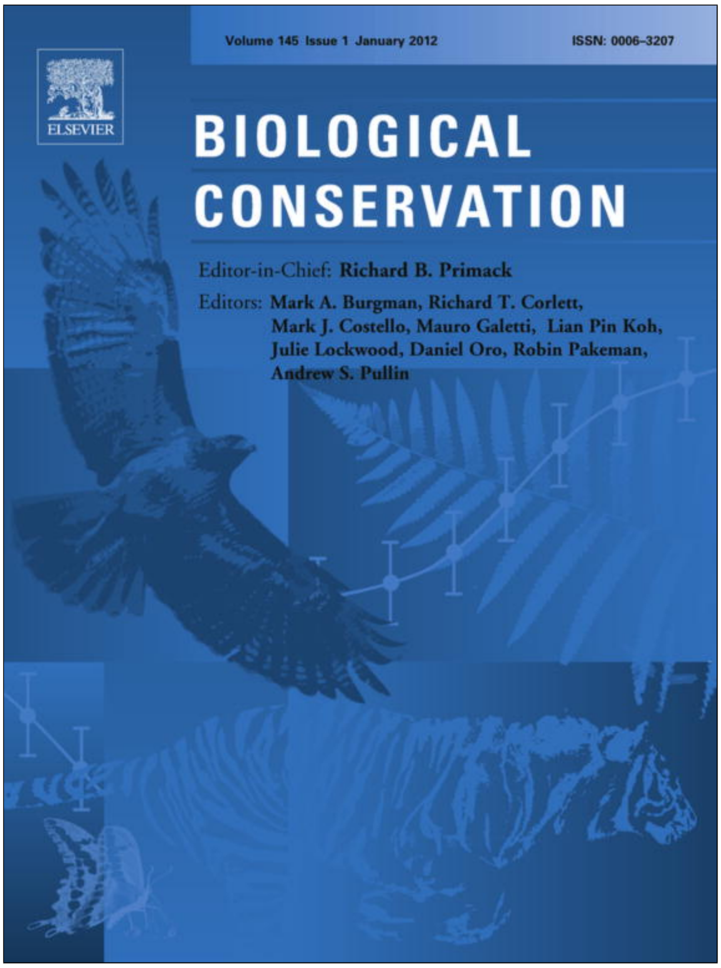

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Identification of Prime Butterfly Areas in Turkey using systematic conservation planning: Challenges and opportunities

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ABSTRACT

Butterflies are among the most sensitive groups to environmental changes and are prime subjects for many conservation studies. It is essential to conserve butterflies through identifying important sites, namely "Prime Butterfly Areas" (PBAs). Using distribution data of 358 butterfly species, we have identified 65 PBAs in Turkey. Selection of important sites for a single taxon is generally performed using a scoring based system, yet in this study we have adopted Systematic Conservation Planning (SCP) approach. The efficiency of SCP approach, the explicit site prioritization process it provides, and the presence of an established SCP system in Turkey has led to this decision. However, regardless of the system used, to secure effective implementation, conceptual and operational subjects should be considered simultaneously. In majority of the cases, the emphasis is given to the methodological details of conservation assessments and effective tools for implementation are not produced. Therefore, while determining PBAs, rather than following the SCP procedure in a strict manner, we have incorporated elements of other site selection approaches into our study for the adoption and use of the outputs by stakeholders. With this study, we discussed how different stages of the PBA identification process (e.g. setting conservation targets, scoring species, determining the initial and optimal site sets and prioritization) should be handled to ensure implementation.

1. Introduction

Turkey is home to 381 species of butterflies, of which 45 are endemics (Karaçetin and Welch, 2011), while in all of Europe a total of 482 species exist (van Swaay et al., 2010). After a period of rapid economic development with widespread negative consequences for many species and habitats during the last decade (Şekercioğlu et al., 2011), Turkey needs to develop a conservation rationale for the persistence of its butterflies. The recently published national butterfly Red List (Karaçetin and Welch, 2011) revealed that 26 butterfly species in Turkey are threatened with extinction (CR, EN and VU), 11 species are near threatened (NT) and 57 are Data Deficient (DD). Thus, the proportion of species threatened or near threatened with extinction is 11.4% of all recorded butterflies in Turkey (with a range from 9.7% to 24.7%). A follow-up study assessed the major threats against butterflies (e.g. natural system modifications, residential and commercial developments, intensive agricultural practices) and recommended possible conservation actions to mitigate those threats (Karaçetin et al., 2011). Although these threats are present throughout the country, given the limited time and resources allocated to conservation, it is necessary to select and prioritize sites where efforts are to be concentrated for the continued existence of this sensitive group.

A first step to challenge the threat of species extinctions is the identification of priority sites and the development of a conservation rationale in them (McNeely, 1994; Groombridge and Jenkins, 2002; Zafra-Calvo et al., 2010). Although approaches for selection of priority sites are numerous, most can be assembled into two groups: scoring-based approaches and complementarity-based approaches (Gaston et al., 2001; Abellan et al., 2005; Fattorini, 2006). Scoring based systems identify the value of a site according to a set of selected criterion (i.e. species richness, rarity, endemism and threat status, Vane-Wright et al., 1991; Williams et al., 1996; Orme et al., 2005; Balletto et al., 2010). Hotspots (Myers et al., 2000), Important Bird Areas (IBAs, Heath and Evans, 2000), Important Plant Areas (IPAs, Anderson, 2002) and Prime Butterfly Areas (PBAs, van Swaay and Warren, 2003) are the best known examples

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of this approach. IBA, IPA, PBA and similarly identified sites will hereafter be called Important Taxon Areas (ITAs, a taxon is used to mean an easily identifiable – usually monophyletic – group of species that appeal to a certain group of stakeholders).

Selection of the important sites for a single taxon is generally performed using a scoring based system. Although methodological assessments based on the complementarity approach for a single taxon exist, these remain mostly as academic exercises (e.g. Hortal and Lobo, 2006; Girardello et al., 2009).

Complementarity expresses the notion of sites complementing each other with respect to biodiversity content. Complementarity based approaches (extensively called as Systematic Conservation Planning, SCP) are used for delineating sites of conservation priority for multiple taxa through a multi-criteria optimization process (Margules and Pressey, 2000; Cowling et al., 2003; Pierce et al., 2005).

Various studies comparing SCP and scoring-based approaches exist (Pressey and Nicholls, 1989; O'Dea et al., 2006), which usually consider the efficiency of SCP approaches as their best advantage. The efficiency offered by SCP makes it particularly attractive to the governmental institutions responsible from conservation ("governmental institutions" hereafter), as long as it is coupled with accountability (Margules and Pressey, 2000; Sarkar et al., 2006; Stewart et al., 2007). Similarly, the algorithm based procedure of SCP, and the fact that it is a multi-criteria decision making process involving objective criteria, broadens its acceptance by the academia. The ITA selection approach, on the other hand, comes closer to capitalizing on the mainstream interest in species groups such as birds, plants and butterflies, while striving to retain the objectivity. However, the relative inefficiency of the site selection using this approach creates an obstacle for those responsible for conservation implementation (Prendergast et al., 1999; Bonn and Gaston, 2005; Knight et al., 2006a, 2006b).

On the other hand, ITA or similar scoring based approaches carry the advantage of having a network of caretakers interested in selected important areas (Evans, 1999; Kuria, 2004). This major advantage of ITA approach has not been specifically mentioned in the scientific literature. Such a network is totally absent for sites identified through SCP – unless they overlap with an ITA. Explaining the logic of complementarity based analysis and the significance of each priority site to the layman and funding bodies is usually not that straightforward (Theobald et al., 2000; Opdam et al., 2008). This in turn makes it difficult to form a network of volunteer caretakers monitoring the selected priority sites.

Both approaches have been accepted and widely used by governmental organizations, NGOs and academic institutions in Turkey (e.g. Welch, 2004; Ambarlı et al., 2011). The SCP approach is adopted by the General Directorate of National Parks and Nature Protection for use in the process of identifying Turkey's Natura 2000 sites. Based on this fact, Nature Conservation Centre, a representative of the Butterfly Conservation Europe and responsible for the facilitation of effective conservation of butterflies in Turkey, has decided to use SCP as the basis of its priority area selection process.

There is a need for a protocol that allows the government, conservation and management organizations to select sites that represent a conservation priority for butterflies of Turkey. To address this need, we have explored combining different approaches by giving emphasis to ease of implementation. We have taken the multi-criteria SCP approach as the basis of our approach to produce a portfolio of Prime Butterfly Areas (PBAs), and then incorporated the strengths of the ITA approach. Here we evaluate our findings and discuss their implications for site selection in Turkey and the rest of the world.

2. Materials and methods

2.1. Study site

Located at the intersection of Asia, Africa and Europe, Turkey hosts a wide diversity of geographical and biological features. The country is a peninsula surrounded by the Mediterranean, Aegean and the Black Sea, has a surface area of 759,290 km^2, and >8000 km of coastline. Turkey contains a high diversity of ecosystems owing to its geographical location and past geological and climatic processes. Three different phytogeographical regions, namely the Mediterranean, Irano-Turanian and Euro-Siberian, meet in Turkey. This diversity has led to the evolution of an outstanding richness in butterflies and other taxa (Davis, 1971; Hesselbarth et al., 1995; Mittermeier et al., 2004; Baytaş, 2007).

2.2. Methodology for selection of the PBAs

We have based our selection procedure on SCP. Since ease of implementation has been one of our concerns, we also integrated aspects of the scoring approach into the procedure. In order to build up an effective methodology for selecting Turkey's Prime Butterfly Areas (PBAs), we incorporated conclusions drawn from previous SCP studies in Turkey; our experiences from working together with governmental and other conservation and management organizations (Welch, 2004; Zeydanlı et al., 2006; Ambarlı et al., 2011; Turak et al., 2011) and from the review of scientific literature (Margules and Pressey, 2000; Cowling et al., 2003; Pierce et al., 2005).

We also employed other comparable methods for selecting PBAs in order to discuss the efficiency of different approaches.

2.2.1. Putting together the dataset

For species to be used in selecting the PBAs, we have followed the same dataset and the taxonomy used for the Turkish Red List in Karaçetin and Welch (2011). During the Red List assessments, the validity of records and their locations (of especially old ones) were checked by experts and the cutoff date for old records was set as 1980. We used the outcomes of this assessment to compile our dataset except for eight species whose records were at a resolution coarser than the resolution used in this study (i.e. province records). The final list used in the analysis includes 358 species.

Resolution for the analysis was fixed as 100 km^2. The 10×10 km UTM grid system was set as the analysis standard, and also used as the unit for candidate sites. Using grid squares will contribute towards the compatibility of this study with other priority area selection studies in the country, since they also constitute the standard mapping units employed in the finalized and ongoing SCP studies in Turkey.

There are a total of 8405 of the 10×10 km UTM grid squares in Turkey, although some squares around the borders and at convergence zones have smaller areas then 100 km^2. After assembling the dataset, we assigned data from records documented at higher resolutions to these grid squares. A total of 32,532 records, in the form of one record per species per grid square, were used in the analysis. The number of grid squares where a species has been recorded ranged from one to 760, with an average of 90.84. The number of species per grid square ranged between one and 160.

The data was comprehensive in the sense that it represented all species and geographical regions. 1720 grid cells were found to contain butterfly data (20% of the squares). This ratio for coverage is lower than most European countries, and inevitably will have an effect in shaping the outcome. However, Turkey has a large land area and expecting a better coverage is unrealistic. Also, this is what is available at the present juncture, and with the present rate at which threats are elevating, waiting for additional data will not serve the purpose of butterfly conservation.

2.2.2. Evaluation of species

In the first phase of the analysis, we prioritized the butterfly species present in our dataset. For this purpose, we developed a set of criteria and scored each species according to selected variables: endemism, range size, Turkish and IUCN Global Red List status, being listed in international conventions [Habitats Directive, Bern Convention and CITES], being a habitat specialist and/or food plant specialist, being a flagship species (determined through expert opinion), and how important populations in Turkey are for the species. Species with a score sum greater than zero are hereafter termed as "priority species". Thus priority species are those species that have conservation priority for any of the reasons included in the scoring system (99 species).

2.2.3. Evaluation of sites

In order to determine exceptional sites for butterfly diversity, we evaluated differences between sites according to their properties listed below:

- Species richness (all species, endemic species, near endemic species, rare species, threatened species, restricted range species, priority species).
- Site rarity value: Sum of rarity values for each species recorded in the square. Rarity value of a species was calculated as:

$$\text{rarity} = [(\#\text{ of all visited squares} \\ - \#\text{ of squares species has been recorded}) \\ /\#\text{ of all visited squares}] \times 100$$

- Site priority value: sum of species score for each species recorded in the square.

2.2.4. Setting conservation targets

Conservation targets for each butterfly species were set as the number of representation aimed at for the persistence of each species within the network of PBAs. The targets were determined by butterfly experts as three representations for priority species and one representation for non-priority species.

2.2.5. Establishing the initial set of sites

Due to their strategic importance, certain squares that are exceptional in terms of richness, endemism, summed species score or summed rarity were included within the PBA network. These exceptional squares for butterfly biodiversity fulfilled at least one of the following criteria:

- Richest squares: with 135 or more species (five squares).
- Squares with a high number of endemic species: with 10 or more endemic species (three squares).
- High priority score squares: with a high value for a combination of characteristics (top five squares).
- High rarity score squares: with many rare species (top five squares).

Some squares constitute the only sites where the rarest species occur. These sites need to be included in the network of PBAs if targets are to be reached. Such squares without alternatives, together with the exceptional squares for butterfly biodiversity, constitute the initial set of sites around which the PBAs are built.

2.2.6. Selection of the final PBA portfolio

The selection was based on the principle of complementarity and was achieved through an optimization procedure. For this, we used the simulated annealing algorithm of the site selection software MARXAN (Ball et al., 2009). The factors used in the optimization were overall richness, summed species scores, summed rarity scores, contiguity (adjacency of selected grid squares) and cost. The optimization process was set to balance the values sought by the first four factors, while adding new squares led to increased cost. This process results in the selection of an optimal set of squares which complement the initial set while reaching the target representation.

Subsets of the final outcome were determined in order to facilitate conservation actions as they reveal the urgency of conservation action. The subsets and the criteria for allocating them are:

- The irreplaceable set of squares: present in the best solution for each of the 1000 replications.
- The essential set of squares: present in the best solution for each of the 999 out of 1000 replications.

Finally, squares belonging to the optimal set were grouped according to shared topographical features and distances to one another to form the final set of PBAs.

Table 1
The comparison of outcomes from different site selection methods used in the identification of PBA's.

Representation target	Site selection analysis			Criteria for target species			Target species		Squares and priority species		# Selected squares
	Richness based selection	Complementarity based selection	Inclusion of initial set	Endemic, Turkish Red List, directives	European PBA priority species	Fulfillment of at least two criteria	# Priority species	All species	# squares with priority species	# Records of priority species	
30% of squares species recorded	√	–	–	√	–	√	12	–	77	84	29
30% of squares species recorded	√	–	–	√	√	√	18	–	190	274	37
Minimum three representation for priority species	√	–	–	√	√	√	18	–	190	274	32
30% of squares species recorded or three squares	√	–	–	√	–	–	70	–	700	1683	127
Minimum three representation of priority species, minimum one representation of all species	–	√	–	√	1	–	99	358			88
Minimum three representation of priority species, minimum one representation of all species	–	√	√	√	1	–	99	358			93

2.3. Selection of PBAs using other methods

We consider stakeholder response to the outcomes as an essential component for ease of implementation. For this reason, we also selected sites using other methods so that stakeholders can evaluate our methodology with reference to these methods.

While in our methodology representation targets were set for all species, only a subset of species were determined as target species for most of the other methods (Table 1). The target species for these methods were determined by applying criteria used in PBA selection methods for other countries (van Swaay and Warren, 2003).

The site selection procedures applied in these methods were based on richness; squares richest for target species were selected until representation targets were met. Finally one of the methods we applied for comparison was based on complementarity and targeted all species. However in this method no initial set was used and contagiousness was not a criterion for selecting squares.

3. Results

3.1. Final portfolio of PBAs

A set of 93 grid squares was determined for reaching targets while optimizing for other criteria, namely overall richness, summed species scores, summed rarity scores and contagiousness. This set constitutes the "optimal set". With an area close to 90,800 km^2, these 93 grid squares constitute approximately 1.12% of Turkey's land area.

The subsets of this final set, which were determined for facilitating conservation actions, are given together with the initial set in Fig. 1. These subsets reveal the urgency of conservation action, with the smaller subsets requiring more immediate concern. The initial set of PBAs was comprised of squares without alternatives and exceptional squares, and a total of 30 squares were identified as having no alternative. The majority of these squares overlapped with the exceptional squares and only five new squares were added to the initial set. As a result, a total of 35 squares were set as the core of the PBA network and covered the initial set. The "irreplaceable set" was found to be 50 squares, while 82 squares satisfied the criteria of constituting "the essential set".

In the optimal set, targets were attained or exceeded, reaching up to a maximum representation value of 62,000% of the conservation targets set. For each species, between 8.16% and 100% were included in the 93 grid squares.

Finally, we evaluated squares belonging to the optimal set by considering topographic features and grouped together some of the adjacent squares for management purposes. This process resulted in 65 sites designated as PBAs of Turkey (Fig. 1).

3.2. Comparison of selected PBAs using other methods

The comparison of the final portfolios produced through different PBA identification methods together with the targets and criteria used are given in Table 1.

4. Discussion

Establishing PBAs can become a powerful tool for butterfly conservation, if those sites are officially recognized and become targets of appropriate conservation action. There usually is a much better chance of implementation if the PBAs are sanctioned by stakeholders. The most effective way for securing this approval is through integrating various priorities of different stakeholders throughout the process of determining those sites. However, maintaining a scientifically sound basis while achieving such an integration, constitutes a challenge for conservation planners. Reconciling different approaches with SCP has enabled us to build such a methodology. Here, rather than the outcome for the selection of PBAs in Turkey, we discuss the most critical features and factors in meeting this challenge, how we took them into account at each stage of the

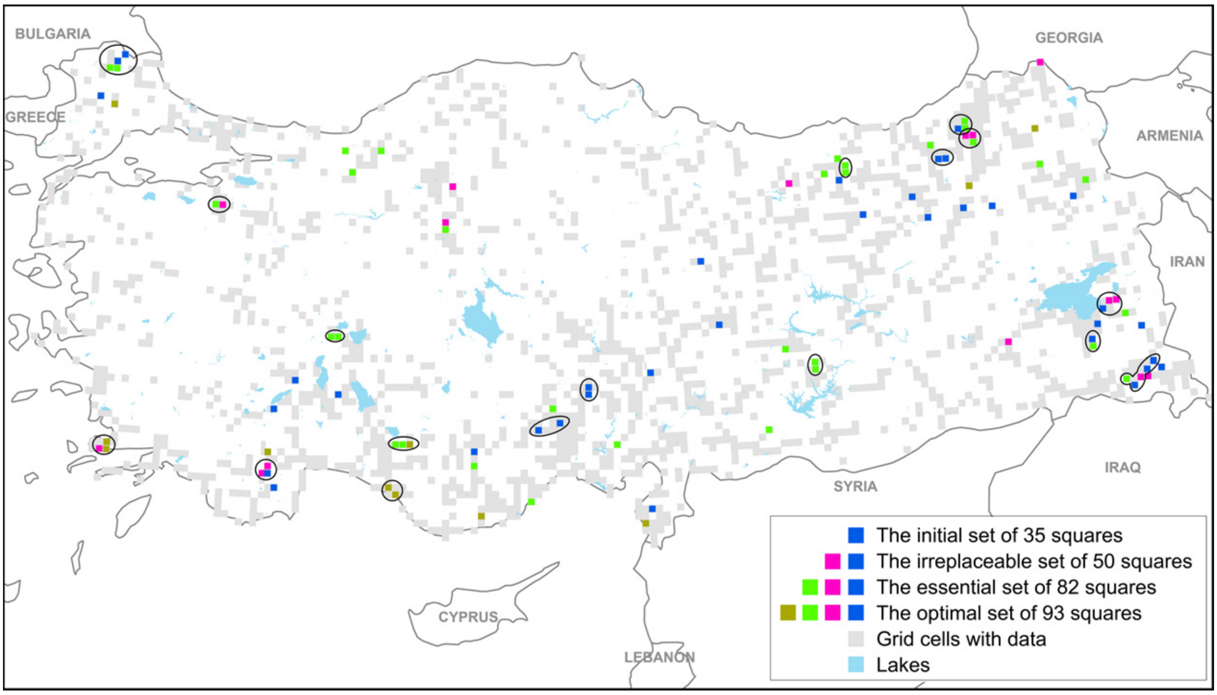

Fig. 1. Map showing the final set of PBAs. Selected squares within a circle are grouped to form a single PBA. Subsets of this final set are represented as different symbols. 10 km × 10 km squares with butterfly record(s) are shown as light grey.

methodology, and how the outcomes of those stages stand with respect to the considered factors.

4.1. Critical factors for implementation

Studies involving the selection of priority sites are often criticized widely, or will be found difficult to attract the attention of conservation implementers (Pressey and Cowlings, 2001; Knight et al., 2006a,b, 2011; Zeydanlı et al., 2006; Ambarlı et al., 2011). However, regardless of whether it is ignored or graduallty accepted, as the conservation community (e.g. academic, governmental, non-governmental and public) becomes ready, the final product presented to the audience should be robust to extensive criticism. In this study, efficiency, accountability, flexibility and compatibility are the main features that we have identified as the key features of such a portfolio.

4.1.1. Efficiency

Within the context of conservation planning, the concept of efficiency expresses the notion of maximizing gain for biodiversity while minimizing conservation costs (Rodrigues et al., 2000). As an inherent feature of SCP, efficiency has been the main determinant of SCP becoming such an accepted approach for site selection in Turkey.

Although conservation cost has many angles, the size and number of sites as targets for conservation action constitutes a disproportionately large component of this cost in Turkey, largely due to competing land use demands. Moreover, the power and financial resources of conservation institutions are usually not up to handling a large set of expensive sites. For this reason, representation per area of targeted sites constitutes the most direct measure for efficiency of conservation plans. Previous ITA and KBA studies in Turkey have often been criticized for lacking this efficiency (A. Çağatay, personal communication).

4.1.2. Accountability

Accountability is a critical feature for the realization of any conservation plan (Rodrigues et al., 2000). The strong conceptual background of SCP and a wide range of relevant publications can be accepted as the basis of accountability. However, if this background is coupled with an explicit assessment process, the final portfolio will then become easily defendable (Nicholls and Margules, 1993; Williams, 1998).

Making the dataset publicly available, delivering it to interested institutions, and explaining the methodology, the criteria used and the findings were critical actions that we have envisaged and used in communicating, in order to maintain the accountability of the study.

However, usually it is not straightforward to assess the accountability of a study. It is particularly difficult to state that the accountability has declined after a certain stage. Therefore, it is important to consider the principles mentioned above from the initial stages onward.

4.1.3. Flexibility

Flexibility is an important aspect of SCP. Many alternatives can be put together, assessed, discussed and reshaped. This flexibility is particularly important for implementing purposes, since rigid plans often come to a standstill when some phase is difficult to implement (Opdam et al., 2008). We recommend flexibility of decisions according to input by stakeholders but we do not recommend presenting alternative portfolios as solutions after the presentation of agreed final portfolio. Presenting alternatives after that stage might be considered as inconsistency and may cause distrust for the outcomes, especially among governmental institutions. Flexibility is very important for the involvement of stakeholders and the ownership feeling among them; however, it should not yield a perception of inconsistency.

4.1.4. Compatibility

In site selection studies, especially if the implementation phase is to be realized, it is important to apply an approach that is compatible with the existing national site selection system and one that can become a part of it. On the other hand, explicitness should not be avoided for this reason. We do not recommend strict replication of the existing site selection approaches with all their deficiencies but rather recommend seeking means of compatibility at various stages of the process.

Since the Turkish government has adopted SCP as the main methodology for selecting Natura 2000 sites, applying this approach instead of traditional approaches will lead to easier acceptance. However, SCP is a flexible procedure, which can differ in detail. For this reason, compatibility of all aspects (e.g. the identification of targets, the resolution of the study, the size and type of the planning units) has to be considered. Similarities between our methodology and the methodologies of government institutions increased the chances of integrating the outcomes into a national multi-species and multi-criteria SCP. Furthermore, since butterflies are one of the surrogates used in such studies, it is possible that sets of priority sites produced by different organizations for different groups of species will support each other, and the core of PBAs may coincide with sites to be selected in future national SCP studies.

4.2. Evaluation of the PBA selection procedure

We have analyzed each stage of the methodology and the corresponding outcomes with respect to relevant stakeholders and key features affecting acceptance by those stakeholders. In order to increase the ease of implementation and acceptance of the PBAs, we have analyzed stakeholder approval at each stage of the process. These key stakeholders were identified as the governmental institutions, the national and international butterfly watchers networks, European Union nature conservation framework, academia, and funding agencies.

4.2.1. Setting targets

4.2.1.1. Representation of all species. ITA studies usually concentrate on the vulnerability of species under prevailing conditions. However, Turkey is in an era of rapid change which manifests itself in many sectors. Agricultural practices are moving from extensive to intensive, land use practices are changing, and the urbanization process is gaining speed. All together, these changes are altering the ecosystems in a dramatic way (Şekercioğlu et al., 2011). Therefore many common species have the potential to become threatened within a few decades.

For this reason, representation of the whole set of species is considered a primary target in conservation planning (Jennings, 2000; Kremen et al., 2008) and is highlighted in the Convention on Biological Diversity (CBD). Governmental institutions consider the issue important for their reputation. Representation percentage is another important feature for academia, as it constitutes a solid measure for the overall success of the final portfolio (Rodrigues et al., 1999; Reyers et al., 2000). Therefore, we targeted at least one representation for common species in this study.

4.2.1.2. Representation of threatened and rare species. Threat categories and the rarity of species are among the main concerns both in complementarity-based and scoring-based approaches (Myers et al., 2000; Justus and Sarkar, 2002). Since safeguarding conservation of these species is a critical measure, we have set a target of at least three representations for these species. A good representation of threatened and rare species is expected to gratify all of the identified stakeholders, especially national and international butterfly watcher networks.

4.2.2. Scoring of species

Scoring of species is a stage where different considerations can be included into the process. Giving higher scores to threatened and nationally important species results in representation targets for these species being met at sites with higher conservation priority. We have incorporated five different systems (i.e. Turkish Red List, IUCN Global Red List, Habitats Directive, Bern Convention and CITES) and four features (i.e. endemism, rarity, habitat specialist and/or food plant specialist and flagship species) in the scoring. Each of these systems is significant for different stakeholders.

Choosing threatened, rare and endemic species as priority species is important for all of the key stakeholders. The IUCN Red List categories are of critical importance, especially for governmental institutions, since the approach is the most widely referred, globally respected and well established system for species assessment (Lamoreux et al., 2003; Rodrigues et al., 2006). We have also considered the Annexes of EU Habitats Directive and Bern Convention, in order to maintain compatibility of the PBAs with the planned Natura 2000 system in Turkey.

4.2.3. Identification of the initial set

For strategic reasons we have included richness hotspots, rarity hotspots, endemism hotspots and high scored sites in the initial portfolio and thus enforced their presence in the final portfolio. A complementarity based analysis without these prerequisites would have produced a more efficient set of sites (Table 1). Many studies comparing sets of complementing areas with sets of richness and rarity areas, have established the inefficiency of the latter with respect to representation of biodiversity (Williams et al., 1996; O'Dea et al., 2006). However, richness and rarity hotspots may still have conservation importance, as they have evolutionary value due to harboring a high number of species, especially if they are rare (Anderson, 2002; van Swaay and Warren, 2003; Eken et al., 2004).

Exclusion of hotspots in previous regional SCP studies was questioned by the stakeholders, even though the explicitness of complementarity was demonstrated (Zeydanlı et al., 2006; Ambarlı et al., 2011). This caused a decrease in overall acceptance of the outcomes, as there is a significant community trained in the scoring tradition and bound up with the hotspot approach. Adding the eight squares, which comprise rarity, richness and endemism hotspots, to the initial portfolio has been critical for increasing the credibility of PBAs among butterfly watchers and such groups familiar with the hotspot approach. However, this inclusion should not contradict with the efficiency criterion. By this addition, we have forced inclusion of only five squares into the final portfolio, as three out of the added eight hotspot squares were also squares without alternatives.

4.2.4. Selection of the final PBA portfolio

The initial set determines some characteristics of the final portfolio. The procedure following this step is based on efficiency while optimizing for all criteria (i.e. overall biodiversity value, contiguity of sites and maximizing representation). This efficiency is crucial for most of the stakeholders, while the other criteria are important for only some of them (Table 2).

Several other ITA (Özhatay et al., 2003; Kılıç and Eken, 2004) and Key Biodiversity Areas assessments (KBAs, Eken et al., 2006) were criticized for their extensive coverage. Thus, the PBA portfolio, which maintains 100% representation while reaching all the targets within only 1.12% of the country, is considered to be a very efficient portfolio. The facts that targets cover all species, and that overall biodiversity value of the portfolio is high are factors which increase the value of this efficiency.

4.2.5. Identification of PBA sites

In order to increase its potential for implementation, contagiousness was one of the criteria used while selecting the final portfolio. Grouping adjacent squares in this portfolio after considering topographical features has produced a set of 65 PBAs for Turkey (Fig. 1). As sites become more compact so the ease of implementing conservation increases, and this is an outcome sought both by those responsible for implementing conservation and funding agencies.

4.2.6. Prioritization and classification of PBAs

Submitting a PBA list is a good step for concentrating the activities of butterfly watchers and caretakers, especially if there is an extensive network of such people. However, triggering conservation actions on the ground is much more complex and difficult (Knight et al., 2008). It requires the interest of many different institutions and the mobilization of a large amount of resources for resolving conflicts. At that point, prioritization and classification of the PBA list becomes critical. A prioritized list helps while developing a time bound and resource based action plan. More importantly, 65 sites may appear too demanding for initiating conservation action as a whole, while a prioritized list of sites provides a starting point for implementation.

We have also grouped the PBAs according to sectors relevant for implementation, starting with the forestry sector, as there is already an ongoing process for integration of biodiversity concerns into forest management plans (Turak et al., 2010). Achievements with forestry department will hopefully set a positive example to agriculture, tourism or other sectors.

In conclusion, conservation plans bringing together the strengths of different approaches within a certain framework has the potential to yield better results in terms of ease of implementation. Therefore, developing unique approaches to tackle different situations by taking into consideration aspects – even simple ones – that are of high priority for principle stakeholders (e.g. Table 2) and at the same time maintaining scientific rigor is of crucial importance.

Table 2
The features of the methodology which can increase the adoption of the study by key stakeholders.

Feature	Including common species	Emphasizing threatened species	Criteria for initial set	Efficiency	Grouping of selected squares	Surrogacy	Prioritization and classification	Comprehensiveness
Governmental institutions	√	√		√	√	√	√	√
National butterfly watcher network		√	√					√
International butterfly watcher network		√	√					√
Academia	√	√		√		√		√
EU Conservation System		√			√	√		√
Funding bodies		√	√		√	√	√	

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