summer and winter roosting sites, temporary refuge sites (swarming) and potential foraging areas from bibliografy in a 20 km buffer from project area;
- active research of refuge in a 5 km buffer from project area;
- realize 30' point counting with bat-detector (heterodine and time expansion) in wind tower exact locations and test locations in a buffer of 2 km from April to October twice a month;
- separing trophic and in transit echolocation signals;
- realize ultrasonic detection (frequency division) at wind tower height lasting for the all night in spring, late summer and autumn.



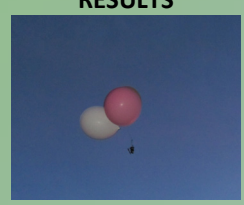
COLLE S. GIACOMO WIND PROJECT PRIOLA AND VIOLA (CN)

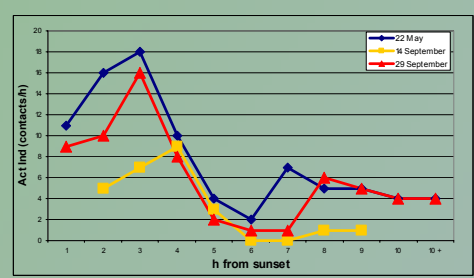
	wind towers
buffer 5 km	
70%	woodlands
10%	grassland
15%	agricoltural land
1:130.000	



Comparing bat activity on the ground and at wind tower height (80 mt)

ELEVATION BAT DETECTOR RESULTS





Bat activity during night at wind tower height

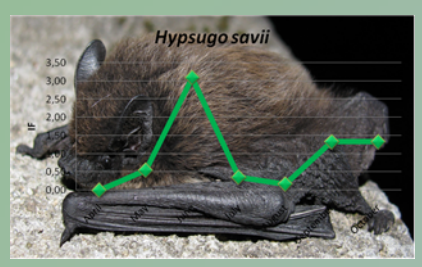
BAT DETECTOR RESULTS ON THE GROUND

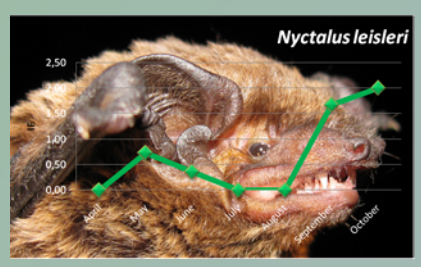
Species	App. 92/43/CEE	Contacts*	Activity Index (ActInd**)
Rhinolophus ferrumequinum	IV, II		0,03
Barbastella barbastellus	IV, II	97	2,62
Eptesicus serotinus	IV	1	0,03
Hypsugo savii	IV	39	1,05
Myotis emarginatus	IV, II	2	0,05
Myotis mystacinus	IV	4	0,11
Myotis nattereri	IV	2	0,05
Myotis sp		3	0,08
Nyctalus leisleri	IV	28	0,76
Pipistrellus kuhlii	IV	64	1,73
Pipistrellus pipistrellus	IV	249	6,73
Pipistrellus sp		1	0,03
Tadarida teniotis	IV	5	0,14
Total		**496**	**13,41**

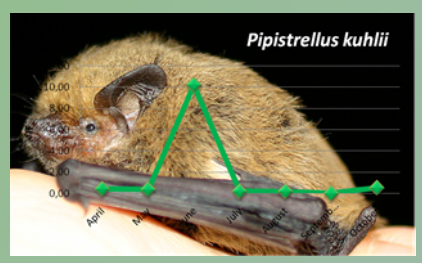
*each ecolocathion sequence assigned to an individual; one sequence every 5" is considered for longer and continuing sequences

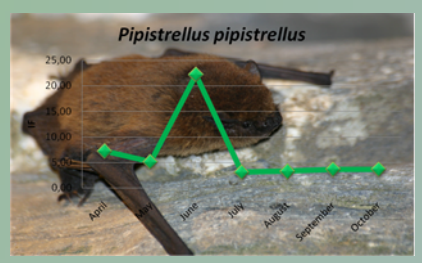
**FI = n° of contacts / h

Bat activity between months – evidence of activity peack







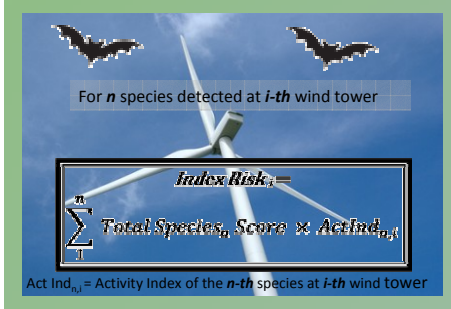


WIND TOWER INDEX RISK

Step n. 1 – define SPECIES SCORE as the sum of each impact score

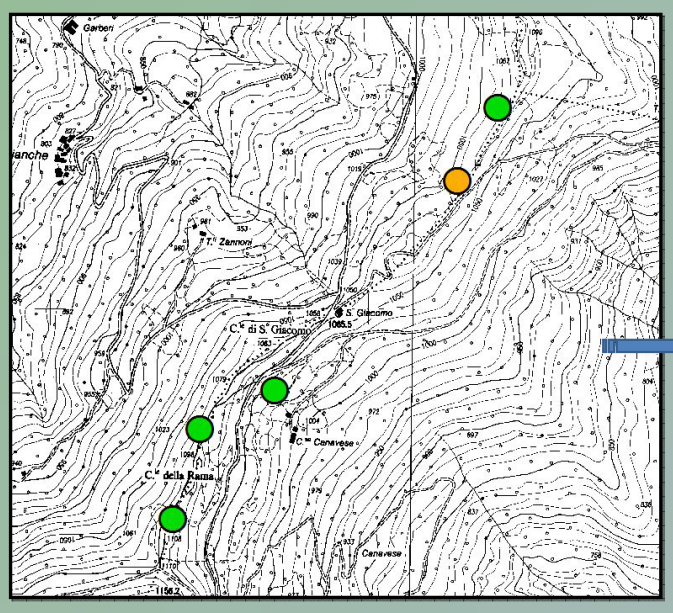
Species	Conservation value	Disturbance from ultrasonic emission	Foraging habitat and roosting site loss	Collision risk	TOTAL SPECIES SCORE
Rhinolophus ferrumequinum	3	1	1	1	**6**
Rhinolophus hipposideros	3	1	1	1	**6**
Barbastella barbastellus	3	1	1	1	**6**
Eptesicus serotinus	2	3	3	3	**11**
Hypsugo savii	1	2	1	3	**7**
Myotis emarginatus	3	1	1	1	**6**
Myotis mystacinus	3	1	1	1	**6**
Myotis nattereri	3	1	1	1	**6**
Myotis sp	2	1	1	2	**6**
Nyctalus leisleri	2	3	2	3	**10**
Pipipistrellus kuhlii	1	2	1	3	**7**
Pipistrellus pipistrellus	1	2	1	3	**7**
Pipistrellus sp	1	2	1	3	**7**
Tadarida teniotis	1	3	1	3	**8**

Step n. 2 – calculate WIND TOWER INDEX RISK



Step n. 3 – define WIND TOWER RISK LEVEL

Index Risk	Level Risk
0-100	LOW RISK
101-200	MEDIUM RISK
>200	HIGH RISK



Wind Towers Level Risk as defined with proposed method

- Arnett, E. B., Huso M. M. P., Schirmacher M., Hayes J. P., 2010. Altering turbine speed reduces bat mortality at wind-energy facilities. Front. Ecol. Environement, 2010; doi:10.1890/100103

- Rodrigues, L., L. Bach, M.-J. Dubourg-Savage, J. Goodwin & C. Harbusch, 2008. Guidelines for consideration of bats in wind farm projects. EUROBATS Publication Series No. 3 (English version). UNEP/EUROBATS Secretariat, Bonn, Germany, 51 pp.

- EUROBATS.MoP5.Record.Annex9 5th Session of the Meeting of Parties Ljubljana, Slovenia, 4 – 6 September 2006 Resolution 5.6 Wind Turbines and Bat Populations

Based on information obtained from monitoring and data analysis proposed here, it was possible to define **LOCAL AND LARGE SCALE MITIGATION AND COMPENSATORY** measures as follows:

- activation of "medium risk" wind tower at 6 m/s wind speed from 1st April to 15th May and from 1st to 30th September, according to activity peaks, from half an hour before sunrise to half an hour after sunset. A 1,5% energy production loss per year was calculated for considered tower; a reduction of 70-80% bat mortality is reported in scientific papers;

- layout reshaping increasing to 800 m distance between the two groups of wind towers, in order to limit barrier effect; the solution was validated with results obtained at test monitoring points;

- natural restoration in yard areas with grassing over and tree replacing;

- open areas restoration (herbage and shrubbery) maintained by turnover grazing and located 2 km away from wind farm in order to exclude an "ecological trap" effect;

- an agreement protocol with town councils for reduction of light pollution by: eliminating light sources, reducing beam dispersal, reducing UV emission.

Necessary, but today still far away, a coordination between authority involved in project evaluation which often give incompatible prescriptions.