

Conservation Science

Translating Knowledge into Actions

Flagship species approach: are we heading on the right track?

Kanchan Thapa*

Summary

Aim The paper aims to evaluate the usefulness of the Flagship Species Approach (FSA) as a conservation strategy.

Location The study was conducted primarily among the conservation practitioners working with the flagship species in Nepal.

Material and Methods Using a structured questionnaire, a total of 89 conservationists from three different categories of conservation agencies: government, nongovernmental organizations, and intellectuals (academics and researchers), were asked about their views regarding the FSA in bringing conservation benefits and reducing the biodiversity threats. I used non-parametric tests for analyzing the data.

Key findings A majority of respondents shared the view that the FSA is being used effectively in raising funds for conservation and in bringing awareness to people and enhancing conservation of other species. Level of satisfaction pertaining to FSA, however, differed among the governmental / nongovernmental organizations and the intellectual agencies.

Conservation implications This study found that FSA had been instrumental in raising the funds for biodiversity conservation and keeping the science in the forerunner.

Keywords conservation, flagship species, non-parametric statistics

Short Communication

Article history

Received	8 August 2013
Accepted	9 October 2013
Published Online	25 December 2013
Edited by	Prakash K. Paudel

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Citation: Thapa K (2013) Flagship Species Approach: Are we heading on the right track? Conservation Science 1, 47–52

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Funding: Not available

Introduction

The effectiveness of flagship species approach (hereafter referred to as FSA) for biodiversity conservation has been widely acknowledged worldwide (Smith et al. 2010, Joseph et al. 2011). The approach acts as the focus of the broader marketing campaign based on the traits and qualities that appeal to the target audience to raise funds and awareness for reducing biodiversity loss (Verissimo et al. 2009, Verissimo et al. 2013). Success stories across the world show an adept selection of the flagship species as “popular, charismatic species serves as good indicator to prioritize conservation urgency, therefore stimulate conservation awareness and action” (Heywood 1995).

Among the mega fauna, the tiger (*Panthera tigris*), rhinoceros (*Rhinoceros unicornis*), and giant panda (*Ailuropoda melanoleuca*) in Asia, and the ‘Big 5’ group in Africa, as examples of flagship species because they increase the public awareness of conservation issues and rally support for the protection of the flagship species’ habitat (WWF 2011, Caro and Riggio 2013). Additionally, protection of non-flagship species is accomplished through the umbrella effect of these flagship species (Favreau et al. 2006). If the population of one such species is kept viable through safeguards and judicious interventions, then it is thought that populations of many sympatric species will maintain positive growth rates (Caro 2010). For example: tigers and leopards are the top predators, so their stable or increasing population sizes will likely signal healthy prey populations (Karanth et al. 2004). Thus, the FSA has been adopted by nongovernmental conservation organizations (NGOs) for decades (Home et al. 2009).

In Nepal, sixty years of modern conservation occurred after first wildlife laws were enacted in 1957 (Heinen and Kattel 1992) and progressive conservation programs were instigated since 1970s (Heinen and Shrestha 2006) highlighting FSA as a major conservation strategy. In the Eastern Himalayas (Nepal, India and Bhutan), NGOs adopted FSA as early as the 1960’s. In Nepal, two major NGOs: World Wide Fund for Nature (WWF) Nepal and National Trust for Nature Conservation (NTNC) have been employing the flagship species concept ever since their establishment (Thapa et al. 2013). In India, implementation of “Project Tiger”, 1973-1974, was hailed as triumph of international environmental advocacy (Lewis 2005). The Government of Assam launched the Indian Rhino Vision 2020 to increase the population of the eastern most rhinoceros population in India (IRF 2008). Hence, the FSA has been widely used as a key conservation strategy in the Eastern Himalayas region for a long time. Despite its broad scale use, we found that no studies exist in the region to evaluate FSA’s usefulness as a conservation strategy.

Two questions are important to us. First, are we

heading in the right direction in working with FSA? Secondly, are flagship species bringing the anticipated conservation benefits and in reducing the biodiversity threats (population decline, imbalanced predator-prey dynamics, lack of awareness of prime threats to biodiversity)(GoN 2004)? Hence the main goal of this study was to evaluate the usefulness of FSA as a conservation strategy. I conducted an online survey among the Nepalese conservationists to investigate usefulness of FSA as a conservation strategy. We present five following predictions pertaining to the usefulness of FSA as a conservation strategy: (1) fundraising and increased awareness, (2) effectiveness in bringing benefits, (3) status of the flagship species, (4) management of the non- flagship species, and (5) overall level of satisfaction among the conservationists. In this paper, level of satisfaction relates to conservationist’s overall contentment resulting from the FSA’s ability to generate the required output.

Prediction 1: The applicability of FSA is exclusively for generating funds and awareness. I hypothesize that the views regarding this notion are not different among the conservationists.

Prediction 2: All the species are equal and important for the government agencies. Many of the flagship species are also on the protected list but their management focus is not subject to the protection of one single species but rather holistic in nature. While NGOs are more focused on the FSA, we hypothesize that there is a difference in views regarding the usefulness of the FSA in bringing positive benefits to conservation.

Prediction 3: Selection of flagship species has been carried out through rigorous scientific method and therefore their status reflects ecosystem integrity. I predict that there are no disparate views regarding the status of the flagship species and the general trend of conservation in the recent years, e.g., tiger and rhino are two mega fauna, conservation-dependent species that are regarded as flagship species.

Prediction 4: There is a benefit in working with the flagship species, as the FSA aids in the management of the other non-flagship species. I predict that there are no disparate views among the conservationists and that the non-flagship species also benefit from the FSA. For example, the greater one horned rhinoceros (*Rhinoceros unicornis*) is regarded as a grassland specialist mammal. They prefer to range in the grassland habitat more than any other habitat type (Dinerstein 2003). Grassland management that is undertaken every year by the park authority (e.g., in Chitwan National Park), thus it would also be beneficial for other ungulates, birds (which are non-flagship species) and many other co-occurring species.

Prediction 5: Conservationists working in all the sectors

(Government, NGOs and intellectuals) are satisfied working with the flagship species approach and its usefulness as a conservation strategy.

Materials and methods

The Conservationists primarily working with flagship species (tiger, rhinoceros, elephant, red panda, snow leopard, Gangetic dolphins and leopard) in Nepal were selected for the questionnaire survey. The respondents from government agencies included representatives from the Ministry of Forest and Soil Conservation (MFSC), Department of Forest (DoF), and Department of National Park and Wildlife Conservation (DNPWC). Respondents from the NGO sector mainly included WWF Nepal (program office of WWF US), WWF US, and National Trust for Nature Conservation (NTNC). These are the primary organizations implementing the FSA in Nepal. I also selected the respondents (in Nepal and abroad) from research organizations, universities, consultancies, and individual researchers on the basis of their experience working with the flagship species (**Table 1**).

I approached 236(n) conservationists working in the three categories: Government, NGOs and Intellectuals. These categories form the basic sampling unit for the comparison. The criteria for selecting in the survey were (i) worked in the conservation sector at least 2 years; (ii) have a field experience (iii) have worked with one flagship species. I designed a structured questionnaires and pre tested it following the modified Dillman method (Dillman 1978).

I used online survey as the most appropriate method for sampling my population. The use of internet for collecting data is gaining wider acceptance in the scientific research (Couper et al. 2007, Couper and Miller 2008). I assumed that all the respondents have access to the internet to respond to the online survey. I gathered email addresses of all potential respondents working in the three conservation sectors wherever possible and organized the list based on the inclusion factors. Prior to the survey, I emailed everyone (n =236) to explain the nature of the survey and its relevance. I sent 3 follow-up emails with the replacement questionnaires approximately every 10 days to all non- respondents (Jonker 2003). At the end, 89 people (38%) responded to the survey. This represents a sample size (n=89) for the study.

Table 1: Representation of respondent based on type of categories

Category	Number of Respondent	In %
Government	20	22.5
Non-Governmental	49	55.1
Intellectual	20	22.5
Total	89	100.0

Statistical analyses were performed using SPSS version 11.5 (SPSS Inc., Chicago, IL, USA). In order to explore and detect any patterns in the data, I first analyzed data through simple descriptive statistics including the cross tabulation tables. Given the nature of the survey, purposive sampling fits the current survey design (Tongco 2007). Because my data were not normally distributed, I performed a non- parametric Kruskal-Wallis One way Analysis of Variance and Chi square tests to ascertain whether the distribution of the variables differed from one another (Zar 2009). For the Likert scale data, I used the mode or the most frequent response as the best measure of the central tendencies. I used the Kruskal-Wallis and Mann Whitney U tests to compare the views among the independent groups (categories) of sampled data (government, nongovernmental organization, and intellectuals). In all analyses, I defined a 2-sided P value of less than 0.05 as statistically significant. For validating the prediction, I carried out the statistical test for each sample (question), between and among the categories (n=3) to gain insight about the individual characteristics of samples with regard to their views and perceptions towards FSA.

Results

Out of 236 online questionnaires sent out, 25 surveys were non deliverable (e.g., non -functional email address) and 122 surveys were not answered (e.g., not checked the email address; busy schedules etc.). After adjusting for non-deliverable respondents, I obtained a total of 89 usable respondents thus giving a 42% overall response rate (**Table 1**). Most of the respondents had 5-10 years of experience (36%), followed by respondent with more than 20 years of experience (21%) mainly the government category. Respondents had an average of 8.6 years (SE: 0.67) of experience working with flagship species.

Prediction 1: On the mode scale, 81% of the respondents agreed with the perceived benefits of using the FSA (**Table 2**). There was a significant difference in the views relating usefulness of FSA for raising funds ($\chi^2=58.281$, $df=3$, $p<0.05$) and raising awareness ($\chi^2=36.069$, $df=2$, $p<0.05$) of the conservation project (**Table 2**).

The three agencies (n=3) appeared to agree that FSA approach is important for raising the funds for the conservation project (Kruskal-Wallis $\chi^2=0.626$, $df=2$, $p>0.05$). Interestingly, many respondents (82%) agreed that FSA was an essential strategy for raising funds for conservation projects and their agreement was significant in nature ($\chi^2=46.7$, $df=3$, $p<0.05$).

Prediction 2: All the species are important for the government agencies regardless of the position of the species in the trophic structure. I found common viewpoints among the respondents between the

agencies (Kruskal-Wallis $\chi^2=1.122$, $df=2$, $p>0.05$) regarding the usefulness of FSA in bringing positive benefits to conservation and reducing the biodiversity threats (species loss, habitat degradation). **Table 3** shows majority of the respondents reported FSA as “somewhat effective” in bringing benefits and reducing the biodiversity threats. A large percentage felt that the FSA approach was “very effective” (30-47.37%) while those that felt that the FSA approach was “somewhat ineffective” was very low (0-4.08%).

Table 2: Agreement to the benefits of working with the flagship species

Perceived benefits using FSA	Number of Respondents (%)
-Raising adequate funds for species conservation	80
-Effective communication means to raise awareness among the people	84
-Economical approach to conserving other co-occurring species and habitat in an ecosystem.	72
-Help in promoting ecotourism.	81
-Attract support for conservation among different stakeholders.	82
-Management of the critically endangered population	82
-Benefiting conservation of other co- occurring species	85

Table 3: Responses (in %) toward the effectiveness of FSA in bringing the positive benefits and reducing biodiversity threats

Category	Very much Effective	Somewhat Effective	Somewhat Ineffective
Government	47.37	52.63	0.00
NGOs	40.82	55.10	4.08
Intellectual	30	70	0
Total	39.77	57.95	2.27

Prediction 3: The majority of the respondents’ opined that scientific basis of selecting flagship species had been implemented in Nepal (82%) and that the FSA contributed to ecosystem integrity (88%). There was no difference among the agencies ($n=3$) regarding their views towards the “status of the flagship species” (Kruskal-Wallis $\chi^2=1.036$, $df=2$, $p>0.05$).

Prediction 4: Flagship species have an umbrella effect on the non-flagship species. The majority of conservationists (83%) agreed that non-flagship species also benefitted when working with the flagship species ($\chi^2=86.74$, $df=3$, $p<0.05$).

All the respondents showed agreement toward the same conclusion regardless of the organization involved (Kruskal-Wallis $\chi^2=0.854$, $df=2$, $p>0.05$).

Prediction 5: Most conservationists from NGO’s and government agencies were found to be satisfied ($\chi^2=58.25$, $df=4$, $p<0.05$) with the application of FSA and the level of satisfaction between the two agencies compared closely (Mann-Whitney $U=466$, $p>0.05$). However intellectuals had different level of satisfaction compared to the respondents from the government (Mann-Whitney $U=101$, $p<0.05$) and from the NGO’s (Mann-Whitney $U=268$, $p<0.05$). Intellectuals were 40% “less satisfied” in comparison to the government and non-government respondents.

Discussion

The adjusted response rate (43%) seems to be reasonable and comparable to previous studies (Quigley et al. 2000, Griffin et al. 2001, Sedivi 2001, Jonker et al. 2009). The use of FSA seems to be working well as it has been able to bring conservation benefits including reducing the threats to biodiversity in Nepal. In 2010, WWF US along with Leonardo Dicaprio Foundation launched a campaign “Save the Tiger Now” and pledged US\$20 million in funding to protect tigers and their habitats (WWF 2011). In 2012, the Government of Nepal committed annually US\$125,000 exclusively for tiger conservation (NTNC 2011).

All species are equal as per the NPWC Act. A few of the flagship species are also listed in the protected animal priority list among the wildlife managers. Yet, wildlife management incorporating multiple species is still far-fetched. So the current practices of the wildlife management are flagship species focused and include the umbrella effects in order to leverage more support for conservation of other species. The response of the government agencies did not differ from NGO’s regarding the usefulness of the FSA as a conservation strategy. This implies that we are heading in the right direction with the FSA and obtaining anticipated benefits.

The population status of flagship species is found to be increasing despite the increasing level of threat in current times (Barber-Meyer et al. 2013, Thapa et al. 2013). This was consistent with my prediction regarding the view among the three conservation groups regarding the status of flagship species. There is little doubt that flagship species aid in conservation of other co-occurring species in the ecosystem. Strict protection against externalities (like poaching, illegal encroachment) have helped increase populations of flagship species (e.g. tiger, rhino, etc.) including other occurring species (e.g., ungulates) (GoN 2013). Hence non-flagship species have benefitted as they share the same ecosystem with the flagship species.

Ironically, conservationist satisfaction level relating to the non-flagship species management is lower. Not all species have been benefitted under the

umbrella effect of the flagship species. For example: focus on the tiger as a flagship species may not have provided adequate management of small mammals or globally important birds. It is important to see whether or not flagship species do offer the protection of other species in the ecosystem (Caro et al. 2004), as debate over management of the non-flagship species continues. Limited conservation funds often hinder the adequate management of non-flagship species as funds are specific to the single flagship species. Joseph et al. (2011) advocated for use of donor funds to manage multiple species and for marketing tools to attract the funds that can be utilized for the management of the multiple species. This highlights the need for management plans that are appropriate for multiple species (Pers. Comm: Shyam Bajimaya, Former Director General).

Both the government and the NGO respondents seem to be “more satisfied” with the usefulness of FSA in bringing desired conservation benefits, than are the intellectuals. This may be due to intellectuals being more research focused, whereas the government and NGOs are management focused. This difference in views should be subjected to further research to elucidate reasons for the discrepancy.

Conclusions and Conservation Implications

This study revealed that majority of conservation practitioners in Nepal acknowledged the usefulness of flagship species approach in terms of its potential to impart conservation benefits including reducing biodiversity threats such as population decline, imbalanced predator-prey dynamics, lack of conservation awareness etc. (GoN 2004). In Nepal, the implementation of the flagship species approach in 1960s has positively changed the conservation landscape in terms of funding assistance (WWF: Terai Arc Landscape Project; UNDP & GEF: Tiger Rhino Conservation Project, The Western Terai Landscape Complex Project; USAID: Nepal Tiger Genome Project), contribution to science and technology (Seidensticker 1976, Sunquist 1981, Dinerstein 2003, Wegge et al. 2009), and generation of awareness among the local people regarding conservation issues (Bajimaya 2003, Baral and Heinen 2007). The recent findings of nearly 70% increase in tiger population and associated increase in their prey base in the Terai Arc (GoN 2013) highlights the fact that FSA is a valuable strategy for conservation of biodiversity in Nepal and elsewhere.

Acknowledgment

I would like to thank all the respondents for actively participating in the online survey. Dr. Steve McMullin for his valuable suggestions and opportunity to conduct this project as part of the Advance Human Dimension Grad Course at Virginia Tech. I would like to thank Dr.

Marcella J. Kelly for reviewing and final editing of the manuscript. Four anonymous reviewers and editor for giving the constructive comment on the manuscript. Gokarna Jung Thapa for his help in conducting the survey and Dr. Amrita Thapa for proof reading.

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Biography

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