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Appendix 3: Template for proposing a new EEP

TAGs can use this Template for proposing a new EEP to the EEP Committee. As per default these applications follow from the RCP publication process and the Species Assessment Sheet should be sent along with this template. In exceptional cases new EEPs may also be proposed in between RCP editions. A separate Species Assessment Sheet should be completed if an EEP is being applied for in between RCP editions. Note that not all sections below may be relevant to each programme. Also note that 'species' represents any taxonomic unit the TAG has chosen as the unit of management in an EEP.

EEP Proposal for

Common Species Name: Undulate ray

Scientific Species Name: *Raja undulata*

Prepared by

Name(s): EAZA Elasmobranch TAG

Year:2023

1. Contact information

Contact details of proposed EEP Coordinator

Name: Chris Brown

Institution: Chessington World of Adventures Theme Park and Zoo

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2. Taxonomy information

Taxonomy of the species (*indicate which taxa are included in this programme and why, and give an indication of the degree of confidence in the taxonomic identification of the individuals in the EEP population*)

Monotypic species

Elasmobranchii > Rajiformes (Skates and Rays) > Rajidae (Skates)

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3. Identified roles

Identified role(s) description *(copy from the Species Assessment Sheet in RCP)*

Direct Role(s)	Programme characteristics required	Benefit	Feasibility	Risk	Recommended?¹	Contribution?²	Notes
Insurance	Genetically and demographically healthy population. Clarity about genetic difference between populations across the range.	High	Medium	Low	Yes	Yes	Priority species for IUCN. Feasibility is lower because it depends on result from research.
Conservation education	Funding and cooperation with university. Political lobby for contact with fishermen.	High	Medium	Low	Yes	Yes	Continue work of SUMARiS with fishermen. Citizen science project to involve fishermen by going via a students' project. Involve organisation of fishermen in the process. Contact EAZA EU office about political work.
Indirect Role(s)	Programme characteristics required	Benefit	Feasibility	Risk	Recommended?¹	Contribution?²	Notes
Conservation education	Have population in aquaria. Collaboration between aquaria on the message.	High/medium	High	Low	Yes	Yes	Educate about skates in the wild. Raise awareness and political attention to protect the species. Focus on visitors. Lower benefit compared to other roles.
Research (<i>in situ/ ex situ</i>)	Funding and cooperation with university/research institute/NGO.	High	High/medium	Low	Yes	Yes	Build on already ongoing studies (see notes below). Can be used as model for taking samples for research on other species. Feasibility lower because on dependence on external parties.

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							Risk is slightly higher because of potential issues of working with fishermen.
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Direct conservation roles:

- Insurance: This role contemplates the possibility to maintain a long-term *ex situ* population to preserve options for the future. In order to fulfill this role, besides a genetically and demographically population, there is need to research about genetic differences between populations across the range.
- Conservation Education: This role’s objective will be to continue the work of SUMARiS with fishermen and develop a “**Citizen science**” project to involve fishermen. To succeed it will be necessary to involve the relevant stakeholders in the process. Furthermore, funding and cooperation with universities will also be required. Seeking advise from EAZA EU Policy team on the lobby aspect of the role is advisable.

Indirect conservation roles:

- Conservation Education: This role will be used to convey messages on the general threats to skates in the wild. This role can contribute to increasing awareness and political attention to protect them and their natural habitat.
- *Ex situ/in situ* research: This role focuses on genetics, abundance and behaviour research. This can be used as a model on how to take samples from similar species. To achieve this, it is important to find research institutions that can collaborate with the research and get enough funding for the research. Nevertheless, it is important to consider some unpredictable factors such as potential challenges of working with fishermen. **The Undulate Ray Programme** aims to be the umbrella programme covering these projects.

Other relevant actions:

- Best practice guidelines: aquariums will join together to share information on the species niche, behaviour and biology to produce best practice guides and produce reports (peer-reviewed and grey literature) to inform the scientific community on findings. Information will be distributed to aquariums holding undulates to increase conservation messaging and welfare.

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- The Undulate Ray Programme: The programme will engage with relevant stakeholders and partners to investigate unknown areas of the species behaviour and biology with the use of aquarium supplemented information from the best practice guides. Furthermore, funding and cooperation from stakeholders will be explored to improve scientific knowledge and understanding.
- Citizen science and engagement: reports of local biodiversity collected from the community, such as anglers, scuba divers and snorkeler, will be collected to better understand the local natural environment underwater. Underwater Visual Surveys will also be conducted. This aims to increase knowledge of undulate rays in the local area and the work of aquariums.

Programme decision statement: EEP

To fulfil the identified roles a demographically and genetically healthy population is required. Additionally, this species will aim to continue with educational work involving fishermen, research and raise awareness to the general public. Therefore, active management is required. In conclusion, the TAG recommends to manage *Raja undulata* as an EEP.

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4. Programme participants and governance

EAZA institutional scope *(As a default, participation in EEPs is obligatory for EAZA Members. If you wish for an exemption, identify which institution(s) holding this species is/are not part of the EEP and explain the underlying reasons.)*

Non-EAZA holding institutional scope *Select one or more of the options below.*

- EAZA population/community is the dominating driver of the EEP and any non-EAZA Members will occasionally join and are not integral to the structure of the EEP.
- In addition to EAZA, there are other structural/equal drivers of the EEP (e.g., World Pheasant Association, ...). Please describe.
- A larger initiative exists and the EAZA population is a small part of this (e.g., GSMP, ...). Please describe.

Additional information: There is a core group of 66 individuals within 7 EAZA member facilities. In addition, there are another 46 rays in 32 non EAZA facilities, most of them being involved in EUAC (collected as part of the European Monitoring Programme 2022). Depending on the importance for the programme the TAG/EEP will be working on the formalization of these facilities with the Aquarium matters (March 2022) document in mind.

Essential non-EAZA partners not holding animals *(List the organisations, define their role, and how they will work with the EEP).*

Members of the EEP core group (Species Committee + non-voting members)

- *By default, EEPs have a Species Committee (a democratically elected representation of the holders) as part of their EEP core group (information on the Species Committee and its associated default decision making process can be found in the Population Management Manual). If that will not be the case for this EEP, explain why and define the composition, structure and decision-making process for the EEP core group.*

Default, species Committee is to be elected.

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- *List the EEP core group members (names and institutions) (if already known): Species Committee members, Advisors, others.*

To be determined

Collaboration with EAZA Working Groups and Committees *(Explain any current and/or future proposed links to existing EAZA groups and committees, such as the Animal Training Working Group, Biobanking Working Group, EAZA Reproductive Management Group (RMG), EAZA Population Management Advisory Group (EPMAG), EAZA Education Committee, EAZA Nutrition Working Group, EAZA Research Committee, Reintroduction and Translocations Group, Transport Working Group, EAZA Veterinary Committee, EAZA Conservation Committee, Animal Welfare Working Group, Palm oil Working Group).*

Biobanking Working Group

Educational Committee

Others to be identified after liaising with relevant population biologists

5. Programme characteristics

The detailed programme characteristics, goals, objectives and management strategies to fulfil the roles and goals of the EEP will be developed at a later stage as part of a Long-Term Management Plan (LTMP). The questions below are intended to help paint a rough view of what is currently intended/expected for the general EEP programme characteristics.

- *If there is a recent/active Long-term Management Plan for this species, list the demographic, genetic and other goals determined (if they still apply post RCP workshop).*

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The European Monitoring Programme: Raja undulata (Fourth edition 2022). This began in 2015. Long-term Management Plan, conducted by SEALIFE. The EEP will replace this programme.

EEP: a check-in and a Long-term management plan with Population biologists from EAZA executive office to help with the population management and the development of the roles.

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Genetic analysis: Conducted on aquarium rays in the UK (Hunter et al. 2016). Microsatellite markers were created by Fox et al. (2018). Microsatellite markers and mtDNA analysis was applied from this on wild populations from Morocco up to the south coast of England, using tissue sampling and non-intrusive mucus sampling.

The Undulate Ray Programme: encompasses in-situ and ex-situ conservation of *Raja undulata* to determine unknown biological and behavioural aspects of the species.

- *What is the anticipated duration of the programme?*

The estimate duration of the programme is 10 years.

- *What is the anticipated likelihood and time scale of the use of the EEP population for restoration in the wild (reintroduction, reinforcement, etc.)?*
- It is estimate that The Undulate Ray Programme will be adapted over the next ten years to overcome barriers in the application of conservation (such as reintroductions etc.). *Are some or all the individuals within this EEP intended to be held in specialist ex situ centres in the species' native range? Specify.*

All undulate rays are held in the aquariums within the native range. Genetic analysis has and will be conducted to determine the origin populations of individuals and their offspring to maintain regional genetic diversity.

- *Is it expected to be necessary that the whole population, or a certain proportion thereof, will need to be held off exhibit in order to fulfil the roles of the programme? If yes, please explain. (this question does not refer to the temporary housing of individuals off exhibit for space reasons)*

No

- *Does a part or the whole of the EEP population need to be held in bio-secure facilities? And/or are there known diseases that have an above average effect on fulfilling the roles of the EEP?*

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There are no known diseases of Undulate Rays under human care. Routine preventative treatment such as Flukesolve or similar anti-parasitic treatments will be in place.

- *What is the expected estimated number of individuals and institutions required to fulfil the selected roles? (this question will be answered in detail during the LTMP session for the taxon, but if some indication of scale is clear already, this should be stated here)*

The European Monitoring Programme 2022 identified 112 individuals in 39 aquariums in Europe. The Tag census in 2021 showed 177 individuals from 39 aquariums. The differences between population sizes 2021 and 2022 are due to the aquariums that responded and a natural change in the population size over time. For more information, please see the European Monitoring Programme 2022 report.

- *Is this EEP intended to include rearing of wild eggs/young (i.e. head-starting)?*

No

- *Is this EEP intended to include ex situ breeding?*

Yes

- *Is there likely sufficient expertise for this, or a model, taxon to achieve the roles of the programme and provide conditions for good welfare? Please indicate if Best Practice Guidelines already exist and if yes, include publication date.*

To establish a best practice guide for the species, an Undulate Ray working group has been established to share information and ideas on development. This will develop the best practice guidelines and improve welfare and conservation messaging. Advancing welfare in housing undulate rays was covered in the European Monitoring Programme 2022.

- *Will (non-)breeding and transfer recommendations be issued? If yes, with what frequency? (naturally problems will need to be solved throughout the year, but with what frequency will recommendations be issued for the whole population at once)*

Yes. The European Monitoring Programme has identified possible individuals for transfer. Within the proposed EEP, extended communication and transfer

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of individuals will be increased. In the European Monitoring Programme 2022, 5 aquariums identified wanted or surplus individuals for transfer.

- Do you anticipate that the EEP population will be (largely) closed or will there be regular planned additions of individuals? In case of the latter, will this be for genetic and/or demographic reasons and what will be the source (other ex situ sources and/or from the wild)?*

To maintain a healthy and genetically viable population of undulate rays, individuals will need to be sourced from either the wild or transferred correctly in accordance with the genetic diversity between aquariums.

The number of viable breeding adults in aquariums is decreasing.

- Do you expect genetic and demographic management in this EEP to be individual and/or group-based?*

The genetic and demographic management will be individual-based.

- Do you expect genetic management in this EEP to be based on pedigree analysis, group history analysis, and/or molecular genetics?*

The genetic management will be based on viable methods depending on the aquarium. All three methods of management, including pedigree analysis, group history analysis and molecular genetic analysis will be used depending on the limitations of the aquarium resources.

- Do you anticipate, or proactively plan for, biobanking and/or assisted reproduction to be key components of this programme?*

We anticipate to biobank samples and work with research institutions such as universities to assist in future genetic analysis.

- Do you anticipate certain national or international legislation to form a particular hindrance (more than average) to achieving the roles of your EEP (e.g., CITES, BALAI, governmental ownership, etc.). If so, explain how.*

Currently No.

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- *Are there any other issues/plans related to in situ conservation support that you feel should be mentioned and are not evident from the role description of the EEP?*

The species has had specific levels of regulations in fisheries management that varies depending on the ICES (International Council for the Exploration of the Sea) region and country.

- *Is there a research component/aspect to the EEP that is expected to have important consequences for the design of the EEP programme (e.g. housing and husbandry of a significant proportion of the population, etc.)? If yes, explain.*

The Undulate Ray Programme aims to locate eggs and juveniles using underwater visual surveys along the south coast of England. This has not yet been published in peer-reviewed literature. Understanding the location/niche of the eggs and hatch individuals/juveniles will help better conserve the species and provide appropriate housing ex-situ improving welfare.

The Undulate Ray Programme has two components: in-situ conservation which includes stakeholder group in an advisory role with quarterly meetings, and an ex-situ group of aquarium curators and relevant members which form the Undulate Ray Working Group.

- *Do you anticipate there to be any sizeable political, social, or public conflicts of interest related to the EEP programme and how do you plan to deal with them?*

The Undulate Ray Programme has built a stakeholder engagement of government and non-government agencies in the UK.

As part of the EEP, social impact evaluation on conservation messaging of the species is aimed to be implemented in some aquariums.

Sizeable conflicts regarding the species is not predicted outside of the current norm.

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- *Any important additional programme characteristics that you would like to mention?*

No

6. References (if any)

- Fox, G., Darolti, I., Hibbitt, J.D., Preziosi, R.F., Fitzpatrick, J.L. and Rowntree, J.K., 2018. Bespoke markers for ex-situ conservation: application, analysis and challenges in the assessment of a population of endangered undulate rays. *Journal of zoo and aquarium research*, 6(2), pp.50-56.
- Fox, G., Darolti, I., Hibbitt, J.D., Preziosi, R.F., Fitzpatrick, J.L. and Rowntree, J.K., 2018. Genetic assessment of ex situ populations to aid species conservation and maintain heterozygosity in non-model species. *Journal of Zoo and Aquarium Research*, 6(2), pp.50-56.
- Hibbitt, J-D., 2015, European Monitoring Program (Mon-P) 2015, 2nd Edition. Merlin Animal Welfare & Dev, Weymouth SEA LIFE Adventure Park, UK.
- Hibbitt, J-D., 2017, European Monitoring Program (Mon-P) 2017, 3rd Edition. Merlin Animal Welfare & Dev, Weymouth SEA LIFE Adventure Park, UK.
- Hook, S., 2020. The application of genetics and proteomics for the conservation of sharks and their relatives (Doctoral dissertation, University of Manchester).
- Hook, S.A. and Brown, C., 2022, European Monitoring Programme (Mon-P) 2022 4th Edition. Conservation, Welfare and Engagement, SEA LIFE UK.
- Hook, S.A., Musa, S.M., Ripley, D.M., Hibbitt, J.D., Grunow, B., Moritz, T. and Shiels, H.A., 2019. Twins! Microsatellite analysis of two embryos within one egg case in oviparous elasmobranchs. *Plos one*, 14(12), p.e0224397.
- Hunter, K., 2017. The Development of Molecular Techniques for the Conservation of Captive Elasmobranchs (Doctoral dissertation, The University of Manchester (United Kingdom)).
- Janse, M., Baylina, N., Wille, M., Aparici Plaza, D., van der Meer, R., Hausen, N. (eds.) 2021. EAZA Elasmobranch Taxon Advisory Group Regional Collection Plan – First Edition. EAZA Executive Office: Amsterdam.