News & views

PAUL SEIN TWA/KESAN

Figure 1 | The Salween Peace Park. Pwak'nyaw (also known as S'gaw Karen) people living at this site in Myanmar, located on a tributary of the Salween River, use their Indigenous knowledge to obtain food. For example, the basket-style nets in this image are a traditional way to catch fish and shellfish in shallow waters. Koning *et al.*[2] report that conservation efforts by the Pwak'nyaw community in the Salween River basin area have substantially boosted fish diversity and might increase the yields of fishing catches.

Fisheries

River conservation by an Indigenous community

Edward H. Allison & Violet Cho

Populations of river fish are threatened by pressures on land and water resources. Networks of reserves managed by Indigenous people at community level offer a way to conserve fish diversity and enhance yields of nearby fisheries. **See p.631**

Rivers are a major source of renewable water, and provide food, jobs and a sense of place and cultural identity for people living in the vicinity. For many Indigenous peoples, rivers are central to how they understand themselves, their origins and their relationships to the rest of nature. As a citizen of the Penobscot Nation in Maine put it[1], "The river is us: the river is in our veins." On page 631, Koning *et al.*[2] report ecological surveys that demonstrate how local Indigenous people in the Salween River basin on the border between Thailand and Myanmar have successfully managed the river for conservation purposes and to protect livelihoods.

Both biodiversity and the people in river-associated communities are under severe stress the world over. Across the globe, 30% of freshwater fish (see go.nature.com/3ixfd9l) are classified as being at risk (in either the critically endangered, endangered or vulnerable categories) in the 2020 Red List of threatened species compiled by the International Union for the Conservation of Nature. Furthermore, it is projected[3] that half the human population will live in water-insecure areas by 2050. Principal among the threats to rivers are pollution, climate change, invasive species, changes in surrounding land use, and the construction of dams and infrastructure that affect river flow. These issues need to be addressed on scales ranging from local to global, and solutions should draw on the knowledge, practices and aspirations of those whose lives are most closely entwined with river health.

Koning *et al.* assessed the outcome of a network of small fishery no-take reserves (areas where fishing is not allowed), and found that there was an average 27% rise in species richness, 124% higher fish density and 2,247% higher fish biomass in the reserve-associated waters compared with the corresponding values for nearby areas open to fishing. The presence of larger species and more individuals in the reserves is what drives the much higher biomass there. The authors suggest that such networks of locally managed, small, protected river areas could be used in other river systems to enhance fisheries and to conserve biodiversity.

The authors' work highlights the importance of inland waters to food and livelihood systems, demonstrates the value of community-led conservation, and points out commonalities between protected-area conservation strategies in marine and freshwater ecosystems. Marine-protected areas, which are usually created by governments, are used widely in ocean conservation and fisheries, but much less commonly in fresh waters[4]. The authors characterize the reserves studied as being created by the S'gaw Karen (also known as Pwak'nyaw) Indigenous people who live in the river catchment areas. The paper thus also supports the growing recognition[5] among scientists and conservationists of the effectiveness of Indigenous resource-management practices.

Koning and colleagues' study draws on natural sciences — limnology (the freshwater equivalent of oceanography) and fish ecology — but also discusses how river management operates at a community level. Their natural-sciences disciplinary lens allows them to rigorously evaluate the benefits that protected areas confer on fish conservation and on the sustainability of local fish catches. In the area studied, Indigenous communities had planned and implemented local no-take reserves that complement other community-based conservation initiatives, including the management of adjacent land.

However, the context in which this management system evolved, the knowledge and politics involved in its creation, and how local forms of knowledge and practice can be supported and valued are less in focus in Koning and colleagues' study. Pwak'nyaw communities have been profoundly transformed as a result of colonization in Myanmar, the arrival of foreign missionaries in Myanmar and Thailand, and state modernization projects in both countries. Supporting river conservation here and elsewhere at locations where other Indigenous peoples live will require a reckoning with such legacies and a willingness to make space for local and Indigenous voices to be heard, alongside those of scientists, in river-basin planning.

One of us (V.C.) is a Pwak'nyaw person, born in Hpa'an, Myanmar, on the banks of the Salween River, and believes that it is crucial that science conducted in Indigenous territory incorporates Indigenous systems of knowledge and beliefs, and for Indigenous people to have ownership over data that involve them. Although, during a period of 8 years of research, Koning *et al.* worked with local people for more than 18 months when living in the study area, there is scope for furthering these relationships so that Indigenous perspectives have increased visibility. An absence of Indigenous agency and control in the production of knowledge is a key issue, leading to calls for Indigenous data sovereignty and the decolonization of science[6].

Koning and colleagues' study positively recognizes Pwak'nyaw involvement in conservation, and includes some cultural context, although Pwak'nyaw perspectives are lacking. One consequence of this might be the study's focus on what the Pwak'nyaw would regard as only part of their integrated system of land and water management. For example, Pwak'nyaw don't commonly identify themselves by categories that are familiar to those in Western culture, such as being a farmer or a fisher. Rather, rotational farming, growing rice, gardening, hunting, gathering and fishing are integrated parts of a Pwak'nyaw livelihood.

Community-based research on Pwak'nyaw livelihoods in northern Thailand has found that fish conservation is also integrated into rotational farming practices. For instance, the concept *nya pla htau*, meaning fish surface, prohibits the clearing of a field on adjacent sides of a river bank in successive years to conserve fish-breeding grounds, and knowledge about fish is a factor in the selection of farmland[7]. In this sense, farming cannot be separated from fishing, which cannot be separated from conservation, because they are all part of a whole — and it is beneficial for them to be studied as such.

Future studies, which should involve collaboration with Indigenous researchers, could adopt approaches to integrate Indigenous and scientific knowledge and Indigenous and Western legal and management approaches in ways that recognize and draw on both[8]. This would help to address some of the unanswered questions in Koning and colleagues' valuable study on the origins, sustainability and future of this successful network of reserves.

Conflict can arise in Thailand and elsewhere when there is confrontation between Indigenous people and the state, or other groups, regarding competing conservation models. Indigenous lives are in danger — around the world in 2019, more than 200 environmental activists died, 40% of whom were Indigenous people (see go.nature.com/36w68di). In the past decade, the deaths of prominent Pwak'nyaw environmental activists in Myanmar (see go.nature.com/2vspujn) and in Thailand (see go.nature.com/3mwjqm1) have hit the headlines.

Indigenous resource-management systems can persist despite difficult circumstances. On the Myanmar side of the Salween River, Pwak'nyaw communities, whose livelihoods are affected by ongoing civil war, displacement and militarized development, have created a large-scale conservation project named the Salween Peace Park (Fig. 1), based on *kaw* (country), a holistic concept that encompasses the localized practice of social and environmental governance, based on Indigenous sovereignty. Pwak'nyaw living there conserve the environment using Indigenous knowledge (see go.nature.com/36tigxg), and are working to revive Indigenous practices lost through decades of conflict.

Without such contextual cultural and political knowledge, it is difficult to say how easily the successes in the Salween River basin, convincingly enumerated by Koning and colleagues' study, can be achieved elsewhere by trying to transfer this approach. The key insight here may be that the small reserves are potentially useful conservation measures that need to be understood from the perspectives of those who created them. Such reserves should be supported and legitimized where they exist, revived where they existed previously, and perhaps tried out where they haven't been used before, as part of efforts to meet global river-conservation challenges. This would support a growing movement led by Indigenous peoples to focus on putting rivers at the centre of conservation efforts — including by assigning legal personhood to rivers, as part of a 'rights of nature' approach to environmental governance[9].

Edward H. Allison is at WorldFish, Penang 11960, Malaysia. **Violet Cho** is in the School of Culture, History and Languages, College of Asia and the Pacific, the Australian National University, Canberra 2600, ACT, Australia.
e-mails: e.allison@cgiar.org; violet.cho@anu.au.edu

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