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Public perceptions of wetlands and preferences for on-site visitor facilities and communication media: a case study from an Australian Ramsar wetland

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Abstract. There is wide recognition, championed by the Ramsar Convention, of the need to increase the public appreciation of wetlands and their conservation by providing meaningful experiences for visitors to Ramsar sites. In a case study of an Australian Ramsar site on the 50th anniversary of the treaty, we investigate the public's awareness of this internationally significant wetland and their understanding of wetland biota and ecosystem services. To inform future communication, education, participation and awareness (CEPA), we also investigate public preferences for particular wetland-related knowledge, on-site activities, facilities and communication media. Less than half of the 326 survey respondents expressed some familiarity with wetlands. Notably, they were not aware of the existence of the Ramsar site, despite having driven past and being within close proximity to the wetland at the time of surveying. Non-extractive and non-commodified recreational activities such as trail walking and photography were preferred over extractive uses such as fishing and duck hunting and activities such as boat cruises and guided tours. There was a high demand for on-site facilities such as walking tracks and viewing platforms and for communication through web-based sources. Visitation to further the goals of Ramsar CEPA could be encouraged through the resourcing of locally appropriate infrastructure, promotion of activities and better communication.

Keywords: ecotourism, environmental education, protected area management, Ramsar Convention, science communication, wetland management.

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Introduction

Wetlands are critically important for the provision of a range of ecosystem services and their role in biodiversity conservation (Millennium Ecosystem Assessment 2005). Where data are available, they indicate that half of the mid-Holocene global wetland area has been lost, with much of the remaining area degraded or threatened (Zedler and Kercher 2005; Meng *et al.* 2017; Convention on Wetlands 2021). There are various reasons for the ongoing loss of wetlands, including both ecological (or direct drivers; e.g. physical modification, pollution, invasive species, climate change) and non-ecological (or indirect drivers; e.g. economic development, lack of information, lack of public awareness of wetland values and threats; Finlayson and Rea 1999; Millennium Ecosystem Assessment 2005). Most notable among the efforts to address the threats to the loss of wetlands is the Ramsar Convention on Wetlands, which was the first international treaty on the conservation of ecosystems (Finlayson *et al.* 2011). Contracting nations agree to work towards the wise use of all wetlands, to list and effectively manage wetlands of international importance as 'Ramsar sites' and to cooperate with other signatories on the management of transboundary wetlands and shared species, such as migratory birds.

Various strategies have been adopted under the Ramsar Convention to achieve wise use, which is considered by some to be synonymous with sustainable use and sustainable development (Finlayson *et al.* 2011). In the 1970s there was a focus on the designation and management of Ramsar sites, transitioning into policy development for the wise use of all wetlands in the 1980s, into a widening of focus to include ecosystem services and human wellbeing in the 1990s and, finally, expanding to include environmental awareness and engagement in the 21st century (Hettiarachchi *et al.* 2015). This latter focus was driven by the Convention's 1999 Resolution (VII.9) 'for promoting the conservation and wise use of wetlands through communication, education, participation, and awareness (CEPA) and work towards wider awareness of the Convention's goals, mechanisms…' (Ramsar Convention Secretariat 2010, p. 5). In the more recent Ramsar Resolution XII.9 (2015), the current CEPA program includes communication, capacity building, education, participation and awareness as 'processes that can be used for

specific purposes and specific target audiences to deliver CEPA aims' (Ramsar Convention Secretariat 2015, p. 10).

An important plank in Ramsar's CEPA efforts has been its focus on tourism and recreation. The Convention urged in its 2012 Resolution (XI.7) that:

> Contracting Parties and relevant stakeholders … use Ramsar Sites as a branding opportunity to promote sustainable tourism and recreation practices, with a view to increasing appreciation of wetlands by providing meaningful experiences for visitors, for example through birdwatching and cultural activities [Ramsar Convention Secretariat 2012, p. 5].

Such place-based experiences reduce the extinction of experience (Pyle 2003; Miller 2005) by increasing 'opportunities' to have positive experiences of nature (by provisioning access to wetlands) and 'orientation' towards nature (e.g. through marketing, educational and outreach activities; Soga and Gaston 2016), thereby promoting pro-environmental behaviour (Mackay and Schmitt 2019). Several studies have reiterated these prescriptions in the context of wetlands, such as the recent global survey by McInnes *et al.* (2020), which recognised the significant roles that public awareness (i.e. orientation) combined with visitation (i.e. opportunity) play as key positive drivers for conservation (see also Zhang and Lei 2012; Do *et al.* 2015*a*; Wilkins *et al.* 2019). This is also recognised by a joint report from the Ramsar and UN World Tourism Organization (2012, p. 13), in which tourism in and around wetlands is recommended 'to raise awareness about wetland values and wetland biodiversity, and win support from tourists and others for wetland conservation'.

Despite these calls, there is yet an ongoing need to explore the opportunities and values of wetlands for such experiences, and the preferences of the public, in order to create the necessary orientation. In the studies that have sought to assess public attitudes, preferences and experiences, there is a strong focus on the economic value of the recreational use of wetlands (Bergstrom and Stoll 1993; Gürlük and Rehber 2008), including uses and preferences (Pueyo-Ros *et al.* 2018). On the same theme, choice experiments have been used to identify attributes (e.g. wetland biodiversity, fish, fenced waterline and walking facilities) that influence the perceived values of wetlands (Carlsson *et al.* 2003; Newell and Swallow 2013). A smaller number of studies have investigated motivations to visit wetlands and satisfaction in relation to visits (e.g. Wang *et al.* 2012; Do *et al.* 2015*a*; Diaz-Christiansen *et al.* 2016). The effects of proximity to wetlands on visitors' knowledge of wetlands has also been investigated (Wilkins *et al.* 2019). More recently, tourism and recreation in wetlands has been addressed within a broader ecosystem services framework as cultural ecosystem services (Clarke *et al.* 2021).

There is more work to be done to fill in temporal and geographic gaps in furthering a combination of CEPA and recreation opportunities, and to explore the relationships of wetland knowledge, motivation and satisfaction, such as in the case now of Australia. Despite being one of the first signatories of the Ramsar Convention and the first country to produce a Wetland CEPA National Action Plan in 2001 (Prahalad and Kriwoken 2010), there has been a limited understanding of how or whether CEPA initiatives have been translated into tangible outcomes (e.g. public awareness of Ramsar sites) and what mix of opportunities and orientation may be required to inform policy and practice both in Australia and elsewhere.

Using a case study of Moulting Lagoon Game Reserve, one of the oldest Ramsar sites (listed in 1982), we investigate the public awareness of this Ramsar site, the public's general understanding of wetland biota and ecosystem services and, for the first time in the Australian context, public preferences for particular knowledge, on-site activities, facilities and modes of communication. We also examine whether these results are explained by socio-demographic variables of origin, age and occupation. These investigations allow us to take stock of the level of public awareness of the Ramsar brand, and of wetland biodiversity and ecosystem services, in order to make informed suggestions for: (1) increasing the opportunities for visitors to have meaningful experience in wetlands; and (2) suitable communication methods for marketing these opportunities. In doing so, we seek to contribute to improve the conservation effectiveness of wetlands as the Convention celebrates its 50th birthday.

Materials and methods

Study area

Moulting Lagoon is located at the head of Great Oyster Bay, near the popular Freycinet National Park (NP), on the east coast of Tasmania, Australia (Fig. 1). The lagoon is ~10 km north-east of the town of Swansea and ~10 km north of Coles Bay, which is the entry and the main hub for the NP (Parks and Wildlife Service 2007). Moulting Lagoon Game Reserve was the third Australian Ramsar site to be listed as a Wetland of International Importance and is now one of the 10 Ramsar sites located in the State of Tasmania (Parks and Wildlife Service 2007). On the northern end of Moulting Lagoon is Apsley Marshes – another Tasmanian Ramsar site. Because Apsley Marshes is almost entirely privately owned and without public access, we restrict our case study to the publicly owned and accessible Moulting Lagoon.

Moulting Lagoon is ~4760 ha, of which 4507 ha are listed as a Ramsar site (Department of Sustainability, Environment, Water, Populations and Communities 2011). Much of the land surrounding the lagoon has been cleared for agricultural use since British colonisation in 1821. In recent decades, parts of the adjacent land have been set aside for conservation and restoration (e.g. fencing out stock and weed removal), through either conservation agreements with private landowners or direct purchases for private reserves (Prahalad and Kriwoken 2010).

There are ~1048 ha of saltmarshes fringing the Lagoon (Fig. 1), which is close to one-fifth of the Tasmanian extent (Prahalad and Kirkpatrick 2019). Tasmanian coastal saltmarshes, including those in Moulting Lagoon, are recognised as 'threatened ecological communities' under the Australian Federal *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act). The lagoon also has large areas of intertidal and subtidal seagrass beds and other submerged aquatic vegetation, mainly dominated by *Ruppia megacarpa* (Temby and Crawford 2008). Unvegetated areas of the lagoon are made up of a mixture of sand and silt.

Thirteen plant species in the lagoon are listed under the Tasmanian *Threatened Species Protection Act* 1995 (Parks and

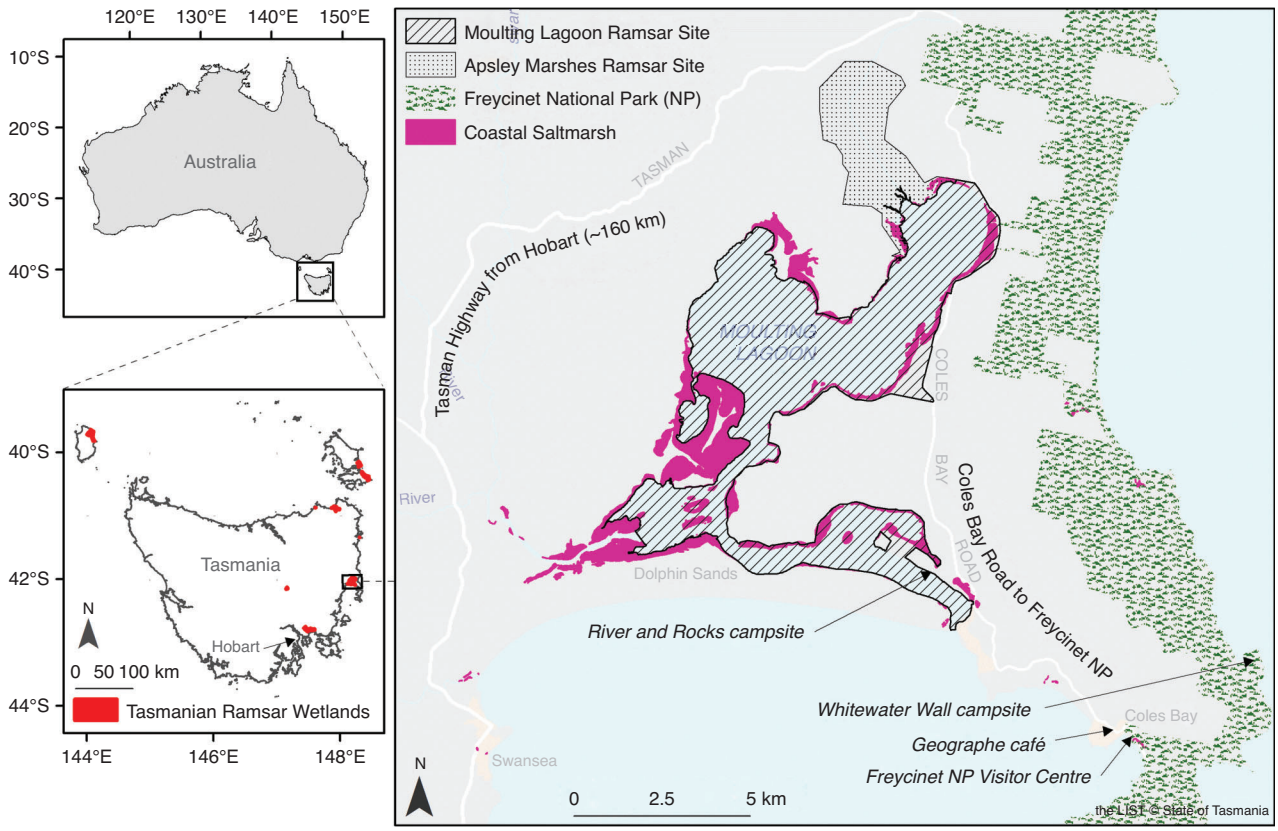

Fig. 1. Location of the Moulting Lagoon Ramsar site and the four survey collection interception points in Tasmania, Australia. Base data from theLIST (www.thelist.tas.gov.au), © State of Tasmania.

Wildlife Service 2007). The lagoon also provides habitat for several waterbirds and shorebirds species, notably as year-round habitat for 5000–10 000 black swans (*Cygnus atratus*; Department of Sustainability, Environment, Water, Populations and Communities 2011). Several migratory shorebird species that use the lagoon, such as the pacific golden plovers (*Pluvialis fulva*), are listed as protected under the EPBC Act. The lagoon also provides an important fisheries habitat, with ~37 species of fish that represent ~60% of all species found in open lagoons in Tasmania (Edgar *et al.* 1999).

The Oyster Bay tribe of the Tasmanian Aboriginal people occupied the lagoon and most of the Tasmanian east coast before British colonisation (Parks and Wildlife Service 2007). Wildlife around the lagoon, particularly black swan eggs, was an important resource for the Aboriginal people. Currently, the lagoon offers duck hunting in season, boating, fishing, bird watching and rough camping (Parks and Wildlife Service 2007). There are two campsites located on the outskirts of the lagoon. The River and Rocks Campsite is located ~8 km north of Coles Bay, next to the lagoon, and was selected as a survey collection location for this study (Fig. 1). There is one pit toilet at the River and Rocks Campsite, and a few fireplaces available on-site. The other campsite is located ~15 km north of Coles Bay, next to the Kitty's Mistake car park, and is accessible only by an unsealed road. Fireplaces have been established at this site, but no other facilities are available.

Survey design

Data were collected using an on-site visitor survey, a method commonly used in surveying public visitors to parks (Chiu and Kriwoken 2003; Hughes and Morrison-Saunders 2003; Weaver and Lawton 2011; Rossi *et al.* 2015; Pueyo-Ros *et al.* 2018). Section 1 sought to evaluate visitor knowledge of Moulting Lagoon (as a Ramsar wetland of international importance) and wetlands more generally. Section 2 focused on visitor expectations of recreational activities and facilities available in wetlands. Section 3 sought visitor demographic information, including the origin of the visitors, their age, occupation and length of visit. The questionnaire was designed with inputs from representatives of Tasmanian Parks and Wildlife Service (park ranger) and the local Glamorgan Spring Bay Council (manager of natural resources).

Approval for the study was granted by the University of Tasmania Human Research Ethics Committee (H0018207). All study participants provided informed consent to participate in the study and for their anonymised data to be published.

Section 1: knowledge of wetlands

A Likert scale (1–5) was used for respondents to report their knowledge of biotic attributes (comprising insects and spiders, mammals, birds, crabs and snails, fish, plants and algae and fungi) and their role in the provision of ecosystem services (comprising

habitat for biodiversity, fish nurseries, a carbon sink, a flood buffer, water purifiers, protectors of the coast and providers of cultural services). The biotic attributes were selected and classed following Prahalad *et al.* (2020). The ecosystem services cover the four classes of de Groot *et al.* (2002).

Section 2: visitor expectation of recreational activities, facilities and information sources

This part of the survey was designed to understand the level of interest that Freycinet NP visitors have for recreational activities and the facilities they consider important, rated using a Likert scale (1–5). The list of activities comprised trail walking, photography, fishing, bird watching, duck hunting, camping, kayaking, boat cruises, guided tours and cultural interpretation; these classes following the Moulting Lagoon Management Plan (Parks and Wildlife Service 2007). The activities currently available (camping, boating, duck hunting and fishing) were supplemented by other activities available in other reserved wetlands in Tasmania (e.g. Parks and Wildlife Service 2013). The list of facilities comprised walking tracks, viewing platforms, toilets, picnic tables, a barbeque station, campsite, campsite showers, fireplaces, vehicle tracks, rubbish bins, information panels and an information centre. Visitors were then asked to select their preferred source of information on wetlands and on-site activities and facilities from brochures, books, websites, apps, video clips (e.g. YouTube), information panels and guided tours (Ramsar and UN World Tourism Organization 2012).

Section 3: visitor attributes

Participants were asked to identify as either Tasmanian residents or interstate or overseas visitors. Blank sections were left for participants to fill out their home state or home country. Participants were asked to select their age group (18–24, 25–34, 35–44, 45–54, 54–65 and ≥65 years). Participants were also asked to fill in their occupation. Responses were initially coded to the 10 classes with reference to the International Standard Classification of Occupations (see https://www.ilo.org/public/english/bureau/stat/isco/, accessed 1 April 2022), and further reduced to 1 of 5 categories comprising blue collar, professional, retired, student and white collar. Questions on age and occupation were identified as being optional.

Participants were asked to fill in their length of visit to Freycinet, and whom they travelled with. Options available for selection were travelled alone or travelled with friends, family or a tour group. Participants were then asked about their interest (yes or no) in visiting the Moulting Lagoon and any other wetlands in the future. In the final part of this survey, an open section was provided to participants for any comments or questions.

Survey administration

The survey was conducted from July to August 2019. Despite the number of visitors to Tasmania being highest in the austral summer (>300 000), there are enough visits during our sampling period (>250 000) and from similar places of origin to exclude bias attributable to seasonal variation (Tourism Tasmania 2019). Our choice of the popular Freycinet NP is also notable because it is Tasmania's fifth most visited attraction (Discover Tasmania 2021), receiving a broad demographic of visitors year-round. To further enhance our data quality in this regard, we collected data during peak visitor times between 0900 and 1700 hours, and on both weekdays and weekends (Rossi *et al.* 2015). In addition, we used a random selection of survey respondents from a carefully selected range of intersection points, designed to maximise the representativeness of our survey respondent demographic (Chiu and Kriwoken 2003; Pueyo-Ros *et al.* 2018).

Due to the close geographic proximity of Moulting Lagoon and Freycinet NP, we chose survey collection interception points located within and on the outskirts of Freycinet NP (Fig. 1). The Freycinet NP visitor centre was the primary intercept location because it is often the first stop for visitors to the region to purchase park passes and obtain relevant brochures and maps. The Geographe Café is a popular local business located in the Coles Bay area and was included as the second intercept point to survey visitors to the region who are not necessarily also visiting Freycinet NP. The Whitewater Wall campsite is a free campsite located within the Freycinet NP, is only accessible by four-wheel drive vehicles and is likely to be more popular with Tasmanian locals, who are less likely to use the visitor centre. The River and Rocks campsite is located on the margins of the Moulting Lagoon and is frequented by Tasmanian locals with caravans.

At each survey location, potential participants were approached with printed copies of the survey ready in paper form for people to read and fill out. Care was taken through reminders and checking to ensure completion of all questions requiring a response (Rossi *et al.* 2015). To increase the survey rate, participants were offered a copy of the Tasmanian wetland birds poster (developed by the second author, VP) as a token of appreciation for their contribution to this study. In total, 326 usable surveys were collected. Only six surveys were unusable due to incomplete data.

Data analyses

Data from completed surveys were entered manually into a Microsoft Excel spreadsheet for curation and accuracy testing. Each completed survey was assigned a number (1–326). An accuracy assessment was done to check whether data had been transferred accurately from paper form to the Excel spreadsheet. Samples used for accuracy testing were randomly selected using the Excel RANDBETWEEN formula. Thirty samples were audited (~10% of the whole population). Each of the randomly selected samples was checked against the original survey in paper format and no errors were found.

The Chi-Square test was used for all analyses because all the data were collected in classes. For tables in which expected values in cells were <5, adjacent Likert scale classes with low expected values were merged. We present data as the percentage of respondents who answered 4 or 5 on Likert scales as an indicator of agreement with statements. Analyses were performed using Minitab statistical software (ver. 18, see https://support.minitab.com/en-us/minitab/18/). Data were visualised using R (ver. 3.6.2, R Core Team, R Foundation, Vienna, Austria) and the Rstudio ggplot2 package (Rstudio, Boston, MA, USA; Wickham 2016).

Results

Participant demographics

Approximately half the participants were visiting from interstate, ~30% were Tasmanian residents and ~20% were visiting from overseas. The greatest number of interstate visitors came from Victoria (34% of the remainder), New South Wales (32%) and Queensland (26%), similar to the order and proportion of visitors to Tasmania during the same period (Tourism Tasmania 2019; see also East Coast Tasmania Tourism 2020). Overseas survey participants represented 21 nations, with most visitors from Asian countries, the US and UK, again in line with data for Tasmania for this period (Tourism Tasmania 2019). All age groups (ranging from 18 to ≥65 years) were well represented, with a minimum of 10% of responses in each of the six age classes. At the higher end, close to one-third (32%) of the participants were in the 25–34 year age group. Tasmanians were prominent in the youngest and oldest age groups and in the occupational categories of student and retired (Table 1). Visitors from the mainland of Australia were prominent in the 56–65 year age group and the professional and blue collar categories, whereas those from overseas were prominent in the 25–45 year age groups and in the white collar work category (Table 1). Students were prominent in the 18–24 year age group and retirees were prominent in the groups >55 years of age (Table 2).

Among the ~91% of participants who filled out their occupation, the most common occupations were retirees, students, healthcare and medical, and hospitality and retail. Most participants were traveling with friends and family (37% + 52% = 89%). Very few were traveling with a tour group (~1%). Only 18 participants were traveling alone. Thirteen participants lived in the Freycinet area, which has a small resident population of 353 people as of the 2016 census (Australian Bureau of Statistics 2017). The time participants spent in the Freycinet area ranged from 1 day to 6 weeks. The mean number of days participants spent in Freycinet NP was 2.6 days, the identical number of days reported for the mean length of stay in the region (East Coast Tasmania Tourism 2020). These results indicate that our sampling strategy, combined with our chosen intercept points, was effective in collecting a dataset that we believe is representative of the public seeking visitor experiences in our study region.

Awareness of Moulting Lagoon and general level of knowledge of wetlands

Approximately 80% of participants had not visited Moulting Lagoon. Over half (54%) of the participants were not aware of the lagoon. Of the remaining 20% of participants, only ~35 people (11%) had visited the lagoon previously. Of these, only 7 (~2%) respondents had visited the lagoon within the previous year. The average time period since the previous visit was 5 years and the longest time since the previous visit was 35 years. The people who best knew Moulting Lagoon were aged >55 years, retired and Tasmanian (Tables 3–5).

Over half (52%) the participants knew nothing (17%) or very little (35%) about wetlands. The rest of the participants (48%) claimed they had a basic knowledge (38%) or that they knew wetlands well (10%). This separates respondents into two approximately equal-sized populations: Group 1, not knowledgeable of wetlands (~52%; $n = 172$); and Group 2, knowledgeable of wetlands (~48%; $n = 153$). The local people thought that they were informed about wetlands more than those from overseas (Table 3). The 56–65 year age group had the highest percentage of people who thought they were knowledgeable about wetlands (Table 4).

Those who were knowledgeable about wetlands wanted to know more about insects and spiders than those not knowledgeable, but the two groups did not differ in their desire for knowledge on any other of the biotic or ecosystem service variables (Table 3). Those who thought they were knowledgeable about wetlands had a greater preference for trail walking and bird watching, but a lesser preference for boat cruises, than those who thought they were not knowledgeable (Table 3). Water refill stations, rubbish bins, information centres, vehicle tracks, barbeques and showers were more desirable for those who thought they were not knowledgeable about wetlands than the rest of the respondents (Table 3).

The respondents as a whole thought that they had a better knowledge of mammals, birds, fish and vascular plants than of

Table 1. Age and occupation of survey respondents by origin
Tas., Tasmanian residents; Aus., Australian visitors residing outside the islands of Tasmania; OS, overseas visitors, *P* values are from Chi-Square analysis for each of the age group and occupation subtables. The figures are column percentages for each table

	Tas.	Aus.	OS	All	*P*-value
Age group (years)					
18–24	29	13	5	16	
25–35	25	26	59	32	
36–45	10	22	19	18	
46–55	6	21	10	14	
56–65	13	10	5	10	
>65	16	9	3	10	<0.001
Occupation					
Professional	21	39	32	32	
White collar	26	25	35	27	
Blue collar	14	18	14	16	
Student	20	7	18	13	
Retired	19	11	2	11	0.002

Table 2. Age of survey respondents by occupation (%)
Values show the percentage of respondents in each age group for each occupation group (column percentages). The bold values are the highest occupational percent for each age group. The probability value for the whole table (χ^2) was < 0.001

Age group (years)	Blue collar	Profess	Retired	Student	White collar	All
18–24	21	8	0	**62**	12	18
25–35	**38**	36	0	31	33	31
36–45	17	21	0	5	**28**	18
46–55	17	**20**	6	3	14	14
56–65	4	12	**24**	0	10	10
>65	2	3	**71**	0	2	10

Table 3. Survey responses by origin (%) and knowledge of wetlands (%)

Unless indicated otherwise, values show the percentage of respondents in each column group who answered 4 or 5 on a 5-point Likert scale. Tas., Tasmanian residents; Aus., Australian visitors residing outside the islands of Tasmania; NA, not applicable; OS, overseas visitors. The probability values are for a Chi-Square analysis relating the row variable to the column variable. For rows with $P < 0.05$, bold values show the highest value for origin

	Tas.	Aus.	OS	All	*P*-value	Know	Not	*P*-value
Know:								
Moulting Lagoon	**45**	13	8	20	<0.001	18	5	<0.001
Wetlands	**62**	43	35	47	0.001	NA	NA	NA
Mammals	31	17	23	23	0.22	35	12	<0.001
Birds	**56**	26	15	23	0.045	40	8	<0.001
Fish	**21**	19	**21**	20	0.027	26	14	<0.001
Vascular plants	23	15	10	17	0.06	25	10	<0.001
Crabs and snails	8	**15**	13	13	0.033	17	9	<0.001
Cryptogams	16	11	8	12	0.149	16	9	<0.001
Insects and spiders	8	7	6	7	0.41	13	1	<0.001
Coastal protection	25	19	18	21	0.308	37	6	<0.001
Water quality	**26**	18	16	20	0.039	33	8	<0.001
Habitat	19	13	14	15	0.167	28	3	<0.001
Flood buffer	13	**15**	11	13	0.014	26	3	<0.001
Cultural service	17	11	10	13	0.623	23	3	<0.001
Fish nursery	15	12	8	12	0.368	24	2	<0.001
Carbon sink	13	11	10	12	0.082	20	4	<0.001
Want to know more about:								
Birds	60	48	54	52	0.161	55	51	0.405
Mammals	43	41	56	45	0.132	41	47	0.259
Vascular plants	53	39	43	44	0.1	45	43	0.673
Fish	40	41	49	42	0.468	43	42	0.782
Cryptogams	**45**	27	27	33	0.004	37	28	0.086
Insects and spiders	**28**	27	16	22	0.047	30	16	0.003
Crabs and snails	**28**	16	27	22	0.047	22	22	0.955
Water quality	51	33	**54**	42	0.002	37	47	0.081
Coastal protection	**49**	33	46	40	0.026	37	43	0.31
Cultural service	42	34	43	38	0.292	44	34	0.057
Carbon sink	**49**	30	40	38	0.008	41	36	0.385
Habitat	40	34	43	37	0.425	39	36	0.529
Fish nursery	36	31	30	33	0.613	31	35	0.415
Flood buffer	31	26	22	27	0.402	27	27	0.966
Interested in:								
Photography	57	60	38	75	0.182	59	64	0.756
Trail walking	76	66	61	70	0.622	71	68	0.024
Camping	**61**	42	38	47	0.032	48	46	0.209
Cultural interpretation	46	41	34	41	0.086	44	39	0.653
Kayaking	42	36	30	37	0.32	42	32	0.392
Bird watching	42	31	30	34	0.714	45	24	0.001
Guided tours	24	**35**	34	32	0.029	25	30	0.287
Boat cruises	24	32	33	31	0.165	25	37	0.016
Citizen science	29	21	33	26	0.447	29	23	0.2
Fishing	32	18	22	23	0.177	24	23	0.12
Duck hunting	**8**	3	**8**	6	0.042	5	7	0.114
Desire:								
Walking tracks	75	76	79	76	0.133	73	79	0.586
Toilets	64	71	78	71	0.201	62	65	0.142
Viewing platforms	74	71	**78**	70	0.05	67	73	0.404
Panels	59	68	72	66	0.559	67	64	0.269
Water refill station	59	55	71	57	0.06	52	62	0.007
Rubbish bin	45	51	62	51	0.319	42	59	0.006
Information centre	23	51	**64**	45	<0.001	34	55	0.001
Vehicle tracks	32	38	**55**	42	0.034	32	50	0.001
Campsite	29	30	33	33	0.441	32	35	0.778
Picnic tables	28	32	36	31	0.182	29	35	0.659
Fire place	29	27	37	30	0.741	27	34	0.187

(*Continued*)

Table 3. (Continued)

	Tas.	Aus.	OS	All	*P*-value	Know	Not	*P*-value
Barbeque	29	27	38	30	0.937	11	24	0.019
Showers	21	25	24	24	0.576	20	27	0.022
Would like access to information from:								
Web	76	68	73	71	0.373	67	75	0.098
Brochures	60	53	49	54	0.39	59	50	0.123
Information panels	47	43	38	44	0.5	47	40	0.231
App	27	31	35	31	0.581	29	32	0.642
Video clips	27	21	27	24	0.471	21	27	0.189
Guided tours	24	23	27	24	0.78	20	28	0.086
Books	**20**	9	13	13	0.037	17	10	0.056

invertebrates and cryptogams (Fig. 2*a*). A greater proportion of Tasmanian respondents believed that they knew the wetland birds well compared with respondents from elsewhere, but the reverse pertained to crabs and snails (Table 3).

Among wetland ecosystem services, there was moderate knowledge of coastal protection, water quality and habitat for biodiversity, with lesser knowledge of other services (Fig. 3*b*). More Tasmanian respondents felt that they understood the role of wetlands in improving water quality than respondents from elsewhere and more mainland respondents felt that they understood the flood mitigation role of wetlands than respondents from elsewhere (Table 3). More of those in the older age groups felt that they understood coastal protection values, flood protection values, cultural values and carbon storage values than those in the younger age groups.

Expressed interest in wetland biodiversity and ecosystem services

Most participants (52%) indicated that they were interested in birds. Apart from birds, participants were most interested in mammals, plants and fish, with some interest expressed in cryptogams, namely algae and fungi (Table 3). Participants were least interested in crabs and snails and insects and spiders. Among ecosystem services, participants expressed similar levels of interest across most of the listed services (Table 3), with notably less interest shown in the flood buffering service.

Tasmanian respondents wanted to know more about insects and spiders, cryptogams, crabs and snails, coastal protection and carbon sink services than mainland and overseas respondents, whereas overseas tourists wanted to learn more about water quality than respondents from elsewhere (Table 3). Both older and younger people wanted to know about birds and carbon sink service more than middle-aged people, whereas younger people wanted to know more about water quality than the older (Table 4). White collar workers wanted to know more about insects and spiders than the other occupational groups, whereas students were prominent in wanting to know more about cultural services (Table 5).

Expressed interest in visiting wetlands, wetland recreational activities, facilities and communication media

Most participants (95%) stated that they would like to visit Moulting Lagoon, and an even higher number (97%) stated that they would like to visit wetland areas in the future. In terms of wetland recreational activities, most participants expressed interest in trail walking and photography (Fig. 3*a*). Participants were also interested in camping and cultural interpretation. A high number of participants expressed ‘very low’ interest in duck hunting (~79%). Several participants added a ‘0’ or a ‘–1’ next to the Likert scale in the survey form to express their disinterest in (or dislike of) this activity.

Tasmanians were more interested in camping and less interested in guided tours than mainland and overseas tourists, whereas the few duck hunters were concentrated among Tasmanians and overseas tourists (Table 3). Kayaking and duck hunting were concentrated in the younger age groups, whereas bird watching was a more prominent activity among the older (Table 4). Camping, fishing, and duck hunting drew most interest from blue collar workers (Table 5). Most participants noted walking tracks and viewing platforms as important facilities if they were to visit wetlands for recreational purposes (Fig. 3*b*). Participants were less interested in having barbeque stations and showers on-site. Viewing platforms, information centres and vehicle tracks were most desired by overseas tourists (Table 3). There was no significant differentiation in desired facilities between age or occupational groups (Tables 4, 5).

Most participants (71%) chose ‘website’ as their preferred media platform for information on the natural and recreational values of wetlands (Fig. 4). Over half (54%) the participants chose ‘brochures’ as their preferred platform for obtaining information. Information panels were also popular (42%). In comparison, fewer participants (13%) chose ‘books’ as their preferred source of information. Books were preferred more by Tasmanians than mainland or overseas tourists as a way of gaining information (Table 3). There was no variation by age group or occupation in preference for communication mode (Tables 4, 5).

Discussion

Awareness of a Ramsar site

Although the Ramsar nomination of a wetland site signifies its natural significance, the present study indicates that the status itself does not guarantee public awareness and visitation. In our case study area, survey participants had driven past, unaware of the Moulting Lagoon Ramsar site (and the adjoining Apsley Marshes Ramsar site), to access the Freycinet NP and were

Table 4. Survey responses by age

Values show the percentage of respondents in each age group who answered positively to the item (i.e. those who circled 4 or 5 on a 5-point Likert scale). The probability values are for a Chi-Square analysis relating the row variable to age group. For rows with $P < 0.05$, bold values show the highest value for an age group

	Age group (years)						All	*P*-value
	18–25	26–35	36–45	46–55	56–65	>65		
Know:								
Moulting Lagoon	19	12	5	19	**50**	40	20	<0.001
Wetlands	40	40	53	34	56	**72**	47	0.007
Mammals	21	18	37	21	38	26	23	0.051
Birds	23	16	19	26	31	42	23	0.08
Fish	17	15	14	29	**34**	25	20	0.021
Vascular plants	17	15	14	24	28	9	17	0.173
Crabs and snails	9	7	9	**28**	19	16	13	0.003
Cryptogams	9	11	12	15	19	13	12	0.83
Insects and spiders	11	6	5	4	9	9	7	0.571
Coastal protection	13	16	20	26	**34**	25	21	0.018
Water quality	15	17	10	32	32	25	20	0.154
Habitat	15	11	14	20	16	22	15	0.688
Flood buffer	6	12	16	**20**	19	12	13	0.018
Cultural service	11	7	11	15	**25**	22	13	0.032
Fish nursery	6	7	16	17	19	19	12	0.129
Carbon sink	4	12	13	17	12	**25**	12	0.045
Want to know more about:								
Insects and spiders	15	22	28	20	22	34	23	0.377
Mammals	43	49	47	37	41	44	44	0.836
Birds	68	43	41	52	63	**69**	52	0.006
Crabs and snails	19	22	24	15	19	37	22	0.274
Fish	40	45	52	35	31	44	42	0.39
Vascular plants	42	50	38	37	53	41	44	0.486
Cryptogams	25	39	26	37	28	34	33	0.358
Habitat	30	36	48	30	41	41	37	0.368
Fish nursery	26	32	40	33	28	34	33	0.765
Carbon sink	**53**	41	24	22	**53**	37	38	0.003
Flood buffer	36	26	29	22	25	19	27	0.524
Water quality	49	**53**	38	30	31	31	42	0.028
Coastal protection	43	40	41	37	44	34	40	0.956
Cultural service	43	38	34	46	31	34	38	0.719
Interested in:								
Trail walking	79	78	74	72	87	66	76	0.792
Photography	60	67	59	61	59	50	62	0.434
Camping	59	52	48	41	27	28	47	0.134
Cultural interpretation	41	36	45	35	47	56	41	0.122
Kayaking	**51**	41	31	39	31	12	37	0.011
Bird watching	21	34	26	33	**53**	**53**	34	0.018
Boat cruises	30	26	36	33	41	31	32	0.468
Guided tours	25	21	34	23	35	21	28	0.238
Citizen science	19	30	24	24	34	22	26	0.084
Fishing	19	29	14	20	22	38	23	0.184
Duck hunting	**4**	**11**	5	2	0	0	6	0.007
Desire:								
Walking tracks	79	79	74	70	77	76	76	0.792
Viewing platforms	64	75	71	62	74	75	71	0.087
Panels	47	68	50	67	91	72	66	0.056
Toilets	68	55	67	65	75	62	63	0.182
Water refill station	58	60	52	59	62	50	57	0.596
Information centre	26	47	48	52	63	57	56	0.107
Rubbish bin	53	50	50	52	55	50	51	0.395
Vehicle tracks	45	45	38	37	37	37	42	0.605
Campsite	36	37	33	32	20	31	33	0.253

(*Continued*)

Table 4. (Continued)

	Age group (years)						All	*P*-value
	18–25	26–35	36–45	46–55	56–65	>65		
Picnic tables	25	31	24	28	50	46	32	0.363
Fire place	26	32	29	37	31	19	30	0.442
Showers	15	26	28	22	24	25	24	0.931
Barbeque	17	21	14	13	22	19	18	0.836
Would like access to information through:								
Brochures	53	50	53	52	66	66	54	0.491
Books	13	16	9	9	19	13	13	0.613
Web	71	72	76	61	78	66	71	0.507
App	23	33	38	30	37	16	31	0.186
Video clips	32	20	28	20	25	25	24	0.59
Information panels	38	47	43	43	50	38	44	0.826
Guided tours	15	21	28	35	25	25	24	0.285

within 20 km of the lagoon at the time of surveying (Fig. 1). Even respondents whose surveys were collected from the River and Rocks Campsite, which is located right on the boundary of Moulting Lagoon, did not know of its location. This is a sobering finding considering the size, location and proximity of the lagoon to Tasmania's most visited NP (Fig. 1) and the fifth most visited attraction (Discover Tasmania 2021). This lack of awareness and interest in this Ramsar wetland, despite its setting, has implications for the long-term conservation of wetlands in general (Prahalad and Kriwoken 2010). Public awareness of wetlands is crucial to their wise use by balancing conservation against long-term degradation and loss of wetland values (Brock *et al.* 1999; Finlayson and Rea 1999; Nam *et al.* 2010; Meng *et al.* 2017). Awareness can also increase public support for wetland conservation through avenues such as media coverage, direct action, policy, legislation, funding and research (Reddy and Char 2006; Duarte *et al.* 2008; Boon 2012).

The CEPA program of the Ramsar Convention recognises the important role of public awareness (Finlayson *et al.* 2011; Ramsar Convention Secretariat 2015). However, there has been an implementation gap in realising CEPA aims and outcomes, as demonstrated in the present case. The 2003 Moulting Lagoon Management Plan has as one of its aims to 'promote the reserve for ecotourism, interpretation and education' (Parks and Wildlife Service 2007, p. 23). The plan intends to provide '[more] interpretive displays with information on the values, Ramsar listing, appropriate recreational activities and … a bird hide/nature walk at Pelican Rocks… [and] promoting the reserve for ecotourism, interpretation and education' (Parks and Wildlife Service 2007, p. iv). This plan has been in effect for 18 years, yet, as a consequence of implementation failure (Prahalad and Kriwoken 2010), visitors to the region are largely unaware of or uninterested in visiting the lagoon.

This failure appears to be a common problem in other Ramsar sites. In the study of Polajnar (2008) in Slovenia, 77% of respondents did not know of the Ramsar Convention despite living in a Ramsar site. Ibrahim *et al.* (2012) reported similar findings in the context of Malaysia's oldest Ramsar site. Do *et al.* (2015*a*, 2015*b*) also found that having a Ramsar status does not guarantee awareness of and visitation to South Korean Ramsar wetlands. Internet search behaviour indicates that the level of visitation is strongly correlated with mentions in news articles. For example, public interest in wetlands increased following the 10th Conference of the Convention on Wetlands (Ramsar Convention) in Changwon, South Korea in 2008, as well as after a new wetland area was designated as a Ramsar site. After the Conference had finished, the level of public interest in wetlands decreased significantly, because of reduced media exposure (Do *et al.* 2015*b*). These findings, combined with our results, reiterate the ongoing need for the Ramsar CEPA activities to move beyond prescriptions (as listed under Goals 1–9 in the Ramsar Convention Secretariat 2015, pp. 6–9) to funding commitments (e.g. for visitor facilities) and institutional support (e.g. information resources, publicity campaigns). Our assessment of opportunities and orientation (discussed below) provides a set of specific targets and indicators that can be used to measure progress.

General knowledge of wetland biodiversity and ecosystem services

In addition to a lack of recognition of Ramsar wetlands, the present study also confirmed a general lack of understanding of wetlands biodiversity and ecosystem services (Fig. 2*a*). Our participant knowledge of wetland biodiversity largely followed size and relatability attributes, with the 'charismatic' vertebrates such as mammals and birds being better known than the more diminutive cryptograms, algae and fungi. Furthermore, responses to our questions asking participants about their interest in learning about wetlands indicated a willingness to know more about birds, followed by mammals, again with relatively lesser interest shown in invertebrates and cryptograms. These findings conform with existing literature on the apparent bias towards larger and more recognisable 'iconic' vertebrate animals (Ainsworth *et al.* 2018; Braby 2018; Eisenhauer *et al.* 2019), reiterating the need to improve awareness of invertebrates and cryptograms (Hart and Sumner 2020).

Among ecosystem services, this study showed that participants were least knowledgeable about the role of wetlands as carbon sinks, fish nurseries, cultural sites and flood buffers (Fig. 2*b*). As the consequences and causes of global warming, and their relationships to wetlands, become more apparent

Table 5. Survey responses by occupation

Unless indicated otherwise, values show the percentage of respondents in each occupational group who answered positively to the item (e.g. those who circled 4 or 5 on a 5-point Likert scale). The probability values are for a Chi-Square analysis relating the row variable to age group. For rows with $P < 0.05$, bold values show the highest value for an occupational group

	Occupation					All	*P*-value
	Blue collar	Professional	Retired	Student	White collar		
Know:							
Moulting Lagoon	13	15	**54**	15	20	20	0.005
Wetlands	49	51	62	33	47	48	0.065
Mammals	21	21	26	15	33	24	0.077
Birds	17	24	29	23	26	24	0.551
Fish	21	21	18	19	19	20	0.267
Vascular plants	17	19	9	21	17	17	0.197
Cryptogams	11	11	6	18	16	13	0.214
Crabs and snails	17	13	9	13	11	12	0.097
Insects and spiders	9	7	0	5	9	7	0.653
Coastal protection	15	26	27	21	19	22	0.053
Water quality	15	24	21	21	20	21	0.225
Habitat	17	20	9	13	14	16	0.483
Flood buffer	8	21	12	8	12	14	0.176
Cultural service	11	14	15	13	15	14	0.402
Fish nursery	15	15	9	8	10	12	0.518
Carbon sink	9	16	15	8	10	12	0.335
Want to know more about:							
Birds	45	57	65	49	51	53	0.378
Vascular plants	40	46	41	44	46	44	0.958
Mammals	40	43	26	49	49	43	0.217
Fish	40	40	38	41	49	43	0.702
Cryptogams	38	32	32	26	37	33	0.699
Insects and spiders	17	29	21	8	**31**	24	0.029
Crabs and snails	15	20	29	26	27	23	0.411
Water quality	43	37	38	54	52	44	0.198
Coastal protection	30	42	38	49	43	41	0.445
Cultural service	26	43	24	**54**	44	40	0.016
Carbon sink	32	46	41	49	32	40	0.183
Habitat	30	45	35	28	40	38	0.263
Fish nursery	36	26	32	26	41	32	0.258
Flood buffer	26	33	21	26	28	28	0.701
Interested in:							
Trail walking	74	75	53	79	75	70	0.13
Photography	68	64	41	59	65	61	0.521
Camping	**64**	40	39	56	49	48	0.039
Cultural interpretation	38	40	50	49	44	44	0.678
Kayaking	51	27	18	24	45	38	0.237
Bird watching	36	29	47	23	33	33	0.175
Boat cruises	32	28	29	31	35	31	0.845
Guided tours	21	32	26	15	36	28	0.314
Citizen science	23	27	18	31	27	26	0.526
Fishing	**34**	14	32	26	20	23	0.021
Duck hunting	**17**	2	0	5	5	6	0.024
Desire:							
Walking tracks	74	77	74	90	73	77	0.64
Viewing platforms	68	64	76	69	65	70	0.194
Panels	55	64	73	54	70	64	0.505
Toilets	66	66	56	62	58	62	0.133
Water refill station	70	59	50	49	53	57	0.527
Rubbish bin	58	45	50	46	53	50	0.755
Information centre	47	47	41	33	46	45	0.861
Vehicle tracks	45	39	30	38	43	40	0.405
Campsite	49	33	35	28	30	34	0.222

(*Continued*)

Table 5. (Continued)

	Occupation					All	*P*-value
	Blue collar	Professional	Retired	Student	White collar		
Picnic tables	38	30	44	31	23	31	0.263
Fire place	40	29	24	23	28	29	0.142
Showers	38	22	21	15	25	24	0.296
Barbeque	28	16	21	18	15	18	0.741
Would like access to information sources:							
Web	60	79	74	74	70	72	0.192
Brochures	60	46	68	56	56	55	0.238
Information panels	38	45	47	54	47	46	0.708
App	32	28	15	33	38	31	0.155
Video clips	17	21	21	41	25	24	0.098
Guided tours	11	22	32	26	31	24	0.086
Books	11	12	9	21	15	13	0.547

(e.g. Conifer 2015), we expected that there would be some awareness of the role of wetlands play as 'blue carbon' sinks. However, our participants, apart from the older demographic (age >65 years), were least knowledgeable on this topic. In addition, despite the increasing recognition of the need to sustain our wild-catch fisheries and research documenting the importance of seagrass and saltmarsh wetland habitats (Whitfield 2017), fish nursery service was reported as the second least-well-known ecosystem service across all demographics. The relatively higher awareness we documented of the coastal protection and water quality services is reflected in other studies (e.g. Dias and Belcher 2015) and is likely explained by popular media coverage of these issues (e.g. extreme weather events and the role of coastal wetlands; urban wetlands for filtering storm water).

Despite a lack of wetland knowledge, participants had considerable interest in learning more about wetland attributes. More than 20% of participants were even interested in the less charismatic insects, spiders, algae and fungi (Table 4). This finding suggests a receptive audience for outreach and engagement activities that focus on these life forms. There was also considerable interest in learning more about the broad spectrum of wetland ecosystem services, especially about water quality, coastal protection, carbon sink and cultural services (Tables 3, 4). Participants were particularly interested in cultural interpretation of wetlands, a service that is now increasingly being recognised as important (e.g. Yorta Yorta Traditional Owner Land Management Board 2020) and sought after by visitors to our study area. These findings reiterate the need for ongoing education on the ecosystem services provided by wetlands, including their cultural services (Clarke *et al.* 2021), starting at the school level, and more broadly across the community (Finlayson *et al.* 2013; Ibrahim *et al.* 2012; Goals 6 and 8, Ramsar Convention Secretariat 2015, pp. 8–9).

Opportunities: wetland recreational activities and on-site facilities

The high level of interest we found in trail walking, photography, camping and cultural interpretation contrasted with a considerable lack of interest in duck hunting (Fig. 3*a*). Duck hunting at Moulting Lagoon has a long history of controversy, leading to the area being designated as a 'game reserve' in 1988 (Parks and Wildlife Service 2007). Duck hunting season runs from March until early June each year in Tasmania and is met with regular protests from animal welfare groups and activists (Drummond 2017; Zhou 2019). Supporters of duck hunting often argue that it is a tradition that dates to early European settlement, and the Moulting Lagoon Management Plan even suggested that any actions restricting hunting must be 'carefully considered and implemented in consultation with the [local] residents' (Parks and Wildlife Service 2007, p. 19). Our study found that most of the respondents are not interested in or are hostile to duck hunting (Fig. 3*a*). Considering this finding, the current designation of the Lagoon as a game reserve may indeed signify a limited and narrow use for the area, thereby restricting its potential to attract a broader range of visitors. In practical terms, promoting the preferred trail walking and photography activities during the duck hunting season is obviously undesirable for safety reasons.

The Ramsar Conference of the Parties has acknowledged in their 2012 resolution that, in addition to recognising the opportunities for sustainable tourism in Ramsar wetlands, without appropriate regulations and infrastructure, tourism in wetlands sites could have detrimental effects (Ramsar Convention Secretariat 2012). The need to balance sustainable tourism in wetland areas with ecological conservation has been considered for several wetlands (e.g. Kairu 2001; Khoshkam *et al.* 2014). In this context, the preference of our participants for non-extractive and non-commodified recreational activities over extractive uses such as fishing, duck hunting and commodified activities such as boat cruises and guided tours (Fig. 3*a*) has relevance. There is a potential for creating place-based opportunities for connecting with nature in wetlands, by shooting with cameras rather than guns (Crusz 1973) and by not having to pay for 'adventures' (Cloke and Perkins 2002). The strong preference for trail walking was also evident in our participants rating walking tracks and viewing platforms as being the two most important on-site facilities (Fig. 3*b*). Walking trails and viewing platforms not only provide visitors with access to wetland sites (Bacon 1987), but they can also guarantee the security of visitors, as well as ensure ecological protection (Lu *et al.*

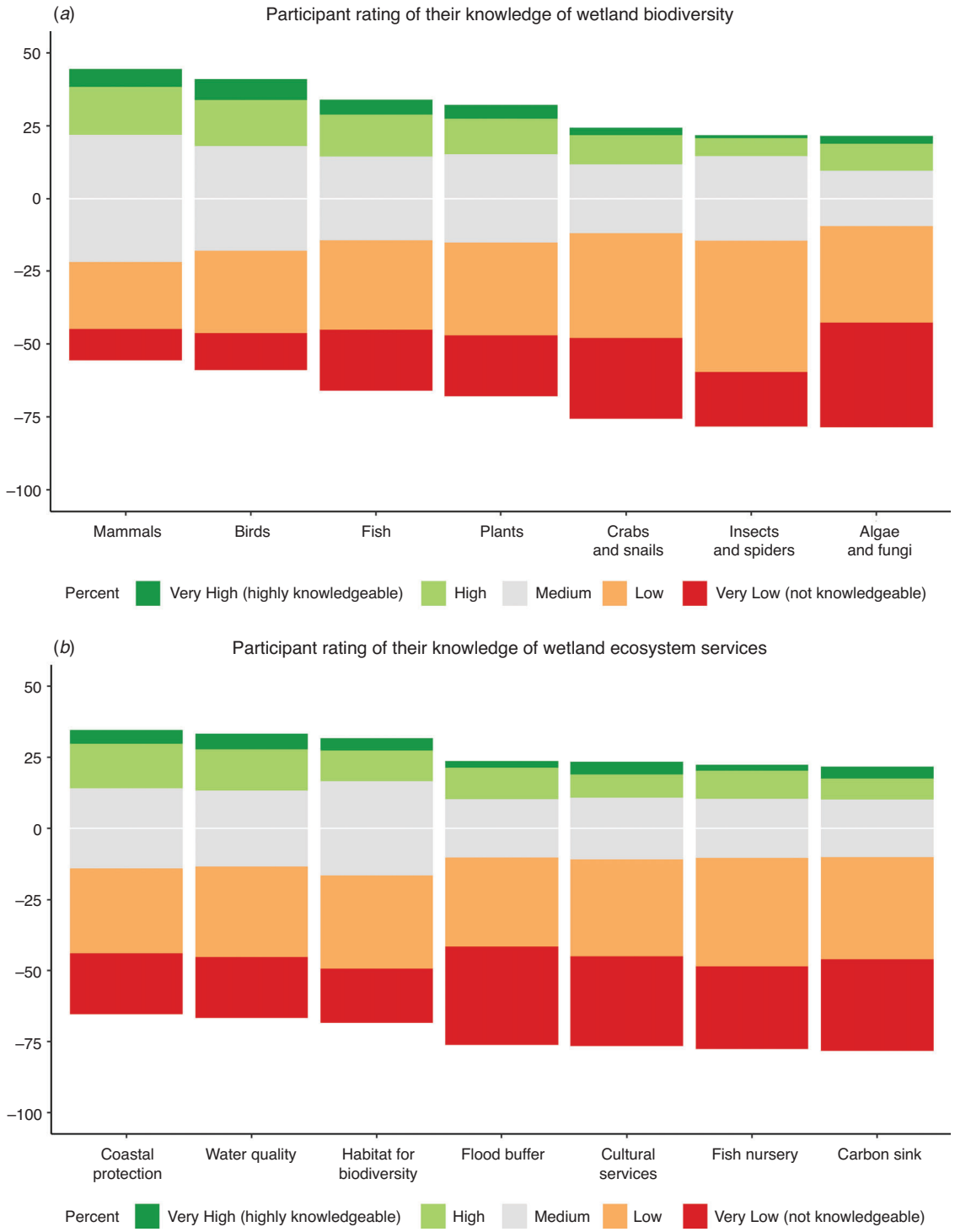

Fig. 2. Survey participants' ($n = 326$) ratings of their knowledge of wetland (*a*) biodiversity and (*b*) ecosystem services.

2009). In this context, the Association of State Wetland Managers from the US has suggested that physical threats to wetlands from ecotourism can be minimised because tourists 'rarely venture into wetlands except on trails or boardwalks due to dense vegetation, surface water, deep organic soils, and a fear of snakes and other animals' (Kusler 2006, p. 3). This infrastructure can also be effectively combined with basic services related to visitors' interests, such as information panels and guidance for photography (Pan *et al.* 2010).

The high demand of participants for information panels and an information centre (Fig. 3*b*) further demonstrates a desire to learn more about wetlands. In particular, visitors who did not

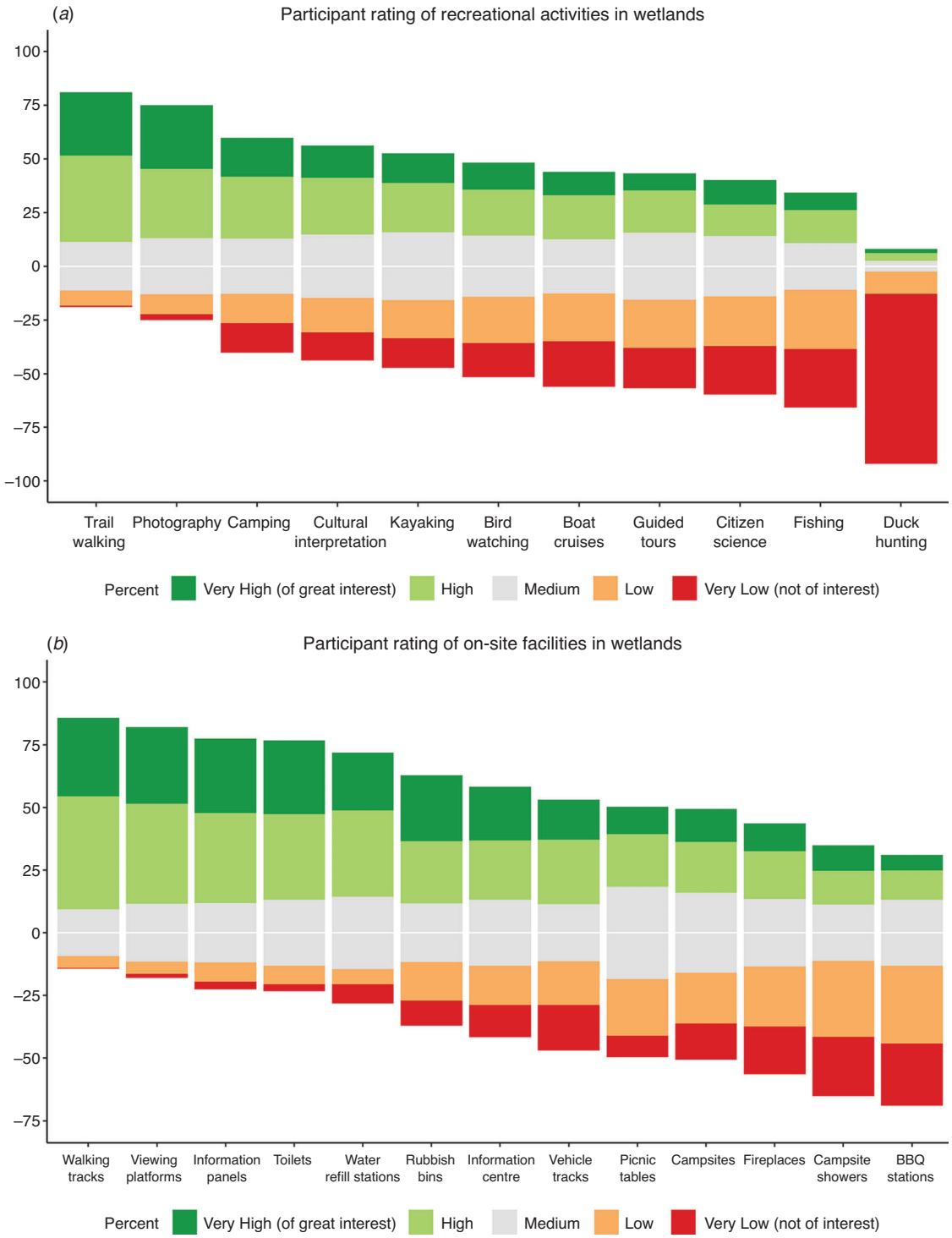

Fig. 3. Survey participants ($n = 326$) rating of (*a*) recreational activities and (*b*) on-site facilities in wetlands.

know much about wetlands had a higher level of demand for on-site facilities, such as information centre, vehicle tracks, water refill stations and rubbish bins (Table 3), highlighting the importance of a visitor centre for engaging this demographic. The lower desire for the construction of on-site facilities from people who know more about wetlands may be due to their desire to keep Moulting Lagoon and other wetlands in their natural state (Zhang and Lei 2012). Comments left by participants in the survey included:

> Ensure that biodiversity is relatively unaffected by tourist interaction.

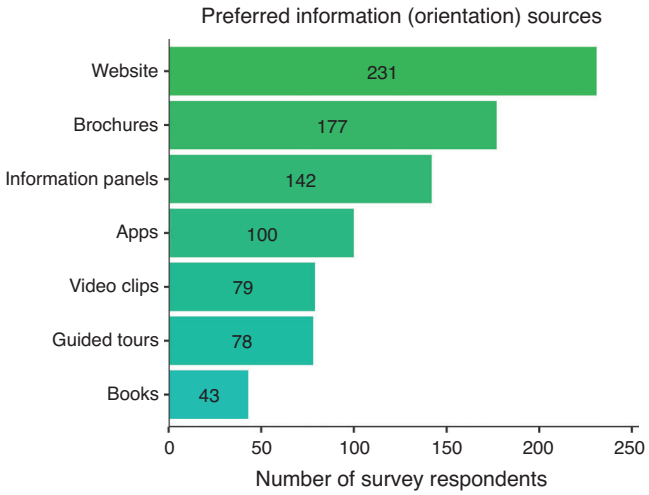

Fig. 4. Preferred sources of information on wetlands (or orientation towards wetlands) identified by the survey respondents.

> All ability to visit must be of low impact on the wetland.
>
> Though I have selected 'tracks' etc., they should also be minimal to confine disturbance.

With these concerns expressed by many of our survey participants, further impact assessment studies are required to balance the need to expand wetland CEPA activities and on-site facilities with consideration of ecological and social values.

Orientation: public preference for communication on wetlands

Reid *et al.* (2008) found that people often lack awareness of recreational opportunities that protected areas can offer due to difficulties in navigating parks information systems. We have shown that our participants were very interested in visiting wetlands, but a lack of easy access to information is preventing people from even knowing that there is a destination there in the first place. The Tasmanian Parks and Wildlife Service provides a brief summary of the lagoon and the management plan on their official website, but no photographs are provided of the site (Parks and Wildlife Service 2008). The website provides a bird checklist for birdwatchers but does not offer detailed information for other recreational activities. Even the newly renovated and highly popular visitor centre for Freycinet NP lacks information relating to Moulting Lagoon. More generally, other popular tourist websites mention the lagoon and its bird watching potential briefly (Discover Tasmania 2021), but no detailed information is provided about how to access the site. In effect, the recreational and environmental values of this Ramsar site are largely unknown to people other than small groups of hunters, fishers and birdwatchers (Prahalad 2017).

In an effort to bridge this information gap, we have quantified the preferred information (or orientation) sources regarding recreational opportunities and knowledge of wetlands (Fig. 4). The overwhelming preference for web-based communication reaffirms previous findings. The effectiveness of Internet- and social media-focused marketing strategies for ecotourism has been well researched in the past (Lai and Shafer 2005; Luo *et al.* 2005; Donohoe and Needham 2008; Reid *et al.* 2008; Sangpikul 2010; Cheng *et al.* 2017). For example, Luo *et al.* (2005) and Sangpikul (2010) found that the Internet is a major travel planning and marketing tool. Reid *et al.* (2008) found official protected area websites, brochures and Internet advertising to be the most popular and effective communication tools. However, Weaver and Lawton (2011), in their study of source of visitors awareness of a low-profile forest, found that word of mouth, brochures and highway signs were more useful than the Internet, indicating the importance of a range of information sources.

Brochures were also popular among our participants. Currently there are no accessible printed brochures to inform visitors about Moulting Lagoon and its recreational opportunities, such as bird watching and camping. One recent brochure designed by the local Glamorgan Spring Bay Council is not well circulated and is unavailable from the Freycinet Visitor Centre. This brochure provides information on birds and plants found in Moulting Lagoon, and briefly talks about the Ramsar Convention and the Aboriginal heritage values of the Lagoon (Glamorgan Spring Bay Council 2016). Given that brochures have been both widely recommended for increasing orientation towards wetlands (Dunmire 1994; Polajnar 2008), are inexpensive to produce and are popular among our participants, they could be made more available and accessible to visitors to Tasmania and Freycinet NP and be distributed in popular tourist destinations, such as visitor centres, as well as in entry points, such as airports (e.g. Magical Places – 40 Wetlands to Visit in New Zealand brochure, Department of Conservation (New Zealand Government) 2012).

Conclusion

The Ramsar Convention on Wetlands has been striving to increase the public profile of wetlands and their conservation for 50 years now. Yet, as we have documented in this paper, there remains a large implementation gap in realising the CEPA objectives, as illustrated by the case of Moulting Lagoon Ramsar site. Ongoing efforts to conserve wetlands require both opportunities to have place-based experiences in these environments and effective communication of these opportunities. The fact that there is very little sociodemographic variation in preferences for on-site activities, infrastructure and communication mode is of interest both to the Tasmanian stakeholders and their global counterparts, as is the nature of the few differences. Visitors' strong preferences for treading lightly, their interest in learning more about wetlands, including the invertebrates and cryptograms, and their interest in Aboriginal cultural interpretation all point to rich and diverse opportunities to provide place-based experiences in these under-recognised ecosystems. In addition, the low costs associated with the preferred communication media of Internet and brochures indicate the likely ease with which the necessary orientation towards wetlands can be achieved.

Authors' contributions

Conception, design and framing of the study: V. Prahalad, X. Wang, J. B. Kirkpatrick; acquisition of approvals: X. Wang, V. Prahalad; data collection: X. Wang; data curation, analysis, visualisation and interpretation: X. Wang, J. B. Kirkpatrick, V.

Prahalad; Writing, first draft: X. Wang; writing, revisions: V. Prahalad, J. B. Kirkpatrick; project supervision: V. Prahalad; approval of the final version of the manuscript: X. Wang, V. Prahalad, J. B. Kirkpatrick.

Data availability

Data can be made available upon request.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Declaration of funding

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References

Ainsworth, G. B., Fitzsimons, J. A., Weston, M. A., and Garnett, S. T. (2018). The culture of bird conservation: Australian stakeholder values regarding iconic, flagship and rare birds. *Biodiversity and Conservation* **27**(2), 345–363. doi:10.1007/S10531-017-1438-1

Australian Bureau of Statistics (2017). 2016 Census QuickStats: Coles Bay. Available at https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/SSC60121#:~:text=People%20%E2%80%94%20demographics%20%26%20education&text=In%20the%202016%20Census%2C%20there,up%201.1%25%20of%20the%20population.&text=The%20median%20age%20of%20people,State%20Suburbs)%20was%2053%20years [Verified 1 April 2022].

Bacon, P. R. (1987). Use of wetlands for tourism in the insular Caribbean. *Annals of Tourism Research* **14**(1), 104–117. doi:10.1016/0160-7383(87)90050-8

Bergstrom, J. C., and Stoll, J. R. (1993). Value estimator models for wetlands-based recreational use values. *Land Economics* **69**, 132–137. doi:10.2307/3146513

Boon, P. I. (2012). Coastal wetlands of temperate eastern Australia: will Cinderella ever go to the ball? *Marine and Freshwater Research* **63**(10), 845–855. doi:10.1071/MF12205

Braby, M. F. (2018). Threatened species conservation of invertebrates in Australia: an overview. *Austral Entomology* **57**(2), 173–181. doi:10.1111/AEN.12324

Brock, M. A., Smith, R. G. B., and Jarman, P. J. (1999). Drain it, dam it: alteration of water regime in shallow wetlands on the New England Tableland of New South Wales, Australia. *Wetlands Ecology and Management* **7**(1), 37–46. doi:10.1023/A:1008416925403

Carlsson, F., Frykblom, P., and Liljenstolpe, C. (2003). Valuing wetland attributes: an application of choice experiments. *Ecological Economics* **47**, 95–103. doi:10.1016/J.ECOLECON.2002.09.003

Cheng, M., Wong, I. A., Wearing, S., and McDonald, M. (2017). Ecotourism social media initiatives in China. *Journal of Sustainable Tourism* **25**(3), 416–432. doi:10.1080/09669582.2016.1214141

Chiu, L., and Kriwoken, L. (2003). Managing recreational mountain biking in Wellington Park, Tasmania, Australia. *Annals of Leisure Research* **6**(4), 339–361. doi:10.1080/11745398.2003.10600931

Clarke, B., Thet, A. K., Sandhu, H., and Dittmann, S. (2021). Integrating Cultural Ecosystem Services valuation into coastal wetlands restoration: A case study from South Australia. *Environmental Science & Policy* **116**, 220–229. doi:10.1016/J.ENVSCI.2020.11.014

Cloke, P., and Perkins, H. C. (2002). Commodification and adventure in New Zealand tourism. *Current Issues in Tourism* **5**(6), 521–549. doi:10.1080/13683500208667939

Conifer, D. (2015). Wetlands, swamps 'hold great potential' to store carbon, fight climate change. In *ABC News*, 16 February 2015. Available at https://www.abc.net.au/news/2015-02-16/australian-researchers-believe-swamps-could-fight-climate-change/6107624 [Verified 20 April 2019].

Convention on Wetlands (2021). 'Global wetland outlook: special edition 2021.' (Secretariat of the Convention on Wetlands: Gland, Switzerland.)

Crusz, H. (1973). Nature conservation in Sri Lanka (Ceylon). *Biological Conservation* **5**(3), 199–208. doi:10.1016/0006-3207(73)90012-8

de Groot, R., Wilson, M. A., and Davidson, N. (2002). A typology for the classification, description and valuation of ecosystem functions, goods and services. *Ecological Economics* **41**, 393–408. doi:10.1016/S0921-8009(02)00089-7

Department of Conservation (New Zealand Government) (2012). Magical places – 40 wetlands to visit in New Zealand brochure. Available at https://www.doc.govt.nz/nature/habitats/wetlands/wetlands-by-region/magical-places-40-wetlands-to-visit-in-new-zealand-brochure/ [Verified 20 January 2022].

Department of Sustainability, Environment, Water, Populations and Communities (2011). Moulting Lagoon ecological character description. DSEWPaC, Canberra, ACT, Australia.

Dias, V., and Belcher, K. (2015). Value and provision of ecosystem services from prairie wetlands: A choice experiment approach. *Ecosystem Services* **15**, 35–44. doi:10.1016/J.ECOSER.2015.07.004

Diaz-Christiansen, S., López-Guzmán, T., Gálvez, J. C. P., and Fernández, G. A. M. (2016). Wetland tourism in natural protected areas: Santay Island (Ecuador). *Tourism Management Perspectives* **20**, 47–54. doi:10.1016/J.TMP.2016.07.005

Discover Tasmania (2021). Freycinet National Park. (Tourism Tasmania.) Available at https://www.discovertasmania.com.au/about/national-parks-and-wilderness/freycinet-national-park-wineglass-bay [Verified 1 April 2022].

Do, Y., Kim, S. B., Kim, J. Y., and Joo, G. J. (2015*a*). Wetland-based tourism in South Korea: who, when, and why. *Wetlands Ecology and Management* **23**, 779–787. doi:10.1007/S11273-015-9418-2

Do, Y., Kim, J. Y., Lineman, M., Kim, D., and Joo, G. (2015*b*). Using internet search behavior to assess public awareness of protected wetlands. *Conservation Biology* **29**, 271–279. doi:10.1111/COBI.12419

Donohoe, H. M., and Needham, R. D. (2008). Internet-based ecotourism marketing: evaluating Canadian sensitivity to ecotourism tenets. *Journal of Ecotourism* **7**(1), 15–43. doi:10.2167/JOE185.0

Drummond, A. (2017). Protesters take aim at Tasmanian duck season, which opens tomorrow. In *The Mercury*, 10 March 2017. Available at https://www.themercury.com.au/news/tasmania/protesters-take-aim-at-tasmanian-duck-season-which-opens-tomorrow/news-story/735b828e269409bb631d1dce622fe20f [Verified 1 April 2022].

Duarte, C. M., Dennison, W. C., Orth, R. J., and Carruthers, T. J. (2008). The charisma of coastal ecosystems: addressing the imbalance. *Estuaries and Coasts* **31**(2), 233–238. doi:10.1007/S12237-008-9038-7

Dunmire, K. M. (1994). The Coburg Wetland Self-guided Interpretive Trail: a case study in environmental interpretation planning. M.Sc. Thesis, Geosciences Department, Oregon State University, Corvallis, OR, USA.

East Coast Tasmania Tourism (2020). East Coast Tasmania Tourism Annual Report 2019–2020. Available at https://eastcoasttourism.com.au/wp-content/uploads/2020/10/East-Coast-Tasmania-Tourism-2019-2020-Annual-Report.pdf [Verified 11 January 2022].

Edgar, G. J., Barrett, N. S., and Graddon, D. J. (1999). A classification of Tasmanian estuaries and assessment of their conservation significance

using ecological and physical attributes, population and land use. Technical report number 2 TAFI, Hobart, Tas., Australia.

Eisenhauer, N., Bonn, A., and Guerra, C. A. (2019). Recognizing the quiet extinction of invertebrates. *Nature Communications* **10**(1), 50. doi:10.1038/S41467-018-07916-1

Finlayson, C. M., and Rea, N. (1999). Reasons for the loss and degradation of Australian wetlands. *Wetlands Ecology and Management* **7**(1), 1–11. doi:10.1023/A:1008495619951

Finlayson, C. M., Davidson, N., Pritchard, D., Milton, G. R., and MacKay, H. (2011). The Ramsar Convention and ecosystem-based approaches to the wise use and sustainable development of wetlands. *Journal of International Wildlife Law and Policy* **14**(3–4), 176–198. doi:10.1080/13880292.2011.626704

Finlayson, C., Bartlett, M., Davidson, N., and McInnes, R. (2013). The Ramsar Convention and urban wetlands: an opportunity for wetland education and training. In 'Workbook for Managing Urban Wetlands in Australia'. (Eds S. Paul.) pp. 34–51. (Sydney Olympic Park Authority: Sydney, NSW, Australia.)

Glamorgan Spring Bay Council (2016). Moulting Lagoon: the lifeblood of the Freycinet Coast. (GSBC.) Available at http://gsbc.tas.gov.au/wp-content/uploads/2016/06/Moulting-Lagoon-Ramsar-Site-Brochure.pdf [Verified 11 October 2019].

Gürlük, S., and Rehber, E. (2008). A travel cost study to estimate recreational value for a bird refuge at Lake Manyas, Turkey. *Environmental Management* **88**, 1350–1360.

Hart, A. G., and Sumner, S. (2020). Marketing insects: can exploiting a commercial framework help promote undervalued insect species? *Insect Conservation and Diversity* **13**(2), 214–218. doi:10.1111/ICAD.12405

Hettiarachchi, M., Morrison, T. H., and McAlpine, C. (2015). Forty-three years of Ramsar and urban wetlands. *Global Environmental Change* **32**, 57–66. doi:10.1016/J.GLOENVCHA.2015.02.009

Hughes, M., and Morrison-Saunders, A. (2003). Visitor attitudes toward a modified natural attraction. *Society & Natural Resources* **16**(3), 191–203. doi:10.1080/08941920309160

Ibrahim, I., Aminudin, N., Young, M. A., and Yahya, S. A. I. (2012). Education for wetlands: Public perception in Malaysia. *Procedia: Social and Behavioral Sciences* **42**, 159–165. doi:10.1016/J.SBSPRO.2012.04.177

Kairu, J. K. (2001). Wetland use and impact on Lake Victoria, Kenya region. *Lakes and Reservoirs: Research and Management* **6**, 117–125. doi:10.1046/J.1440-1770.2001.00135.X

Khoshkam, M., Marzuki, A., and Arzjani, Z. (2014). Wetland capabilities in enhancing wetland tourism in Gandoman, Iran. *International Journal of Sustainable Development and Planning* **9**, 362–375. doi:10.2495/SDP-V9-N3-362-375

Kusler, J. A. (2006). Common questions: wetland and ecotourism. (Association of State Wetland Managers, Inc.) Available at https://www.aswm.org/pdf_lib/21_ecotourism_6_26_06.pdf [Verified 11 October 2019].

Lai, P. H., and Shafer, S. (2005). Marketing Ecotourism through the Internet: An Evaluation of Selected Ecolodges in Latin America and the Caribbean. *Journal of Ecotourism* **4**(3), 143–160. doi:10.1080/JET.V4.I3.PG143

Lu, Z., Li, Y., and Lu, J. (2009). Designing of scenic spots trail from the angle of ecological protection-a case study of Xixi national wetland park. *Journal of Sustainable Development* **2**(3), 166–171. doi:10.5539/JSD.V2N3P166

Luo, M., Feng, R., and Cai, L. A. (2005). Information search behavior and tourist characteristics: The internet vis-à-vis other information sources. *Journal of Travel & Tourism Marketing* **17**(2–3), 15–25.

Mackay, C. M., and Schmitt, M. T. (2019). Do people who feel connected to nature do more to protect it? A meta-analysis. *Journal of Environmental Psychology* **65**, 101323. doi:10.1016/J.JENVP.2019.101323

McInnes, R. J., Davidson, N. C., Rostron, C. P., Simpson, M., and Finlayson, C. M. (2020). A citizen science state of the world's wetlands survey. *Wetlands* **40**(5), 1577–1593. doi:10.1007/S13157-020-01267-8

Meng, W., He, M., Hu, B., Mo, X., Li, H., Liu, B., and Wang, Z. (2017). Status of wetlands in China: a review of extent, degradation, issues and recommendations for improvement. *Ocean and Coastal Management* **146**, 50–59. doi:10.1016/J.OCECOAMAN.2017.06.003

Millennium Ecosystem Assessment (2005). 'Ecosystems and Human Well-Being: wetlands and water synthesis.' (Island Press: Washington, DC, USA.)

Miller, J. R. (2005). Biodiversity conservation and the extinction of experience. *Trends in Ecology & Evolution* **20**(8), 430–434. doi:10.1016/J.TREE.2005.05.013

Nam, J., Ryu, J., Fluharty, D., Koh, C. H., Dyson, K., Chang, W. K., Choi, H. J., Kang, D., Khim, J. S., and Lee, C. H. (2010). Designation processes for marine protected areas in the coastal wetlands of South Korea. *Ocean and Coastal Management* **53**, 703–710. doi:10.1016/J.OCECOAMAN.2010.10.002

Newell, L. W., and Swallow, S. K. (2013). Real-payment choice experiments: valuing forested wetlands and spatial attributes within a landscape context. *Ecological Economics* **92**, 37–47. doi:10.1016/J.ECOLECON.2012.08.008

Pan, L., Cui, L., and Wu, M. (2010). Tourist behaviors in wetland park: a preliminary study in Xixi National Wetland Park, Hangzhou, China. *Chinese Geographical Science* **20**(1), 66–73. doi:10.1007/S11769-010-0066-4

Parks and Wildlife Service (2007). Moulting Lagoon Game Reserve (Ramsar Site) Management Plan 2003. Department of Tourism, Arts and the Environment, Hobart, Tas., Australia.

Parks and Wildlife Service (2008). Moulting Lagoon Game Reserve. (PWS Tasmania.) Available at https://www.parks.tas.gov.au/index.aspx?base=4319 [Verified 11 October 2019].

Parks and Wildlife Service (2013). Tamar Island. (PWS Tasmania.) Available at https://www.parks.tas.gov.au/?base=1392 [Verified 11 October 2019].

Polajnar, K. (2008). Public awareness of wetlands and their conservation. *Acta Geographica Slovenica* **48**(1), 121–146. doi:10.3986/AGS48105

Prahalad, V. (2017). Talking Point: Coast lovers usually ignore the riches behind our beaches. In *The Mercury*, 25 March 2017. Available at: https://www.themercury.com.au/news/opinion/talking-point-coast-lovers-usually-ignore-the-riches-behind-our-beaches/news-story/704b48ae928a498ea00fa01271c43c62 [Verified 17 April 2019].

Prahalad, V., and Kirkpatrick, J. B. (2019). Saltmarsh conservation through inventory, biogeographic analysis and predictions of change: Case of Tasmania, south-eastern Australia. *Aquatic Conservation* **29**(5), 717–731. doi:10.1002/AQC.3085

Prahalad, V. N., and Kriwoken, L. K. (2010). Implementation of the Ramsar Convention on Wetlands in Tasmania, Australia. *Journal of International Wildlife Law & Policy* **13**(3), 205–239. doi:10.1080/13880292.2010.486697

Prahalad, V., Kirkpatrick, J. B., Aalders, J., Carver, S., Ellison, J., Harrison-Day, V., McQuillan, P., Morrison, B., Richardson, A., and Woehler, E. (2020). Conservation ecology of Tasmanian coastal saltmarshes, south-east Australia–a review. *Pacific Conservation Biology* **26**(2), 105–129. doi:10.1071/PC19016

Pueyo-Ros, J., Garcia, X., Ribas, A., and Fraguell, R. M. (2018). Ecological restoration of a coastal wetland at a mass tourism destination. Will the recreational value increase or decrease? *Ecological Economics* **148**, 1–14. doi:10.1016/J.ECOLECON.2018.02.002

Pyle, R. M. (2003). Nature matrix: reconnecting people and nature. *Oryx* **37**(2), 206–214. doi:10.1017/S0030605303000383

Ramsar and UN World Tourism Organization (2012). 'Destination wetlands: supporting sustainable tourism.' (Secretariat of the Ramsar Convention on Wetlands: Gland, Switzerland; and UNWTO: Madrid, Spain.)

Ramsar Convention Secretariat (2010). Wetland CEPA: The Convention's Programme on communication, education, participation and awareness

(CEPA) 2009–2015. Ramsar handbooks for the wise use of wetlands, 4th edition, vol. 6. Ramsar Convention Secretariat, Gland, Switzerland.

Ramsar Convention Secretariat (2012). Resolution XI.7 Tourism, recreation and wetlands. Available at ramsar.org/sites/default/files/documents/pdf/cop11/res/cop11-res07-e.pdf [Verified 28 June 2021].

Ramsar Convention Secretariat (2015). Wetlands of International Importance. Available at https://www.ramsar.org/document/the-ramsar-conventions-programme-on-communication-capacity-building-education-participation [Verified 26 January 2022].

Reddy, M. S., and Char, N. V. V. (2006). Management of lakes in India. *Lakes and Reservoirs: Research and Management* **11**(4), 227–237. doi:10.1111/J.1440-1770.2006.00311.X

Reid, M., Wearing, S. L., and Croy, G. (2008). Marketing of protected areas as a tool to influence visitors' pre-visit decisions. CRC for Sustainable Tourism Pty Ltd, Gold Coast, Australia.

Rossi, S. D., Byrne, J. A., and Pickering, C. M. (2015). The role of distance in peri-urban national park use: who visits them and how far do they travel? *Applied Geography* **63**, 77–88. doi:10.1016/J.APGEOG.2015.06.008

Sangpikul, A. (2010). Marketing ecotourism through the Internet: a case of ecotourism business in Thailand. *International Journal of Hospitality & Tourism Administration* **11**(2), 107–137. doi:10.1080/15256481003732782

Soga, M., and Gaston, K. J. (2016). Extinction of experience: the loss of human–nature interactions. *Frontiers in Ecology and the Environment* **14**(2), 94–101. doi:10.1002/FEE.1225

Temby, N., and Crawford, C. M. (2008). Coastal & estuarine resource condition assessment: a baseline survey in the southern NRM region, Tasmania. Tasmanian Aquaculture and Fisheries Institute, University of Tasmania, Hobart, Tas., Australia.

Tourism Tasmania (2019). Tasmanian Tourism Snapshot – year ending September 2019. Available at https://www.tourismtasmania.com.au/__data/assets/pdf_file/0006/86199/2019-Q3-Tasmanian-Tourism-Snapshot-September-2019-TVS,-IVS-and-NVS....pdf [Verified 20 January 2022].

Wang, W., Chen, J. S., Fan, L., and Lu, J. (2012). Tourist experience and wetland parks: a case of Zhejiang, China. *Annals of Tourism Research* **39**(4), 1763–1778. doi:10.1016/J.ANNALS.2012.05.029

Weaver, D. B., and Lawton, L. J. (2011). Information sources for visitors' first awareness of a low profile attraction. *Journal of Travel & Tourism Marketing* **28**(1), 1–12. doi:10.1080/10548408.2011.535440

Whitfield, A. K. (2017). The role of seagrass meadows, mangrove forests, salt marshes and reed beds as nursery areas and food sources for fishes in estuaries. *Reviews in Fish Biology and Fisheries* **27**(1), 75–110. doi:10.1007/S11160-016-9454-X

Wickham, H. (2016). 'ggplot2: Elegant Graphics for Data Analysis.' (Springer-Verlag: New York, NY, USA.)

Wilkins, E. J., Sinclair, W., Miller, H. M., and Schuster, R. M. (2019). Does proximity to wetlands matter? A landscape-level analysis of the influence of local wetlands on the public's concern for ecosystem services and conservation involvement. *Wetlands* **39**(6), 1271–1280. doi:10.1007/S13157-018-1076-8

Yorta Yorta Traditional Owner Land Management Board (2020) Joint Management Plan for Barmah National Park. Available at https://yytolmb.com.au/wp-content/uploads/2020/04/Minister-Approved-Final-Barmah-NP-JMP.pdf [Verified 21 June 2021]

Zedler, J. B., and Kercher, S. (2005). Wetland resources: status, trends, ecosystem services, and restorability. *Annual Review of Environment and Resources* **30**, 39–74. doi:10.1146/ANNUREV.ENERGY.30.050504.144248

Zhang, H., and Lei, S. L. (2012). A structural model of residents' intention to participate in ecotourism: The case of a wetland community *Tourism Management* **33**(4), 916–925. doi:10.1016/J.TOURMAN.2011.09.012

Zhou, N. (2019). 'Intimidation': Tasmanian activists say duck hunters left dead wallaby at camp. In *The Guardian*, 9 March 2019. Available at https://www.theguardian.com/australia-news/2019/mar/09/intimidation-tasmanian-activists-say-duck-hunters-left-dead-wallaby-at-camp [Verified 26 January 2022].

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