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Prioritising ecosystem opportunities and threats of floating solar photovoltaics

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Floating solar photovoltaic installations are an emerging form of solar energy deployed on varying types of water bodies globally. Deployments have proliferated in recent years, particularly in land-scarce areas, as the drive to decarbonise the energy-mix intensifies. However, the potential ecosystem opportunities and trade-offs of floating solar photovoltaic installations remain unclear, often acting as a barrier to deployment. Exploiting floating solar photovoltaic knowledge systems, we synthesise evidence and insight from scientists and industry stakeholders, through a systematic review, international survey and workshop, to evaluate potential opportunities and threats to ecosystems. We found that reduced evaporation is the greatest perceived opportunity of floating solar, while detrimental chemical impacts, such as anoxia and internal nutrient loading, are perceived as the greatest threat. Using this knowledge, we assessed the overarching sustainability of floating solar, using the United Nations Sustainable Development Goals (SDGs) as a framework. We identified that floating solar photovoltaic installations may impact on eight of the seventeen SDGs. Given the need to rapidly develop understanding, in light of the anticipated growth rates, we prioritise the knowledge gaps and improvements critical to ensuring floating solar photovoltaic installations minimise ecosystem threats and maximise opportunities, safeguarding overall sustainability.