Proposal Guidelines:
Wild Genomes - Kelp Forest Ecosystems

PROGRAM SUMMARY

Revive & Restore and Morris Animal Foundation are pleased to partner on the Wild Genomes - Kelp Forest Ecosystems Program: a new funding opportunity for conservationists interested in applying genetic insight to the protection and management of kelp ecosystems.

Wild Genomes funding calls are topic-specific. We are now accepting Wild Genomes proposals focused on species that live within kelp forests. From fish, to invertebrates, sea birds, marine mammals, and kelp, all species belonging to kelp ecosystems qualify. Proposals should describe a conservation-oriented effort that will benefit substantially from genomic sequencing and biobanking.

Wild Genomes is designed to accelerate the genomic sequencing and biobanking of species with a clear conservation need. Potential projects will be evaluated according to timeliness and urgency (e.g. at-risk species), the ecological role of the targeted species (e.g. keystone species), the species' potential role in providing ecosystem services, and the potential impact of the project. Through this program, we aim to put the fundamental tools of genetic rescue into the hands of people who manage wildlife to achieve positive conservation outcomes.

Researchers interested in applying to Wild Genomes should download the proposal template.

Applications for the Kelp Forest Ecosystems topic are due December 16, 2022, at 5:00 p.m. ET.

WILD GENOMES PROPOSAL CRITERIA

Target Species and Conservation Need:

- Wild Genomes - Kelp Forest Ecosystems projects must aim to create genomic resources for kelp forest species of conservation relevance.
- The ideal target taxon will have ecological significance, strategic conservation value and/or evolutionary significance. Examples of poor candidates are species that can be recovered by traditional means without genetic rescue; that play little significant role in their habitat; or whose extinction would not be a major loss to evolutionary biodiversity.
- For the Kelp Forest Ecosystems topic, proposals should focus on collecting data that will help conservationists make a more informed decision(s) regarding the conservation, management and/or restoration of a relevant taxon. We are especially

interested in proposals that address genomic insight into the health of kelp forest species, ecological imbalances such as urchin overgrazing, and climate resilience. Other topics of interest include, but are not limited to the impacts/mitigation of commercial harvesting, coastal development, and pollution.

- Proposals that focus on the genomics of pathogens or parasites, including fungi, protists, bacteria or viruses are specifically excluded from this program.
- Proposals that make use of captive populations of a target species will be considered, particularly where the results will be used to inform wild release. However, a preference will be given to proposals that address wild populations directly.
- Target species can be from any kelp forest, provided that high quality samples can be obtained for nucleic acid preparation and tissue biobanking.
- Target species can be from any area of the world; however, required import and export permits must be obtained by the research teams prior to the start of funding. For example, Revive & Restore/Morris Animal Foundation will not be able to support the acquisition of CITES permits, or compliance of Nagoya protocol procedures in either the country of origin or the United States. Similarly, researchers working with endangered species protected in the United States at the federal or state level must ensure proper permits are obtained for sample collections.

Genomic Resources and Biobanking:

- Biological samples must be collected in a manner consistent with high quality nucleic acid preparation. Proposers may use the rough guidelines in the table below to estimate the type of samples that will be required for creating a reference genome:

Tissue Type (in order of preference)	Minimum Amount
Tissues	
Blood	50-100 ml
Sperm cells	5×10^7 - 10×10^7
Liver	1 g
Spleen	1 g
Brain	1 g
Heart	1 g
Muscle	1 g
Lung	1 g
Purified DNA	
High mol weight (50+ kbp)	20+ µg

- Duplicate tissue samples, or vouchers, must be collected in a manner consistent with cryopreservation for the species of interest and stored along with relevant metadata in a publicly accessible biobank.
- All teams, especially those that do not have a preferred biobank, or that lack experience with tissue preservation, are encouraged to store tissue samples at the Smithsonian National Museum of Natural History (NMNH). In collaboration with NMNH curators, Revive & Restore will provide taxon-specific guidelines for tissue collection, storage and shipping conditions to all successful applicants. Research teams can propose an alternative biobank for storing samples.
- All resultant data from tissue collections created through the Wild Genomes program, including sequencing data, metadata and locations of banked biospecimens, must be held in a publicly accessible repository. Examples include the UC Santa Cruz Genomics Institute, NCBI GenBank and Ensembl Genomes.
- Revive & Restore/Morris Animal Foundation will work with successful applicants on the details of data and specimen storage plans prior to the start of the project. It is not necessary for proposing teams to have a plan for biobanking and data storage prior to applying to Wild Genomes. However, proposals may indicate the team's data and specimen storage preferences.
- Research teams working on specimens to be collected outside of the United States must comply with legal and regulatory parameters of the country of origin. Proposals should describe any legal or regulatory requirements that will need to be addressed. Where necessary, the biobanking and storage plan will be tailored to meet country-specific guidelines.

Sequencing Standards:

- Teams can apply for funding of reference genome assembly and/or lower levels of resequencing to address the needs of specific conservation applications.
- For reference genome assembly, Wild Genomes will use the G10K minimum quality metric for error-free gapless assembly: contig N50 of 1 million bp (1Mb), scaffold N50 of 10Mb, 90% of the genome assembled into chromosomes confirmed by two independent sources, a base-call quality error of no less than QV40 (no more than one nucleotide error in 10,000 bp) and haplotype phased.
- For reference genome assemblies that are particularly difficult, either due to size, degree of heterogeneity, or limitations of sample sizes or quality, the metrics stated above may be relaxed. This decision will be made on a case-by-case basis.
- Teams able to leverage an existing reference genome for a target species can apply for funding for lower resolution genome sequencing to meet the needs of a conservation application. For example, population genomics studies may require

whole genome sequencing of a vast number of individuals of a species that already has a reference genome available.

- With the exception of reference genomes, the type of sequencing that proposals request (including whole genome resequencing, shot gun sequencing, transcriptomics and/or eDNA barcoding) must be justified by the needs of the intended conservation application. For example, whole genome sequencing for applications that require only barcode sequencing will not be funded.

Key Personnel:

- Wild Genomes teams must include a field scientist(s) with knowledge of and access to tissue samples that have been, or can be, collected from wild populations of the target species.
- Wild Genomes teams may include an expert in molecular biology, especially those with experience in DNA and RNA library preparation from tissue samples of the target species.
- Wild Genomes teams may include an expert in genomics, especially those with experience in comparative genomics, for deriving relevant information from genomic resources provided by the project.
- Teams of field biologists that lack molecular or genomics expertise may apply to Revive & Restore for assistance in identifying suitable collaborators.
- Teams of molecular and/or genomics experts that lack field expertise or ability to access tissue samples from wild populations are not eligible. If such teams are interested in joining a Wild Genomes project, please inform Revive & Restore by email.
- Revive & Restore/Morris Animal Foundation will provide reference genome assembly services through our established commercial partners. However, proposing teams can apply to use alternative genome assembly services that meet the same quality standards at equal or lower cost.

Conservation Application and Transition:

- Any wildlife conservation effort that could benefit from, or be made possible through, the use of amphibian genetic resources could be an appropriate impetus for a Wild Genomes - Kelp Forest Ecosystems project. Examples include, but are far from limited to, genomic insight into a kelp forest species' health, climate change resilience, or the impacts/mitigation of commercial harvesting, pollution, or coastal development.
- The purpose of Wild Genomes is to provide the genetic/genomic information necessary to aid conservation applications. The conservation applications are themselves beyond the scope of the program and should have a separate source of funding.

- The conservation application does not need to be conducted by the same research team applying to Wild Genomes. The conservation application may involve individuals or entities with no formal connection to the Wild Genomes team. However, Wild Genomes proposals will benefit from letters of support from qualified partners willing to carry out the intended conservation application.
- Proposals should describe the details of potential conservation applications that could benefit from the proposed Wild Genomes project, including potential application partners/organizations and the status of the potential conservation project (e.g., whether the project has started, if it is funded and the interest of those involved in making use of genetic insight).

ADDITIONAL CRITERIA

Health Study Policy: Projects must adhere to the Morris Animal Foundation's Health Study Policy for Animals Involved in Research. Our preference is not to fund projects that include euthanasia of animals for research purposes, or that derive data and/or samples from such projects. Justification for such activities needs to be significant in terms of rejecting alternative approaches. Note that proposals recommended for funding by scientific reviewers are reviewed separately by animal welfare and ethics experts prior to funding.

Parachute Science: Projects that include international collaborations should address international scientific engagement and benefits and include a named principal investigator (PI) or co-investigator in the country where the research will occur. We endeavor to achieve impact through ethical pathways and with the clear intention of inclusivity, diversity and the elimination of the practice of parachute/colonial science.

COVID-19 Considerations: Research plans must include mitigation strategies for operational risks posed by the ongoing COVID-19 pandemic. Alternative strategies for travel restrictions, pandemic related mandates, supply shortages, etc., should be included in the proposal.

Environmental Policy: Consideration should be given to reducing the detrimental effects of research projects on the environment. Travel requests should be limited and well justified with respect to the project objectives. We encourage means of transportation with the lowest possible carbon emissions.

PROPOSAL GUIDELINES

All Wild Genomes proposals must use the provided proposal template. Please pay attention to word limits.

Proposal Format: Proposals must address all sections of the template. Incomplete proposals may be disqualified from review.

Proposals must include a budget, as described in the template. The budget should include any costs associated with the collection, processing, sequencing and storing of the genomic data and tissue samples required for the Wild Genomes project. Budgets should not include costs associated with basic research into the natural history of the target species, or habitat exploration or characterization. Revive & Restore/Morris Animal Foundation will pay indirect costs up to 8% of the total project cost.

APPLICATION PROCESS

All proposals should be submitted through AIBS SCORES. Create an account and follow the instructions to submit your proposal.

Approval: An authorized administrative official from your institution/place of work must approve your application. This should be done after all required sections are complete and attachments uploaded.

To initiate the institutional approval and submission process, click “select your approval invitee” and identify the individual responsible for signing off on your proposal from your designated person records that you created earlier.

Finalize Your Submission: Before you click “FINALIZE” you can review your entire submission by clicking on “Click here to preview your current submission content prior to finalizing it.” If you are missing any attachments, a message will prompt you to add the missing item. If all components are present/uploaded, the submission can be finalized. At this point content cannot be changed unless the institutional official declines approval.

Once you click “FINALIZE” your nominated approval official will be notified by email and asked to review, validate and officially submit your application. THIS MUST BE DONE BEFORE THE DEADLINE. It is the applicant’s responsibility to make sure that their Institutional Official has sufficient time to approve the application before the deadline. Your application is not considered to be fully submitted until approval is received – you will receive an email confirming approval. You also can check the status of your submission by logging onto the system, navigating to the proposal mechanism and clicking on your submission link.

Questions Regarding the Submission Process: Please contact wildgenomes@aibs.org for technical assistance.