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Local perceptions of Tibetan village sacred forests in northwest Yunnan

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ABSTRACT

Sacred natural sites have played important social and cultural roles in many cultures around the world for centuries. More recently, scientists have shown that sacred sites act as de facto protected areas. However, the potential for sacred sites to be integrated into conservation strategies depends on the motivations of people to protect them. The objective of this study is to understand people's relationships with village-level sacred forests in northwest Yunnan, China. We conducted 201 standardized open-ended interviews of both men and women over 18 years of age from six communities in the area near the city of Shangrila. While this region of Yunnan is undergoing dramatic socio-economic changes that can contribute to changes in cultural values, we find no evidence that people's appreciation for sacred forests is declining. Our results show that the forests hold primarily religious meaning for people, people visit the forests regularly, and, while younger people know less about the forests, they do not differ in terms of use and appreciation, indicating that the value of the areas is not decreasing. Because people primarily view these sacred forests as religious sites and do not directly associate them with ecological value, we suggest that direct integration of these areas into conservation strategies may not be appropriate.

1. Introduction

Sacred natural sites have played important social and cultural roles in many cultures around the world for centuries (Rutte, 2011; Verschuuren et al., 2010). More recently, scientists have shown that sacred sites act as de facto protected areas. They protect biodiversity at multiple spatial scales and for a wide range of taxa (Bhagwat and Rutte, 2006; Dudley et al., 2009). The potential of these areas to conserve biodiversity has led conservationists to suggest that sacred areas should be integrated into conservation strategies (Dudley et al., 2005; Verschuuren et al., 2010).

However, in the face of rapid social changes, sacred natural sites around the world are degrading (Dudley et al., 2005; Verschuuren et al., 2010). Cultural assimilation, imported religions, formal education, increasing migration, and other factors are all contributing to the breakdown of the traditional values and social structures that have served to protect these sacred areas (Barre et al., 2009).

The reasons that people protect sacred natural sites are diverse and sites range in size from a particular tree or spring to large landscapes. Because sacred areas are often not formally designated or recognized, their existence and effectiveness is dependent on the people that protect them. This form of protection is very different from official protected areas, which depend on decisions by the central or local governments and external enforcement of rules and regulations (Bhagwat and Rutte, 2006). Thus, the potential for sacred sites to be integrated into conservation strategies depends not only on the biodiversity they contain, but also on the values and perceptions of the people that motivates them to protect these sites (Rutte, 2011).

The Himalayan region has a rich history of sacred natural sites spread across a landscape that is one of the most biodiverse in the world (Myers et al., 2000). Northwest Yunnan Province, China is in a biodiversity hotspot and has three of the world's most important rivers flowing through it – the Salween, Mekong, and Yangtze. In this area, Tibetan Buddhists protect sacred sites that range in size from entire mountains recognized by all Tibetan Buddhists to small patches of forest associated with and protected by a single neighboring village (Xu et al., 2005).

Sacred natural sites in northwest Yunnan are a combination of Bön and Buddhist traditions (Kolås, 2007). Bön traditions, which pre-date Buddhism, center on the worship of natural features, including trees, springs, forests and mountains based on the belief that these were homes of the deities. As Buddhism spread into Tibet, religious leaders incorporated pre-existing beliefs and traditions into Buddhist belief systems. Larger sacred mountain areas tended to be incorporated into Buddhist tradition and had Buddhist creation stories and traditions incorporated into their worship, including rites such as pilgrimage and circumambulation.

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Smaller sacred areas, such as village-level sacred forests or specific springs or trees, were not as fully incorporated into Buddhism. The creation stories and rituals associated with these sacred areas remained pre-Buddhist and consist primarily of the lighting of incense and making offerings (Kolås, 2007).

The larger sacred natural areas are known to play a key role in conserving biodiversity at multiple spatial scales and for several different taxonomic groups (Anderson et al., 2005; Brandt et al., 2013; Salick et al., 2007; Xu and Melick, 2007). However, they are under threat from rapidly expanding development and tourism. After disastrous flooding of the Yangtze river killed thousands of people, a commercial logging ban was put into effect in 1998 to protect mountain forests in the Yangtze watershed from clear cutting (Liu et al., 2008). However, old-growth forests continue to be logged due to continued economic development and population growth in the region (Brandt et al., 2012; Xu, 2011).

In contrast, the smaller village-level sacred sites are not as well-studied in terms of the conservation value. They are small in size, but numerous on the landscape, occupying niches along environmental gradients and at various altitudes. Furthermore, they are not as clearly under threat as the larger sacred sites, even in areas that are in more densely populated tourist centers (Brandt et al., 2013).

While these areas contribute to the conservation of biodiversity, we know very little about people's reasons for conserving these village sacred areas other than that they are religious sites. The objective of this study is to understand people's relationships with village-level sacred forests. The specific goals are to describe people's use, knowledge, and perceptions of benefits and change of their sacred forest patch to understand the role that these sacred forests play in people's day-to-day lives.

2. Methods

2.1. Study area

This study was conducted in the communities associated with six sacred forest sites in Shangrila County (Fig. 1). The county was renamed from Zhongdian in 2001 by local officials to promote tourism and is referred to as Gyaltang in Tibetan (Hillman, 2010; Kolås, 2007). The study was conducted in the same sites studied by Brandt et al. (2013) in order to complement their research to understand the importance of sacred forests for bird conservation in the Himalayan region. Around Shangrila, very few native forest ecosystems remain, but small village-level sacred forests protect remnant patches of relatively undisturbed native forest ecosystems. These forests protect relatively intact native vegetation and support distinct bird communities and higher bird diversity compared to the surrounding landscape (Brandt et al., 2013).

The sacred forests ranged between 13 and 75 ha (Table 1) and were a mix of mature and secondary native forest patches

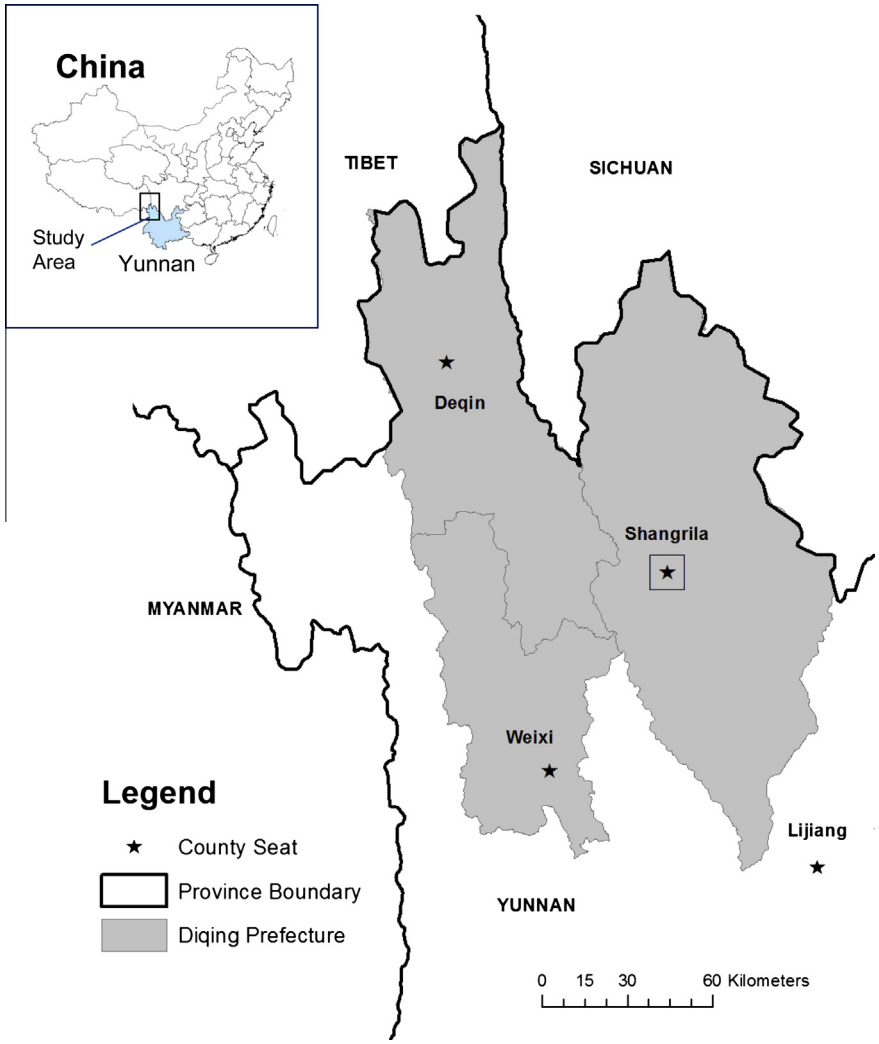

Fig. 1. Location of study site.

Table 1
Description of sacred forest sites.[a]

ID	Area (ha)	Elevation	Type	Description	Bird species richness	
					Sacred forest	Adjacent non-sacred forest
A	13	3300–3400	Village Sacred Forest	Regenerating and mature white birch, oak, rhododendron, spruce	18	15
B	69	3300–3600	Temple Site and Sacred Forest	Near city of Zhongdian, heavily visited. Old-growth larch, oak, and rhododendron	36	23
C	30	3200–3500	Village Sacred Forest	Mature mixed forest, including maple, spruce, bamboo, pine and oak.	37	25
D	16	3300–3500	Village Sacred Forest	Old-growth pine and oak	28	16
E	75	3300–3700	Village Sacred Forest	Mature and secondary native forest near village. Spruce, oak, bamboo, birch, and pine	40	26
F	24	3300–3500	Village Sacred Forest	Mature and secondary native forest near village. Birch, oak, spruce/fir, pine	27	16

[a] Based on breeding bird surveys in 2010 and 2011 (Brandt et al., 2013).

surrounded by forests degraded by intensive use by local communities. In terms of vegetation and disturbance, the forests exhibited a wide range of within forest heterogeneity. They were more heavily disturbed at the edges and in accessible areas, while areas towards the center of the sacred forest patch, or that were inaccessible due to steep topography, experienced less disturbance. Sacred forests also exhibited among-forest heterogeneity. For example, site A (Table 1) was very small (13 ha) and close to the village, and was composed almost entirely of secondary vegetation. Site E, on the other hand, was the largest forest (75 ha), and was extremely inaccessible due to very steep slopes and thick bamboo thickets. Despite the variability among the different sacred forest patches, and their small size and isolated location relative to the surrounding forests, all six sacred forests supported distinct bird communities and higher bird diversity compared to the surrounding landscape (Brandt et al., 2013).

In general, while anyone is free to enter the sacred forests, there is no cutting of wood in the sacred forests for timber or fuel. However, people may collect dead and fallen wood and non-timber forest products, such as mushrooms, and grazing is also allowed (Kolås, 2007; Van Den Hoek, 2012). Sacred forest boundaries are not marked. There is usually a cairn that marks the destination point for religious ceremonies, often located at the top of the mountain or in the center of the sacred forest. Creation stories of the sacred forests center around the original "owners" of the land, the deities who welcomed people to settle, and then themselves were left only with tops of mountains and ridges on which to live (Kolås, 2007).

2.2. Survey

We conducted 201 standardized open-ended interviews of both men and women over 18 years of age from the six communities in May of 2012. Five communities were villages in the area surrounding Shangrila and one was a neighborhood on the edge of the urban center of Shangrila. Village sizes ranged from 39 to 109 households and approximately 220 to 600 people.

The methods used in this study are based on methods the first author has used previously in Nepal, Myanmar, and China, to describe attitudes and perceptions toward protected areas (Allendorf and Yang, 2013; Allendorf, 2007; Allendorf et al., 2006). The survey was modified slightly to incorporate additional questions of interest and yet maintain comparability among the studies.

The survey was standardized and included sections that covered the following topics in this order: socio-economic characteristics; use of the sacred forest; knowledge about the sacred forest; perceptions of benefits and problems of the sacred forest; attitude toward the sacred forest; and perceptions of change, including the plants and wildlife, in the sacred forest. Survey questions were open-ended and are listed in Tables 2 and 3.

Interviews were conducted by three local Tibetan people trained by the first author in the survey technique. Training included practice interviews with each other and with residents of Shangrila near to but outside the urban neighborhood that was a part of the study area. Two interviewers were female college students whose homes were in a village north of the study area. The third interviewer was a male local tour guide. All interviews were conducted in Tibetan. The first author accompanied the survey team to the field but was not present at any of the interviews.

Within a village, we randomly selected 30 households by starting from the center of the village and assigning the three interviewers to a section of the village. We were unable to get a list of total number of households within each village, and so relied on local people to tell us how many households there were. Each interviewer then sampled every *n*th house of the total number of houses to ensure a minimum of 30 interviews in each village.

To ensure representation of the perspectives of different residents, the sample was roughly stratified by age, gender, and household position. At the first house in a village, the male head of household was interviewed, the wife at the second, the grandfather at the third, the grandmother at the fourth, the eldest child 18 years or older at the fifth, and the youngest child 18 years or older at the sixth. If the appropriate person was not available, the interviewer proceeded through the sequence until a respondent was identified. The response rate was high, with only a handful of people refusing to do the survey due to time constraints or, in some cases, old age. Interviews lasted about fifteen minutes and were conducted to the extent possible without others present.

3. Results

3.1. Socio-economic characteristics

Respondents had a mean age of 51 years and 2.5 years of education (Table 2). Over half of respondents were women. While most respondents self-identified as farmers (90%), their income sources were diversified, with farming being supplemented by income from business opportunities and by traditional livelihood activities. The majority of households participated in some business activity, with the primary ones being employment in Shangrila, vehicle rental, and horse riding for tourists near the village. Others engaged in traditional labor activities, such as carpentry or

Table 2
Summary of socio-economic status and knowledge about sacred forests survey results.

Variables	All respondents (n = 201) %[a]
Socio-economic	
Female	53
Age (years) (mean±SD)	51 (±20)
Education (years) (mean±SD)	2.5 (±3.7)
Income sources	
Farming	41
Traditional labor	15
Business	52
Land (mu) (mean±SD)	16.6 (±8.2)
Use	
Respondent enters	
Yes	82
No	18
Times per month (±SD)	4.2 (±.46)
Knowledge	
Do you know the meaning of the forests' name?	
Something	33
Does not know	67
Do you know the creation story?	
Knows	5
Knows a little	14
Does not know	81
Does the sacred forest have rules?	
Yes	49
No	49
Does not know	2
Who makes the rules?	
Historical	13
Villagers/each person	8
No one	15
Village leaders	12
Government	4
Does not know	54
Who enforces the rules?	
Household rotation	13
Each person	13
Other	3
No one	10
Does not know	62
Do you know the rules?	
Knows	48
Does not know	53

[a] Except where noted.

Table 3
Summary of attitude and forest change survey results.

Variables	All respondents (n = 201) %
Attitude (Do you like or dislike the sacred forest?)	
Like	84
Does not know	16
Benefits/problems	
Does the sacred forest have benefits?	
Yes	94
No	5
Does not know	1
What are they?	
Religious benefit	
Given	94
Not given	6
Extractive benefit	
Given	8
Not given	92
Recreation/esthetic benefit	
Given	4
Not given	96
Does the area cause problems?	
Yes	5
No	95
Forest change	
Has the sacred forest changed?	
Yes	41
No	58
Does not know	1
Have the wildlife changed?	
Yes	25
No	75
Has vegetation changed?	
Yes	50
No	50
Do you worry about area?	
Yes	6
No	89
Does not know	5

collecting and selling natural resources, such as timber, fuelwood, or mushrooms.

3.2. Use of the sacred forests

On average, most respondents reported visiting the sacred forest slightly more than four times per month. They said that they visit regularly, or at least as often as they can, in order to light incense and pray for good luck (Table 2). To go to light incense is auspicious and is believed to bring good luck to an individual and family members. A handful of respondents said they go to the sacred forest to pray for rain, for a good harvest, or to prevent soil loss.

A few respondents also said they visit the sacred forest to extract fuelwood (n = 3), mushrooms (n = 3), and fertilizer in the form of pine needles or leaves (n = 2). Although it did not come up in the survey, one person mentioned that a particular tree (*Betula platyphylla*), used to stake out guard dogs in people's yards, is sometimes cut in the sacred forest. He joked that young people are too lazy to walk to the more distant non-sacred forests to cut this tree, so they cut them in the sacred forests, which are closer to the village.

3.3. Knowledge and management

One-third of respondents knew the meaning of the forest's name (Table 2). Some examples of the meanings people gave for the sacred forest names were "monk's sacred forest," "woman who sat on lakes," and "the highest mountain." The majority did not know the creation story of the forest. Half of the respondents said there are rules regarding the sacred forest and the other half say there are not. Most respondents said that they do not know who makes the rules. About equal numbers said that the rules of the sacred forest came from history (the ancestors), that the village chief or elders make the rules, or that no one makes them. Fewer people said that the villagers or each person makes the rules or that the government makes the rules.

The most common responses to who enforces the rules were that each person is responsible for enforcing the rules, that no one is responsible, or that they do not know who enforces the rules. However, three of the villages also had respondents mention a system of household rotation for enforcing the rules. The number

who mentioned this system varied from a low of 17% in one village to 63% in another.

3.4. Perceptions of benefits and problems

Nearly everyone reported that they like the sacred forest and that it had benefits, which were primarily religious. A few people also mentioned that extraction of fuelwood, mushrooms, and leaves and pine needles for fertilizer, was a benefit. Very small numbers of people mentioned recreation and esthetic benefits, i.e., that having picnics and the nice view were benefits. While no one said they disliked the sacred forest, a few said they did not know how they felt (Table 3).

In terms of religious benefits, respondents said that lighting incense and praying bring benefits in the form of good luck in many ways. Two ways were protection from disaster and illness and economic benefits. Protection from disaster and illness was mentioned for individuals, families, the village, region, and country. Economic benefits included such things as professional success, for villagers to get richer, procuring a good job for themselves or a family member. Other responses included good scores on a child's exams, recovery from illness, making dreams come true, and conception of children. Other responses described protection and blessings for various entities: travelers, the next generation, blessings for all creatures, and blessing for all Tibetans and Chinese to be happy and safe

When asked why they liked the sacred forest, many people mentioned feeling better, blessed, peaceful, and/or protected by god when they went to the forest. They also said it is in their nature, their beliefs, to like the sacred forest. People also described the area is inviolable, holy, and pure. They feel in awe of it. As one person said "Many generations of people believe it helps us if we pray for it."

A few respondents mentioned that the area can cause problems if you disturb it, such as cutting trees or neglecting to visit for some period of time ($n = 7$). People told us stories in which a friend's or relative's bad luck, such as a long-term sickness, was attributed to their cutting trees in the sacred forest. Some also mentioned that the sacred forest is an obstacle to getting to the collective forest that lies higher up and beyond the sacred forest ($n = 3$). We interpret this response to reflect the fact that sacred forests have few paths and dense vegetation. Thus, people tend to walk on bigger paths that go around sacred forests to reach forests higher up from which they extract items such as fuelwood and timber.

3.5. Perceptions of forest change

Fewer than half of respondents think that the sacred forest had changed over time (Table 3). When asked how it has changed, the most common response was that the trees are thicker and denser ($n = 52$). Some mentioned improved infrastructure, such as a stupa built or improved or better roads ($n = 27$). A few mentioned that there are more wildlife now such as deer, rabbits, and squirrels ($n = 7$), that it looks better now ($n = 2$), that people's lives are better so the forest is better ($n = 2$), that it is cleaner because people take care of it ($n = 1$), and that the forest has mushrooms now ($n = 1$).

One quarter of respondents said that wildlife has changed, with some responding that it has decreased ($n = 25$) and some that it has increased ($n = 17$). Half of the respondents said that the vegetation has changed, with most saying it has increased ($n = 69$).

3.6. Future

Very few respondents said they worry about the future of the sacred forest (Table 3). Many said that the forests are a part of everyday life and religion and that they cannot imagine life without the sacred forest. The few who said they are afraid say they that worry future generations may not take care of the sacred forest.

3.7. Age and gender differences

There were no significant differences in women's versus men's responses to the survey questions. However, responses did vary significantly by age (Table 4).

In terms of use of the area, half of those over 70 years said they did not visit the sacred forest because of their age, health, or inability to walk. In terms of knowledge about the area, older people were more likely to know the meaning of the forest's name, especially those over 70 years. Also, the older a person was the more likely they were to know the creation story. Only one respondent under 70 years said they knew the complete creation story and no one under the age of 40 said they knew the story even a little. There were no significant differences in age concerning questions about the existence of rules, the enforcer of rules, and if the respondent knew the rules.

In terms of benefits, of the few who said the sacred forest had no benefits, most were under 30 years old. Respondents under 30 years were also the least likely to mention that the area had religious benefits.

Older respondents were more likely to perceive changes in the area. They perceived that the forest has changed generally and that the plants have increased. They were also more likely to think that the number of wildlife has changed, although this difference is not statistically significant ($p = 0.20$).

4. Discussion

4.1. One dimension of meaning

These sacred forests have primarily one dimension of meaning for local residents. It is a place to light incense and pray for good luck. Respondents do not link the environment or conservation values to these sacred forests. Their perceptions of these sacred forests are one-dimensional compared to people's perceptions of more traditional protected areas, such as national parks and wildlife reserves, where the first author has conducted similar studies in China, Nepal, and Myanmar. In these areas, people perceived multiple types of benefits, including conservation and ecosystem services (Allendorf and Yang, 2013; Allendorf, 2007; Allendorf et al., 2006). In Gaoligongshan Nature Reserve in central Yunnan, the majority of respondents perceived conservation and ecosystem service benefits (Allendorf and Yang, 2013). People's perceptions of these sacred forests also contrast with studies of other Tibetan sacred areas. Luo et al. (2009) found that, in addition to religious benefits, Tibetan villages in Gansu Province recognized conservation benefits of their sacred areas, such as protecting animals, trees, the environment in general, and bringing rain. However, the two villages in the study were located within the Baishuijiang Nature Reserve and have had development projects focused on environmental conservation, which may have increased or made more salient their appreciation of environmental benefits. Our results also differ from other sacred areas not associated with externally-imposed protected areas. In Zimbabwe, for example, people valued sacred forests for their conservation aspects, such as protecting trees, medicinal plants, and animals (Byers et al., 2001).

However, our results do not rule out that people may value these aspects of the sacred forests, just that they are not directly salient to people when they are asked what they perceive to be benefits of the area or reasons for liking the area. The fact that two people in this study mentioned that they pray for rain in the

Table 4
Survey responses by age category (only significant results shown).

Born	<30 (n = 36) After 1982	30–39 (n = 26) 1972–81	40–49 (n = 31) 1962–71	50–69 (n = 56) 1942–61	70+ (n = 51) Before 1942	p-value from χ^2 test
Use						
Respondent enters						
Yes	91.9	88.5	100	87.5	54.9	<0.01
No	8.1	11.5	0	14.3	45.1	
Knowledge						
Name meaning						
Something	18.9	19.2	25.8	28.6	58.5	<0.01
Does not know	81.2	80.8	74.2	71.4	41.2	
Creation story						
Knows	0	0	0	1.8	17.7	<0.01
Knows a little	0	0	9.7	26.8	19.6	
Does not know	100	100	90.3	71.4	62.3	
Benefits						
Yes	77.8	96.2	100	96.4	98.0	<0.01
No	19.4	3.9	0	3.6	0	
Does not know	2.8	0	0	0	2.0	
Religious benefit						
Yes	73.0	92.3	100	98.2	100	<0.01
No	27.0	7.7	0	1.8	0	
Forest change						
Has the sacred forest changed?						
Yes	13.5	20.8	32.3	53.6	62.5	<0.01
No	86.5	79.2	67.7	46.4	37.5	
Has vegetation changed?						
Yes	24.3	32.0	38.7	58.9	72.6	<0.01
No	75.7	68.0	61.3	41.1	27.5	

sacred forests highlights the fact that it can be difficult to capture all of the values of these areas because of their close integration into society and culture (Byers et al., 2001). Religious reasons for respecting the forest are tied to the deities bringing good luck and not bad. Good luck translates into direct and material benefits, which may have been more environmentally-focused when livelihoods were based only on farming and grazing. However, because of changes in the local economy, good luck now translates more often into luck with business and education, for example. Thus, while environmental and conservation values may not be salient to people in a direct and conscious way, a fuller range of benefits may be linked in deeper and more complex ways than we were able to capture with our approach.

4.2. Resiliency

This region of Yunnan is undergoing dramatic changes, including tourism, diversification of livelihoods, and increased formal education (Hillman, 2010), which can contribute to the degradation of traditional sacred areas (Dudley et al., 2005; Verschuuren et al., 2010). The area around Shangrila, in particular, is being heavily impacted by the growth of tourism that has been promoted since the logging ban was enacted (Hillman, 2010), with old growth forests being severely impacted because of a need for timber and fuelwood to meet the needs of tourism and a growing population. The number of tourists in Diqing Prefecture, where Shangrila County is located, rose from 40,000 in 1995 to 5.3 million in 2009 (Brandt et al., 2012).

However, despite the profound changes occurring in the area, our results do not appear to support the idea that residents' values toward these sacred forests are changing. If values were changing, we would predict that youth, because they leave the village to study and work, would be less likely to visit the sacred forests, would have less knowledge, and/or would value the sacred forests less. However, in terms of use, there are no significant differences among people of different ages. Except for the very old, people of all ages are visiting the sacred forest and with about the same frequency. There are also no age differences in terms of knowing how the area is managed.

We do find differences in the knowledge about the history of the area and perceptions of benefits among the age groups. Only the very oldest people know the creation story while the number knowing the meaning of the name increases slowly over the age groups. We also find that people in their 20's are less likely than other age groups to perceive benefits: over 90% of all the age groups perceive religious benefits, except for the youngest group, where it drops to 73%.

These age differences in historical knowledge and benefits might indicate that this knowledge is being lost among younger people. However, because the percentage perceiving religious benefits is very high amongst all age groups and the young are visiting as regularly as everyone else, it is not clear that these differences point to a loss of value or knowledge. It is also possible that people may be more likely to appreciate and learn about certain aspects of the sacred forest as they grow older.

The influence of age seems particularly likely for the differences in knowledge about the history. The fact that younger people understand the rules but not the name meaning or the creation story of the sacred forests may be explained by the way that people learn about the sacred forests. Respondents explained to us that the transmission of values occurs at a very young age when children are taught by their parents the rules of the sacred forest, rather than the meaning or religious context. Thus, there is an emphasis on behavior, both in terms of conserving the forest and visiting regularly to light incense. As one person explained to us, "Parents teach children what they can and cannot do so that everyone knows and follows the rules."

An interesting question is whether the process of transmission of rules and stories has changed over the past few decades of change and upheaval. If the transmission of the rules from one

generation to another is the primary way these areas have been protected for generations, then the average person in the village may not necessarily have learned the stories and history of the sacred areas even in earlier times. Thus, from our data we cannot discern if the data is reflecting that older people know the forest name meaning and creation stories more than younger people because the knowledge is being lost or because the younger people have not yet learned them.

It is also useful to place our results in historical context. People's commitment to these sacred forests over centuries demonstrates remarkable resiliency. These sacred forests survived the overlaying of a foreign religion (Buddhism) centuries ago and have undergone economic, social, and cultural transformation during the era of collectivization from 1950 to 1978 (Colchester, 2003; Xu and Ribot, 2004). During the "Great Leap Forward", deforestation was widespread in order to meet industrial production quotes and then, during the Cultural Revolution, traditional religious practices were banned, including those relating to sacred forests (Kolås, 2007). During these decades, the sacred forests suffered degradation. Respondents in two of the villages told us that up to half of their sacred forest was completely cut down during this time. However, when people were allowed to practice religion once again in the 1980s, they resumed their Tibetan practices (Kolås, 2007). Temples were rebuilt and sacred forests were protected. Remote sensing data from 1990 to 2010 indicates that these sacred forests have not significantly changed during that time, supporting the idea that these areas are relatively well-protected now (Brandt, unpublished data).

4.3. Management implications

Based on ecological, social, and spiritual/cultural criteria that Rutte (2011) identified to define success for sacred natural sites, these sacred forests are successful. Biologically, they are important: they have relatively low rates of human disturbance, a high percentage of vegetative cover compared to the surrounding landscape, and high biodiversity, at least in terms of vegetation and birds, compared to the surrounding area. Socially, people have protected these areas for a long time, have developed effective and equitable rules, have few conflicts, and show the capacity to adapt to changes. Culturally, the areas are associated with deities and spirits and people participate in regular ceremonies in them.

Does this mean that these village-level sacred forests should be assimilated into conservation efforts? This approach has already been promoted for sacred areas in southern Yunnan (Shengji, 2012). In northwest Yunnan, non-governmental organizations, such as The Nature Conservancy (TNC) and WWF, have supported this integration (Anderson et al., 2005), based on the idea that a closer relationship between religious leaders and conservationists can be good for conservation (Bhagwat and Rutte, 2006). Also, since the 1990s, local officials in the area have promoted Tibetan culture, specifically the monasteries and sacred mountains, as tourist sites in order to promote and increase tourism (Kolås, 2007).

However, our results highlight some issues to consider regarding the integration of these sacred forests into conservation strategies. While sacred areas are under threat in many places (Dudley et al., 2005; Verschuuren et al., 2010), it is important to consider the local context before recommending if and how sacred areas should be incorporated into conservation strategies (Bhagwat and Rutte, 2006; Ormsby, 2013, 2011). One of the key issues involved with incorporating sacred areas into larger conservation strategies is that it entails some form of outside intervention, which can change, and even undermine, local management of sacred areas (Virtanen, 2002). Thus, as these sacred forests have been resilient to change in the past and do not appear to be under immediate threat now, they do not seem to be in need at this point of outside intervention for their continued existence.

We also saw indications that local residents may want their beliefs and practices concerning the sacred forests to be left alone. In a few instances, we had people remark to us that we should not be conducting research on the sacred forests. It was a rare occurrence, and it may simply reflect a desire not to have outsiders asking questions. However, given the history of interference by the government in religion, it may reflect that residents would prefer to practice their traditions without outside influence. Indeed, outside interference, even with the best of intentions, may have unexpected and unintended consequences due to the larger context of Tibetan-Chinese relationships. As Topgyal (2012, p. 238) writes: "...the Chinese and the Tibetans are caught in a cyclical process of Chinese attempts to control, if not undermine, Tibetan Buddhism and the Tibetan resistance to defend it. This cycle appears set to continue for the foreseeable future."

An additional consideration is that in the case of these village sacred forests, and maybe because of their small size, they do not hold ecological value for people. This lack of ecological value may indicate that a direct approach to assimilating them into a protected area system may not resonate with local residents. Indirect approaches may be more appropriate. For example, it may be more effective to increase their access to knowledge about the environment and the importance of protected areas for biodiversity. This might pave the way for residents in this area, in their own way, to link their village-level sacred forests to the broader landscape and to perceive more types of benefits from the sacred forests.

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