



RAPID ASSESSMENT OF MANAGEMENT EFFECTIVENESS OF THE ZHANGYE NATIONAL WETLAND PARK, GANSU PROVINCE, PEOPLE'S REPUBLIC OF CHINA

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ABSTRACT

A rapid assessment of management effectiveness was undertaken for the Zhangye National Wetland Park, a small, remote protected area in Gansu Province, the People's Republic of China (PRC). During site visits and a workshop with park personnel in 2011, park management activities were documented and the first baseline score of management effectiveness was derived. The park exhibits similar trends to many other protected areas in the PRC and globally, with legal establishment, design and objectives, and economic benefits reported as management strengths, and budget security, monitoring and evaluation, and law enforcement reported as management weaknesses. Specific challenges for the park include a need to balance the development of tourism infrastructure with biodiversity conservation, and to develop quantitative management targets linked to conservation objectives.

Key words: wetland, park management, METT, Zhangye, Gansu, China

INTRODUCTION

Protected areas are a principal tool in most national strategies to conserve biodiversity, yet many are ineffectively managed (Leverington et al., 2010). Assessing the management effectiveness of a protected area is a critical element towards achieving responsive, pro-active management, and is defined as evaluating 'the extent to which management is protecting values and achieving goals and objectives' (Hockings et al., 2006: xiii). The People's Republic of China (hereafter 'PRC') has at least 2,697 protected areas, covering 146.3 million ha (MEP, 2014), but few published assessments of management effectiveness are available. Notable exceptions are three studies (Ervin, 2003; Quan et al., 2009, 2011; Xu et al., 2012) which examine trends in management performance in multiple protected areas (ranging from 88 to 535), and reviews for individual protected areas (e.g. Zhou & Grumbine, 2011; He et al., 2012). These studies identified strengths and weaknesses in protected area management and highlight the need for review of the PRC's other protected areas. This paper describes the first assessment of management effectiveness for a small protected area in western PRC, the Zhangye National Wetland Park (ZNWP).

STUDY AREA

National Wetland Parks (NWP) are multiple-use protected areas managed for ecological and human benefit (State Forestry Administration, 2010). The ZNWP (N38°57'41"–N39°02'27" E100°24'30"–E100°28'53"; 4,602 ha; elevation 1,440–1,474 m), is located in the municipality of Zhangye City, Gansu Province, and was established in 2009 (ZCG, 2009). It is situated along the Heihe, the PRC's second longest inland-draining river, beside a city of over 0.5 million residents (ZCG, 2010). The river is bordered by arid plains, sand dunes, and rocky gorges, and supports restricted wetland habitats and internationally significant biodiversity, including migratory waterbirds (ZCG, 2010; Bezuijen, 2013). The region is part of the historic Silk Road trade route and has been inhabited for many centuries. Recent industrial and agricultural development has resulted in declining water tables, vegetation dieback, pollution, and salinization (Qi & Luo, 2006). The ZNWP was designated for wetland rehabilitation, biodiversity conservation, and ecotourism (ZCG, 2009). It comprises an 'inner' (695 ha) and 'outer' (3,907 ha) area (ZCG, 2009), both modified by long-term human activities. The inner area supports



'Inner area', Zhangye National Wetland Park, People's Republic of China. Top left: Restored reed beds *Phragmites* on former farmland (summer). Top right: Constructed lake, access road, and tourism complex. A culvert and sluice gate (foreground) regulate water flow from the lake to the adjacent wetland. Bottom left: Elevated boardwalk within dry reed beds and woodland (winter). Bottom right: Education centre, under construction 2011 © ADB/Mark R. Bezuijen

large restored beds of reeds *Phragmites* and reedmace *Typha*, woodland, agricultural land, and constructed lakes connected by water channels (see pictures above). The inner area previously supported small settlements, but from 2009–2011 these were relocated to the outer area. The outer area encompasses 9 km of the Heihe, here a shallow, braided channel 100–400 m wide, with agricultural land, woodland, townships, and roads (see pictures overleaf). In 2013, about 20 settlements with <50,000 people were present in the outer area. The ZNWP partly overlaps with another protected area, the Gansu Zhangye Heihe Wetland National Nature Reserve (41,164 ha), which extends further north along the Heihe (ZCG, 2010). The ZNWP is generally equivalent to an IUCN Category V protected area ('protected landscape'; Dudley, 2008: 20–21), based on its modified nature, multiple-use objectives, and scenic value.

METHODS

Information on the ZNWP was collected during site visits and discussions with park agencies in July and October–November 2011. River dimensions and the extent of park infrastructure in the inner area were estimated from Google Earth satellite imagery. A one-day workshop (3

November) was held in Zhangye City to derive a baseline score of management effectiveness, using the Management Effectiveness Tracking Tool (METT) (Stolton et al., 2005). The METT comprises 30 core questions, each scored from 0 (poor) to 3 (excellent), and six supplementary questions, each scoring up to one point (Stolton et al., 2005). Although many protected area assessment methodologies are available, the METT was selected due to the limited need for training, ease of replication, and low cost (no specialized equipment required). It has also been applied elsewhere in the PRC (e.g. Quan et al., 2011). The workshop was facilitated by the author and attended by 16 park staff including the vice-director. Due to time constraints, a larger workshop involving local communities and other stakeholders could not be organized. Questions were scored by the staff through group discussion and consensus. One question (*Do indigenous and traditional peoples resident or regularly using the protected area have input to management decisions?*) was excluded, as no indigenous groups occur in the ZNWP. In total 35 questions, including all supplementary questions, were answered, yielding a maximum possible score of 93 points (100 per cent).

RESULTS

• Park establishment and management

The ZNWP is managed by a municipal committee with representatives from the ZNWP Construction and Management Committee, Zhangye Binhe New District, and Ganzhou Wetland Bureau. Other bureaus, including forestry, environmental protection, and land resources, give input to park management. For park designation, baseline surveys of ecology and hydrology were conducted (2007–2008) and a 10-year (2009–2018) park master plan was prepared (ZCG, 2009). The plan articulates a vision ('to establish the park as the identity of Zhangye City, promote the culture of the Heihe basin, promote education and research, and establish a masterpiece of ecotourism') and objectives ('to protect and utilize wetlands, improve wetland ecological function, and enable scientific research and education') for the ZNWP (ZCG, 2009). From 2009–2011, management focused on the development of tourism facilities and wetland protection in the inner area. By 2011, three tourism complexes, three lakes and linking canals, three park entrances and car parks, viewing pavilions, 21.8 km of access roads, and 4.8 km of boardwalk had been constructed; visitor signs and trails, resting points, portable toilets, electric tour cars and bicycle hire had been installed; and guided tours by trained local guides were available (MRB pers. obs.). Entry to the park is free. Wetland protection initiated included: a 'farmland to wetland' restoration programme (by 2011, at least 80 ha of reed beds had been established); installation of concrete boundary markers and signs; and, routine safety patrols by local police. Approximately 172 staff (22 permanent and 150 temporary, the latter mainly construction workers) had been employed. In 2011, the park received 300,000 visitors; by 2014, this had increased to 550,000 per year (ZNWP committee in litt.). The park is described by local agencies as a 'green lung' for Zhangye City, and which helps improve water and air quality, water retention, and benefits for society.

In 2011, the government also designed a five-year project to support implementation of the park master plan. The project comprises three components, 'wetland protection' (construction of watch-towers, guard posts, offices for research, monitoring and education, and remaining boundary delineation; staff training; community outreach programmes; wetland monitoring), 'restoration' (rehabilitation of 1,480 ha wetlands in the outer area), and 'sustainable economic development' (more tourism facilities in the inner area – viewing pavilions, kiosks, car parks, public toilets, and another 11 km of roads and 4 km of boardwalk). The project began in 2013 and is partly supported by a loan from the Asian Development Bank.¹

• Threats

No systematic threat assessment was conducted for this study. Water supply from the Heihe is the critical basis for the wetland ecological function and tourism values of the ZNWP, but has been reduced by upstream dams and barrages and intensive water extraction for agricultural, domestic and industrial use. The latter has resulted in depressed water tables near the park (ZCG, 2009). Water quality is impacted by the discharge of untreated industrial effluent from nearby factories, and the extensive use of agricultural chemicals for farming within and near the park (ZCG, 2009). In the outer area, population growth and construction of residential buildings is causing increasing pressure on wetland habitats. Some management actions also present a risk to the park. In 2011, park tourism infrastructure occupied 17–24 ha of the inner area (2.5–3.4 per cent) and another 68 ha (9.8 per cent) is planned (total 85–92 ha; 12–14 per cent): a large footprint for this small area. This does not account for indirect construction impacts such as local changes in hydrology and vegetation. Roads in the inner area constructed perpendicular to the natural direction of water flow have caused water logging and woodland dieback (MRB pers. obs.). The partial overlap of the ZNWP with another protected area (see Study Area) has institutional implications, yet is not mentioned in the ZNWP master plan. Workshop participants listed the two greatest threats to the ZNWP as climate change ('reduced water supply') and unregulated water extraction by local communities.

• Management effectiveness in 2011

A score of 67 per cent management effectiveness was derived for the ZNWP. Scores assigned by workshop participants were '1' (N=6), '2' (N=18) and '3' (N=5) for core questions and '0.5' (N=1) and '1' (N=5) for supplementary questions (Table 1). No question was scored zero. Activities that scored lowest (and the reasons given) were *law enforcement* ('limited staff capacity'), *boundary delineation* ('incomplete', 'low community awareness of boundaries', 'markers not durable'), *stakeholder opportunity to influence the management plan* ('limited community input'), *current budget* ('inadequate'), *security of budget* ('dependent on insecure fund sources'), *equipment* ('insufficient'), and *visitor facilities* ('inadequate'). Actions scored highest were *legal status* ('park is gazetted'), *regulations* ('are being implemented'), *resource management* ('ecological values are being protected'), *commercial tourism* ('excellent cooperation with operators'), and *economic benefit* ('most employees are from local communities'). Positive examples of management cited were the closure of two factories that were discharging effluent into the ZNWP, the conversion of farmland to reed beds, and

employment of local residents. Challenges cited were a skewed management focus toward the inner area, dealing with agricultural non-point source pollution, and limited funding. Important management activities were stated as maintaining the security of water releases from upstream dams, construction of a water storage dam within the park, and increasing the management effort in the outer area.

DISCUSSION

This study provides a baseline score of management effectiveness for the ZNWP, two years after park establishment. The baseline score (67 per cent) reflects the considerable management efforts undertaken between 2009 and 2011, when a functioning management framework was established. It may also indicate some over-scoring; nearly one-third of questions (N=10; 29 per cent) were assigned maximum scores and most (N=28; 80 per cent) were scored moderate or higher (Table 1). Three questions about adaptive management and monitoring were assigned maximum scores (7b–c, 11; Table 1), yet monitoring programmes for water and biodiversity, quantitative management targets for conservation and tourism, and feedback mechanisms, had not been implemented at the time of assessment. Reasons for over-scoring may be numerous, including the challenge of translating technical discussions, knowledge gaps, differing perspectives, group consensus rather than individual scoring, as well as bias. Park managers may be a valuable source of information about the sites they manage (Cook et al., 2014), and the ZNWP personnel were clearly familiar with local management issues. Nonetheless, the lack of involvement of other park stakeholders, especially communities (see Methods), is a key limitation which may have contributed to the high scoring, as demonstrated by studies elsewhere (e.g. Carbutt & Goodman, 2013).

Key areas of concern revealed by the study were (i) heavy management bias toward one portion of the park, the inner area, despite the outer area being over five times larger and supporting the largest habitats and human populations, (ii) potentially excessive tourism infrastructure development in the inner area, (iii) lack of quantitative management targets, (iv) lack of environmental monitoring programmes and feedback mechanisms for management, and (v) institutional overlap with another protected area. National regulations for NWPs require that economic development is sustainable (State Forestry Administration, 2010), yet the sustainability of infrastructure development in the inner area, and continuing population growth in the outer area, is unclear. Against the ZNWP ‘vision’ and

‘objectives’ (Results), the park’s tourism infrastructure may fulfil the goals for tourism and education, but unless closely managed, could be counter-productive for biodiversity and wetland protection.

The ZNWP management score of 67 per cent is high compared with a mean score of 52 per cent for 535 other protected areas in the PRC assessed using the same method (Quan et al., 2009). Similar to these other protected areas, the ZNWP scored higher in resource management and lower in community input to management, budget, and equipment needs. In contrast, in the ZNWP, progress with boundary delineation was scored low, and management systems and regulations were scored high (Table 1), the opposite of findings by Quan et al. (2009, 2011). Compared with the management performance of two other protected areas in different geographic settings, the Yellow River Delta National Nature Reserve (a coastal wetland in eastern PRC; He et al., 2012) and Pudacuo National Park (a forested mountain region in south-western PRC; Zhou & Grumbine, 2011), the ZNWP showed similar trends, with most government attention focused on tourism, limited or no biodiversity monitoring, incomplete boundary demarcation, and/or the possibility that some economic development may not comply with protected area regulations. Elsewhere in the PRC, unregulated mass tourism and infrastructure (Li & Han, 2001; Ervin, 2003; Xu et al., 2012) and overlapping jurisdictions with other land tenure (Kram et al., 2012) are symptomatic of many protected areas, and have resulted in impacts to biodiversity (e.g. Shen, 2011). Such issues are of particular concern for wetlands in the PRC, where the area of protected natural wetlands is declining while the area of protected artificial wetlands is increasing (Zheng et al., 2012). Globally, findings for the ZNWP are mostly similar to world-wide trends for protected areas, with legal establishment, design and objectives, resource inventory, and economic benefits reported as management strengths, and budget security, monitoring and evaluation, and law enforcement reported as management weaknesses (Leverington et al., 2010).

Prior to the workshop, ZNWP personnel were unaware of global methods to assess management effectiveness, and the study provided the opportunity for informal training. Limitations of the METT were discussed, including its limited scope, subjective nature of some questions, and the lack of explicit links between management effectiveness and conservation outcomes (Stolton et al., 2005). The workshop illustrated the strength of the tool for facilitating discussion and identifying perspectives, yet the over-scoring of some questions also indicated some weakness for objective assessment. Based on the

Table 1. Baseline scores of management effectiveness for the Zhangye National Wetland Park, Gansu Province, People's Republic of China, applying the METT (Stolton et al., 2005).

| Variable | Max. score | Score 2011 | Comments – workshop participants |
|---|------------|-------------|--|
| Legislation and regulations | 6 | 6 | |
| 1. Legal status - does the park have legal status? | 3 | 3 | Yes |
| 2. Park regulations - inappropriate activities (e.g. poaching) controlled? | 3 | 3 | Regulations being implemented |
| Enforcement | 3 | 1 | |
| 3. Law enforcement - can staff enforce park rules well enough? | 3 | 1 | Hindered by limited resources |
| Management planning | 18 | 11.5 | |
| 4. Park objectives - have objectives been agreed? | 3 | 2 | Objectives are only partly implemented |
| 5. Park design - park need enlarging, corridors, etc to meet its objectives? | 3 | 2 | Park design could be improved |
| 6. Park boundary demarcation - boundary known and demarcated? | 3 | 1 | Incomplete. Low community awareness |
| 7. Management plan - is there a plan and is it being implemented? | 3 | 2 | Little management in outer area |
| a. Can stakeholders influence the management plan? | 1 | 0.5 | District agencies review master plan |
| b. Is there an established schedule/process for review and updating the plan? | 1 | 1 | Plan is 'regularly' reviewed |
| c. Results of monitoring, research and evaluation incorporated into planning? | 1 | 1 | Resulted in closure of two factories |
| 8. Regular work plan - is there an annual work plan? | 3 | 2 | Yes, but not fully implemented |
| Information, research and data requirements for management | 9 | 7 | |
| 9. Resource inventory - is there enough information to manage the area? | 3 | 2 | Baseline data available, but no new research |
| 10. Is there a programme of management-orientated survey and research work? | 3 | 2 | Limited current research |
| 11. Resource management - is the park adequately managed? | 3 | 3 | |
| Staff numbers, training and management | 9 | 6 | |
| 12. Staff numbers - are enough people employed to manage the park? | 3 | 2 | Insufficient staff for outer area |
| 13. Personnel management - are the staff managed well enough? | 3 | 2 | |
| 14. Staff training - is there enough training for staff? | 3 | 2 | |
| Budget | 9 | 4 | |
| 15. Current budget - is it sufficient? | 3 | 1 | |
| 16. Security of budget - is the budget secure? | 3 | 1 | |
| 17. Management - budget managed to meet important management needs? | 3 | 2 | More allocation for staff training required |
| Equipment | 6 | 3 | |
| 18. Equipment - is equipment sufficient? | 3 | 1 | Insufficient equipment |
| 19. Maintenance of equipment - is equipment adequately maintained? | 3 | 2 | |
| Working with stakeholders and the general public | 20 | 14 | |
| 20. Education and awareness - is there a planned education programme? | 3 | 2 | Programmes for TV, radio, schools planned |
| 21. State and commercial neighbours - co-operation with adjacent land users? | 3 | 2 | 'Good' co-op with townships, industry |
| 22. Indigenous people - have input to management decisions? | N/a | N/a | None in park - question excluded |
| 23. Local communities - have input to management decisions? | 3 | 2 | Village leaders participate in decisions |
| a. Open communication and trust between community and park managers? | 1 | 1 | Relocated residents were compensated |
| b. Are programmes to enhance community welfare being implemented? | 1 | 1 | Residents involved in park management |
| 24. Visitor facilities - are they good enough? | 3 | 1 | Insufficient to meet expected demand |
| 25. Commercial tourism - do operators contribute to park management? | 3 | 3 | ZNWP assists operators for park visits |
| 26. Fees - if applied, do they help park management? | 3 | 2 | Yes - supports park management |
| Condition and access assessment | 7 | 5 | |
| 27. Condition assessment - park being managed consistent to its objectives? | 3 | 2 | |
| a. Active restoration programmes for degraded areas in park and/or buffer zone? | 1 | 1 | |
| 28. Access assessment - is access/resource use sufficiently controlled? | 3 | 2 | Insufficient patrol of outer area |
| Economic benefits to local communities | 3 | 3 | |
| 29. Economic benefit assessment - does the park benefit communities? | 3 | 3 | Most park staff are from local communities |
| Monitoring and evaluation (M&E) | 3 | 2 | |
| 30. Are management activities monitored against performance? | 3 | 2 | 'Some' monitoring but is irregular |
| Total score | 93 | 62.5 | |



‘Outer area’, Zhangye National Wetland Park, People’s Republic of China. Top left: Heihe river and adjacent cultivation (mainly corn) and riparian corridor. Top right: Farmland, with inset showing fertilizer applied to crops, a key source of non-point source pollution to local water quality. Bottom left: New residential construction. Bottom right: Industrial complex at eastern border of the park © ADB/Mark R. Bezuijen

workshop and study outcomes, the following recommendations were identified for the ZNWP: (i) initiate regular (e.g. annual) participatory assessment of management effectiveness, (ii) conduct a systematic threat assessment, to help link METT outcomes to conservation outcomes, (iii) increase management efforts in the ZNWP outer area, particularly for wetland restoration, tourism, and land planning, (iv) implement monitoring programmes for water resources and biodiversity, and (v) clarify the institutional and management links between the ZNWP and an overlapping protected area. Most of these points remain pending, although since 2011, awareness raising activities have been conducted and a water quality monitoring programme began in 2014.

ENDNOTES

¹ www.adb.org/projects/44020-013/main

ADB recognizes ‘China’ as ‘the People’s Republic of China.’

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RESUMEN

Se acometió una evaluación rápida de la eficacia en la gestión del Parque Nacional del Humedal Zhangye, una pequeña zona remota protegida en la provincia de Gansu, República Popular de China (RPC). Durante las visitas y un taller con personal del parque en el año 2011, se documentaron las actividades de gestión del parque y se obtuvo la primera base de referencia sobre la eficacia de la gestión. El parque exhibe tendencias similares a muchas otras áreas protegidas en la RPC y en el mundo, consignándose la constitución legal, el diseño y objetivos, y los beneficios económicos como fortalezas de gestión, y la seguridad presupuestaria, el monitoreo y evaluación, y la aplicación de la ley como deficiencias de gestión. Entre los desafíos específicos para el parque se incluye la necesidad de equilibrar el desarrollo de la infraestructura turística con la conservación de la biodiversidad, y de formular objetivos cuantitativos de gestión vinculados a los objetivos de conservación.

RÉSUMÉ

Nous avons entrepris une évaluation rapide de l'efficacité de gestion au parc nationale de Zhangye, une petite zone humide protégée et isolée dans la province de Gansu, au République Populaire de Chine (RPC). Lors de visites du site et d'une réunion de travail avec le personnel du parc en 2011, nous avons examiné les méthodes de gestion et sommes parvenus à un premier résultat qui sert de base pour mesurer son efficacité. Les orientations de ce parc sont en de nombreux points similaires aux autres aires protégées de la République Populaire de Chine, et dans le monde. Il en sort des points forts tels la conformité de sa constitution, de sa conception et de ses objectifs, ainsi que ses avantages économiques, et puis des faiblesses de gestion tels le manque de maîtrise de son budget, de la surveillance et de l'évaluation, ainsi que dans l'application de la loi. Ce parc présente des défis notamment autour de l'infrastructure touristique face aux besoins de conservation de la biodiversité, et du développement d'objectifs quantitatifs liés à ses objectifs de conservation.