



Species

ISSUE 64

2023 Report of the IUCN Species Survival Commission and Secretariat



The IUCN Species Survival Commission (SSC)

The IUCN Species Survival Commission (SSC) is a science-based network of thousands of volunteer experts from almost every country of the world, all working together toward achieving the vision of “a just world that values and conserves nature through positive action to both prevent the loss and aid recovery of the diversity of life on earth.”

Members of SSC belong to one or more of near 200 Specialist Groups, Red List Authorities, Action Partnerships, Task Forces, and Conservation Committees that make up the Network, each focusing on a taxonomic group (plants, fungi, mammals, birds, reptiles, amphibians, fishes, and invertebrates), national species, or a disciplinary issue, such as sustainable use and livelihoods, translocation of species, wildlife health, climate change, and conservation planning.

Framed by the Species Conservation Cycle, SSC’s major role is to provide information to IUCN on biodiversity conservation, the inherent value of species, their role in ecosystem health and functioning, the provision of ecosystem services, and their support to human livelihoods. This information is fed into the IUCN Red List of Threatened Species.

2021-2025 Species Strategic Plan

The IUCN Species Strategic Plan encompasses the joint work of the IUCN Species Survival Commission and a number of partnerships to achieve more than 2,700 targets proposed by the Network during the 2021-2025 quadrennium.

To accomplish those targets, the Species Conservation Cycle was established, which is the conceptual framework for the Network activities. The Species Conservation Cycle’s main purpose is to guide efforts for valuing and conserving biodiversity through three essential components that are linked to each other:

ASSESS: Understand and inform the world about the status and trends of biodiversity.

PLAN: Develop collaborative, inclusive and science-based conservation strategies, plans and policies.

ACT: Convene and mobilise conservation actions to improve the status of biodiversity.



Their implementation requires two transversal components:

NETWORK: Enhance and support our immediate network and alliances to achieve our biodiversity targets.

COMMUNICATE: Drive strategic and targeted communications to enhance our conservation impact.

SSC Species Report

Annual progress in the implementation of the 2021-2025 Species Strategic Plan is documented in the SSC *Species Report*, which consists of a comprehensive description and analysis of the activities and results generated by the members of the SSC Network and Centers for Species Survival (CSS) each year. Each SSC and CSS group contributes to this document by providing a yearly summarised description of their achievements, which is presented in stand-alone reports.

Structure of the IUCN SSC and CSS Stand-alone Reports

Stand-alone reports summarize the activities conducted and results generated by each group member of the SSC and CSS. Following, is the structure of the stand-alone report and the contents under each session.

Title of the group

Photograph(s) of the Chair/Co-Chairs

Group information

Includes names of Chair/Co-Chairs, Vice-Chairs, Deputy Chairs, Red List Authority Coordinators, Program Officers, Species Survival Directors, and Species Survival Officers, their institutional affiliations, number of members and social networks currently active.

Logo of the group

Mission statement

Includes the mission of the group.

Projected impact for the 2021-2025 quadrennium

Includes the description of the impact on species conservation resulting from the implementation of the targets formulated by the group for the 2021-2025 quadrennium.

Targets for the 2021-2025 quadrennium

Includes the targets planned by the SSC or CSS group for the 2021-2025 quadrennium ordered alphabetically by component of the Species Conservation Cycle. Each target is labeled with a numerical code (e.g., T-001, T-012) that identifies it in the SSC DATA database and its status for the reported year is indicated (Not initiated, On track or Achieved).

Activities and results

Includes the targets for which activities were conducted and results were generated during the reported year, ordered alphabetically, first by component of the Species Conservation Cycle, and second by Activity Category. Description of activities and results includes the indicator that best describes progress, its associated quantitative or qualitative result, and the narrative description of the activity conducted or result obtained. Each activity or result reported is linked to the Key Species Result to which it is mainly associated (e.g., KSR#1, KSR#5).

Acknowledgements

Includes the acknowledgements to funding agencies, partners, and persons who contributed to the progress of the targets of the group.

Summary of achievements

Summarises information of the group's strategic plan for the quadrennium and progress achieved implementing targets for all the components of the Species Conservation Cycle during the reported year.

Animalia

Fungi

Plantae

National Species

Disciplinary

Action Partnership

Task Force

Red List Authority

Committee

Center for Species Survival

Example for the recommended citation:

Lewis, S. and Jusoh, W.F.A. 2024. 2023 Report of the Firefly Specialist Group. In: IUCN SSC and Secretariat. *2023 Report of the IUCN Species Survival Commission and Secretariat*. Gland, Switzerland: IUCN. 8 pp.

IUCN SSC Firefly Specialist Group



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NUMBER OF MEMBERS

47

SOCIAL MEDIA AND WEBSITE

Facebook: [Friends of Fireflies International](#)

[IUCN Fireflies](#)

Instagram: [@iucnfireflies](#)

TikTok: [@iucnfireflies](#)

X: [@IUCNFireflies](#)

Mission statement

Our mission is to compile existing knowledge for ca. 2,500 lampyrid species worldwide on their geographic range, population size, and population trends, identify major extinction threats and risk factors, increase public knowledge concerning firefly diversity, ecology and behaviour, and promote long-term conservation efforts.

Projected impact 2021–2025

By the end of the quadrennium we hope to: (1) establish monitoring programmes for most of the threatened firefly species on the Red List (Critically Endangered, Endangered, Vulnerable); (2) distribute guidelines for sustainable tourism to places where firefly tourism is rapidly developing; and (3) complete the Assess to Plan (A2P) process for congregating mangrove fireflies of Southeast Asia.

Targets 2021–2025

ASSESS

T-004 Write and publish a scientific article with guidelines for sustainable firefly tourism.
Status: Achieved

T-005 Submit global assessments for North American firefly species.
Status: Achieved

T-006 Write and publish scientific articles including new species descriptions, ecology and behaviour, and threats.
Status: Achieved

T-007 Complete global assessments of fireflies in Hong Kong, Thailand, Malaysia, Europe, and Taiwan.
Status: On track

T-008 Develop and disseminate standardised methodologies for monitoring firefly species abundances.
Status: On track

PLAN

T-009 Identify stakeholders and hold a national Workshop on Guidelines for Sustainable US Firefly Tourism.
Status: Achieved

T-010 Organise a regional Key Biodiversity Area/Conservation Planning Workshop to protect habitat of congregating mangrove fireflies with other taxa in Southeast and East Asia.
Status: On track

T-011 Identify stakeholders and hold a national Conservation Planning Workshop for threatened US fireflies (south-eastern and mid-Atlantic states).
Status: Achieved

T-012 Identify stakeholders and hold a national Conservation Planning Workshop in Mexico to discuss guidelines for sustainable tourism for the endemic firefly *Photinus palaciosi*.
Status: On track

T-013 Start developing guidelines for captive breeding and restoration of firefly populations.
Status: On track

T-018 As needed, issue regional-specific position statements addressing major drivers and/or emerging threats of firefly species or population loss.
Status: On track

ACT

T-014 Act as consultant to Forestry Research Institute of Malaysia (FRIM) on their 6-year project to do national conservation planning and tourism guidelines for congregating mangrove fireflies in 12-14 river systems.
Status: On track

T-015 Provide technical consults for national and local entities to support firefly conservation efforts, including local Firefly Sanctuaries.
Status: On track

T-016 Prepare intervention letters addressing major drivers and/or emerging threats of firefly species or population loss.
Status: On track



A selection of globally imperiled fireflies in their habitats

Photo: From Lewis et al. Firefly Conservation Review

T-017 Establish biological monitoring programmes to determine population trends for threatened firefly species by working with citizen science groups, volunteers, and local and state agencies.

Status: On track

T-020 Disseminate to other countries firefly tourism guidelines developed in Thailand, Malaysia, Taiwan, and Mexico to encourage sustainable natural resource use.

Status: On track

NETWORK

T-001 Strengthen existing partnerships with Xerces and New Mexico BioPark Society for species assessment and planning.

Status: Achieved

T-002 Strengthen existing partnership with Fireflyers International Network for outreach and communication.

Status: Achieved

T-019 Strengthen ties with the International Dark-Sky Association (IDA) for IDA/Firefly Sanctuary certification.

Status: On track

T-026 Recruitment of new members to aid biodiversity exploration in poorly researched regions (West and Central Asia, South and Southeast Asia and Africa).

Status: On track

COMMUNICATE

T-021 Compile a list of relevant documents and make them publicly available (e.g. on the Fireflies International Network website).

Status: On track

T-022 Work with IUCN Communications, national and international media to publicise threatened firefly species, conservation actions and outcomes.

Status: Achieved

T-023 Appoint a focal person to manage social media outreach (e.g. Twitter, Instagram, others).

Status: On track

T-024 Give interviews and presentations to schools, communities, government agencies and the public.

Status: Achieved

T-025 Harness the power of visual imagery by collaborating with artists, videographers, photographers, and musicians to spread awareness of firefly ecology and conservation.

Status: Achieved

Activities and results 2023

ASSESS

Red List

T-007 Complete global assessments of fireflies in Hong Kong, Thailand, Malaysia, Europe, and Taiwan. (KSR 6)

Number of new global Red List assessments completed: 6

Result description: In 2023, Red List assessments were published for four Hong Kong firefly species. Although an additional 15 assessments for European and Southeast Asian species were drafted at a June 2022 workshop, reviewed and submitted in September 2022, these have not yet been published. We are hopeful that once the RLU backlog is resolved, these and others will finally be published in 2024.

Research activities

T-004 Write and publish a scientific article with guidelines for sustainable firefly tourism. (KSR 5)

Number of scientific publications about species research that acknowledge SSC affiliation: 0

Result description: Our guidelines for sustainable firefly tourism published in 2021 have already been cited 38 times and continue to be adopted by tourism sites in many countries, including Mexico, Thailand, and the US.

T-006 Write and publish scientific articles including new species descriptions, ecology and behaviour, and threats. (KSR 5)

Number of scientific publications about species research that acknowledge SSC affiliation: 1

Result description: In 2023 our Firefly SG members continued to be highly active contributors to biodiversity knowledge, publishing over 16 peer-reviewed articles and talks on firefly species descriptions. Members also wrote numerous articles and presented scientific talks on the status of fireflies in Brazil, Malaysia, Mexico, Europe, the Philippines, and the US. In addition, our paper 'Illuminating Firefly Diversity: Trends, Threats and Conservation Strategies' was published as an Open Access Review.

PLAN Planning

T-010 Organise a regional Key Biodiversity Area/Conservation Planning Workshop to protect habitat of congregating mangrove fireflies with other taxa in southeast and east Asia. (KSR 8)

Number of conservation plans/strategies developed: 0

Result description: We have submitted assessments (not yet published) for these vulnerable species and are continuing discussions with CPSG/Mandai Nature in Singapore and the Forestry Research Institute of Malaysia. We are currently looking for funding to support a regional workshop. We are also developing questionnaires for firefly experts in Malaysia to determine the status of protection and ongoing conservation work.

T-011 Identify stakeholders and hold a national Conservation Planning Workshop for threatened US fireflies (south-eastern and mid-Atlantic states). (KSR 8)

Number of conservation plans/strategies developed: 1

Result description: In collaboration with the Xerces Society, surveys continued during 2023 for ~13 high-priority data-deficient and threatened fireflies in three US regions: Mid-Atlantic, Southeast, and Western. Regular virtual meetings have been held to exchange information and answer questions, and occurrence data for these and other US fireflies is being reported to Xerces' newly launched [Firefly Atlas](#).

T-012 Identify stakeholders and hold a national Conservation Planning Workshop in Mexico to discuss guidelines for sustainable tourism for the endemic firefly *P. palaciosi*. (KSR 8)

Number of species conservation plans/strategies developed: 0

Result description: Our Mexican team members have published articles and given talks outlining guidelines for more sustainable firefly tourism and we sent a letter of concern to the Secretary of Tourism for the state of Tlaxcala, Mexico about the need for more carefully regulated tourism in Nanacamilpa to protect firefly populations. FSG members effectively used [media outreach](#) to disseminate information about how unregulated firefly tourism endangers these economically important insects. We are now seeking funding for a planning workshop we hope to hold in association with the International Firefly Symposium that will be held in Mexico in July 2025.

T-013 Start developing guidelines for captive breeding and restoration of firefly populations. (KSR 8)

Number of conservation plans/strategies developed: 1

Result description: We are currently working with Monash University Malaysia as part of student research projects to understand the firefly species' life cycle in Kuala Lumpur urban forests. At least four species of fireflies are under observation in the lab to record their behaviour and morphology of every life stage.

T-018 As needed, issue regional-specific position statements addressing major drivers and/or emerging threats of firefly species/population loss. (KSR 8)

Number of position statements issued: 2

Result description: In China, we sent a letter of concern about the impact on local firefly populations of a planned expressway expansion near Guangzhou, China. In response, the planning department of Huangpu District, Guangzhou required the construction organization to conduct an in-depth investigation of local firefly habitats. In collaboration with the IUCN China Species Specialist group, provincial forest and grassland departments were alerted to this issue and recommended to make the site a demonstration case of biodiversity conservation in Guangzhou, and to carry out a firefly nature education program. In Mexico, we sent a letter of concern to the Secretary of Tourism for the state of Tlaxcala, Mexico about the need for more carefully regulated tourism in Nanacamilpa to protect firefly populations. Members of the FSG effectively used [media outreach](#) to disseminate information about how unregulated firefly tourism endangers these economically important insects. We worked with Buglife to increase awareness of light pollution threats to European fireflies and other insects through its 'Nurture the Night Shift' campaign.



ACT

Conservation actions

T-014 Act as consultant to Forestry Research Institute of Malaysia (FRIM) on their 6-year project to do national conservation planning and tourism guidelines for congregating mangrove fireflies in 12-14 river systems. (KSR 11)

Number of communities benefited from sustainable use programs: 0

Result description: This work contributes to WCC-2020 Resolution 78 'Conservation, restoration, and sustainable management of mangrove ecosystem', and is ongoing. We have used the A2P planning process to complete assessments for congregating mangrove fireflies, and we are working with CPSG-Southeast Asia and hoping to secure funding to host a planning workshop at FRIM.

T-016 Prepare intervention letters addressing major drivers and/or emerging threats of firefly species or population loss. (KSR 10)

Number of intervention letters addressing major drivers/emerging threats of species or population loss: 2

Result description: In China, we sent a letter of concern about the impact on local firefly populations of a planned expressway expansion near Guangzhou, China. In response, the planning department of Huangpu District, Guangzhou required

the construction organisation to conduct an in-depth investigation of local firefly habitats. In collaboration with the IUCN China Species Specialist group, provincial forest and grassland departments were alerted to this issue and recommended to make the site a demonstration case of biodiversity conservation in Guangzhou, and to carry out a firefly nature education program. In Mexico, we sent a letter of concern to the Secretary of Tourism for the state of Tlaxcala, Mexico about the need for more carefully regulated tourism in Nanacamilpa in order to protect firefly populations. Members of the FSG effectively used [media outreach](#) to disseminate information about how unregulated firefly tourism endangers these economically important insects.

T-017 Establish biological monitoring programmes to determine population trends for Threatened firefly species by working with citizen science groups, volunteers, and local and state agencies. (KSR 10)

Number of threatened species being monitored for population trends: 0

Result description: The Xerces Society is continuing outreach and participant training for their Firefly Atlas, a community science tool focused on gathering occurrence data for 13 high-priority (threatened and data deficient) US species. Regular regional online meetings have been held for participants in the Southeastern, Mid-Atlantic,

and Western US. The Xerces Society also hosted a workshop in Arizona, USA geared towards land managers, conservation professionals, and associated community scientists who are participating in the Firefly Atlas. The goal was to provide participants with the necessary tools and knowledge to survey suitable habitats for the SW Spring Firefly, categorized as Threatened on the IUCN Red List. Finally, the Xerces Society designed free [Firefly 'Wanted' posters](#) to encourage people to watch for Threatened and data-deficient firefly species and report their sightings to the Firefly Atlas.

[SSC Grant awarded]

Technical advice

T-015 Provide technical consults for national and local entities to support firefly conservation efforts, including local Firefly Sanctuaries. (KSR 10)

Number of technical consultations provided to support conservation actions: 6

Result description: Five technical consults were made in 2023: (1) In collaboration with the Xerces Society, we filed five petitions to US Fish & Wildlife Service to gain federal protection under the US Endangered Species Act for Threatened US firefly species and their habitats; (2) In April 2023 students, teachers, professionals and ecotourism guides attended an in-person course to learn about the diversity and

Long exposure image shows unique flash pattern of the threatened US Cypress Firefly (*Photuris walldoxeyi*)
Photo: Radim Schreiber | FireflyExperience



ecology of Mexican fireflies, their major threats, conservation strategies and good practices in firefly ecotourism; (3) Xerces sponsored the development and offered an online species identification course for US fireflies taught by FSG member Dr Oliver Keller; (4) The Xerces Society gave a field-based workshop on Arizona fireflies for land managers, conservation professionals, and associated community scientists participating in the Firefly Atlas. The workshop provided participants with the necessary tools and knowledge to survey suitable habitats for the SW synchronous firefly, which is categorized as Threatened on the IUCN Red List; (5) In July 2023, many FSG members participated in a webinar hosted by EMPRI (Bengaluru India) to share technical information about firefly diversity, ecology, and conservation issues; (6) We consulted with private landowners in several US states (Arkansas, Connecticut, Georgia) to establish Firefly Sanctuaries to protect areas with high firefly diversity.

T-020 Disseminate firefly tourism guidelines developed in Thailand, Malaysia, Taiwan, and Mexico to other countries to encourage sustainable natural resource use. (KSR 11)

Number of sustainable use practices supported: 3

Result description: FSG Mexico members provided [interviews, seminars, and courses to spread knowledge](#) about how unregulated firefly tourism endangers an endemic, and economically important, synchronous firefly. Hosted by EMPRI in Bengaluru India, many FSG members participated in a 2-day Webinar held in July 2023 'Monitoring firefly populations, landscape conservation, and ecotourism'. Firefly education training

courses for responsible tourism were held in Kung Bangka Chao, Thailand, as well as firefly ecotourism conservation guidance in Krabi and Trang Nakhon Ratchasima provinces. We also provided guidance about sustainable firefly tourism in the Philippines and Indonesia.

NETWORK

Membership

T-026 Recruitment of new members to aid biodiversity exploration in poorly researched regions (West and Central Asia, South and Southeast Asia and Africa). (KSR 2)

Number of SSC members recruited: 3

Result description: Following informational webinars, we have recruited new members from the Philippines and India. We also continue to recruit and train young people and note that in addition to our two women Co-Chairs, several young women serve as Regional Coordinators.

Synergy

T-001 Strengthen existing partnerships with Xerces and New Mexico BioPark Society for species assessment and planning. (KSR 1)

Number of 'in kind' partnerships established and maintained: 7

Result description: During 2023, we continued working closely with Anna Walker at CSS/New Mexico BioPark Society and the Xerces Society on species assessment and planning. In 2023 we began to work with James Biggs, IUCN CSS Australasia on Red List assessments for Australian fireflies. We are continuing to work with Roopali Raghavan, Mandai Nature Singapore & CPSG – Southeast Asia & Forestry Research Institute of Malaysia on conservation planning for congregating mangrove

fireflies. We started a new collaboration with the Environmental Management and Policy Research Institute in Bengaluru, India, Far Eastern University, the Philippines and collaborated with the China Species Specialist Group regarding the impact of planned expansions of the Guangzhou Expressway on nearby firefly populations. We continue our highly productive partnerships with The Xerces Society, Buglife, New Mexico BioPark Society, and the Indianapolis Zoo Global Center for Species Survival. However, we are still searching for Zoo or NGO partners in Australia, Taiwan, and Brazil.

T-002 Strengthen existing partnership with Fireflyers International Network for outreach and communication. (KSR 1)

Number of 'in kind' partnerships established and maintained: 1

Result description: In 2023 both FSG Co-chairs met in person with FIN Steering Committee chair in October 2023 to discuss complementary strategies. We consulted with Mexico FIN members on planning for the next International Firefly Symposium in July 2025, and we continue to co-administer the Friends of Fireflyers International Facebook Group (~2,600 members).

T-019 Strengthen ties with the International Dark-Sky Association (IDA) for IDA/Firefly Sanctuary certification. (KSR 1)

Number of 'in kind' partnerships established and maintained: 1

Result description: We are still working on the light pollution IUCN Brief with Will Richard and his team at IUCN Global Communications Unit.

COMMUNICATE Communication

T-021 Compile a list of relevant documents and make them publicly available (e.g. on the Fireflies International Network website). (KSR 12)

Number of documents: 50

Result description: FSG members engage in numerous activities to educate and advocate for species conservation, including scientific publications, popular articles, lectures and presentations. We also give numerous media interviews to print, TV, radio, and online journalists; this year our activities received media coverage in Mexico, India, Spain, Belgium, Canada, and the US (see attached spreadsheet 2023 Firefly SG Member Activities).

T-022 Work with IUCN Communications, national and international media to publicize threatened firefly species, conservation actions and outcomes. (KSR 12)

Number of media articles mentioning IUCN Species theme: 40

Result description: During 2023 FSG members provided ~40 media interviews on firefly conservation for print, radio, and film. This work included: members Tania Lopez-Palafox and Cisteil X Pérez-Hernández who worked with journalists to highlight ecotourism-related conservation problems confronting Mexican fireflies; Anchana Thancharoen, whose work on firefly restoration in Thailand was featured in a Thai TV special; Avalon Owens, whose work on how light pollution affects the reproductive success of US fireflies was featured in NBC, PBS, and CBS news; Sriram Mirali, whose photograph of fireflies in India won the 2023 Natural History

Museum of London's Wildlife Photographer of the Year Award; Co-Chair Dr Wan F.A. Jusoh gave a TED talk on new firefly species discovery at TEDWomen 2023 in Atlanta; W.M.C.D Wijekoon gave several talks and interviews about threats and conservation of Sri Lankan fireflies. We also continue working with IUCN Communications to prepare an IUCN Brief on the impacts of light pollution on wildlife, including fireflies.

T-023 Appoint a focal person to manage social media outreach (e.g. Twitter, Instagram, others). (KSR 12)

Social media engagement: 0

Result description: We now have two FSG members, Vickly Mobilim (Institute for Tropical Biology and Conservation at Universiti Malaysia Sabah) and Ishwari Gutiérrez (UNAM, Mexico) managing FSG social media accounts on Instagram, Twitter, and TikTok; we also do outreach on Facebook and Threads.

T-024 Give interviews and presentations to schools, communities, government agencies and the public. (KSR 13)

Number of SSC members' presentations developed in relation to specific taxonomic groups: 0

Result description: In 2023, Firefly SG members continued to give presentations to schools, communities, and the public, including a TED talk on new firefly species discovery given by FSG Co-Chair Dr Wan F.A. Jusoh at TEDWomen 2023 in Atlanta. Four FSG members gave presentations for a webinar on "Discussions from the IUCN SSC Firefly Specialist Group" hosted by Far Eastern University, the Philippines on May 18, 2023.

T-025 Harness the power of visual imagery by collaborating with artists, videographers, photographers, and musicians to spread awareness of firefly ecology and conservation. (KSR 13)

Number of communication products using innovative tools: 3

Result description: FSG member Sriram Mirali's photograph of fireflies in India won the 2023 Natural History Museum of London's Wildlife Photographer of the Year Award.

Acknowledgements

We thank the Xerces Society for Invertebrate Conservation, the Center for Species Survival at the New Mexico BioPark Society, the Center for Species Survival at the Indianapolis Zoo, and the Forestry Research Institute of Malaysia, for their collaboration and support.

Summary of achievements

Total number of targets 2021–2025: 25

Geographic regions: 19 Global, 5 America, 4 Asia

Actions during 2023:

Assess: 3 (KSR 5, 6)

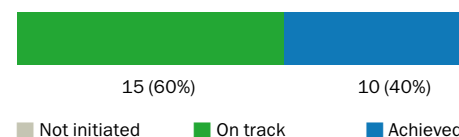
Plan: 5 (KSR 8)

Act: 5 (KSR 10, 11)

Network: 4 (KSR 1, 2)

Communicate: 5 (KSR 12, 13)

Overall achievement 2021–2025:



■ Not initiated ■ On track ■ Achieved



Nothobranchius fuscotaeniatus
Photo: Csenge Nagy



Tetra Parnaiba
Photo: Karina Molina



Trioceros hoehnelii
Photo: Christopher V. Anderson



Sternberia lutea
Photo: Hayri Duman



Egretta rufescens
Photo: Ernesto Gómez



Lactifluus neotropicus
Photo: Aida Vasco



Mayfly nymph (*Ecdyonurus* sp.)
Photo: Astrid Schmidt-Kloiber and Wolfram Graf