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## Plan Overview

*A Data Management Plan created using DMPonline*

**Title:** Monitoring of reef fish

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**Template:** DCC Template

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### Project abstract:

The Marine Remote Imagery Platform (MARIP) at the NRF-SAIAB collects video footage using benthic and more recently, pelagic, Baited Remote Underwater Stereo-Video systems (stereo-BRUVs). Baited remote underwater stereo-video systems (stereo-BRUVs) allow ecosystem, community and species-level research on fish and benthic habitats to be conducted in a non-obtrusive manner while providing a permanent record to refer back to. Such information may contribute to conservation, fisheries management and our general ecological understanding.

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# Monitoring of reef fish

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## Data Collection

### What data will you collect or create?

Data type	Data format	Data volume	Data longevity	Data details
Video (samples & calibration)	.mp4, .MTS, .avi	approx. 800GB (samples), 20GB (calibration) per sampling trip	long term access	Two videos per sample
Image (benthic habitat & field of view)	.JPG, .PNG	approx. 20MB per sampling trip	long term access	At least one image extracted per sample
Metadata/sample data & backup	.xlsx, .JPG (backup)	approx. 90KB per sampling trip	long term access	Updated regularly as biodiversity data are extracted from video footage. Back up images (scans/photographs of hard copy field recording sheet) may not be needed on more than one storage system (will always be saved on institute's storage system)
Species, MaxN, fish length and benthic habitat data	.xlsx	approx. 700KB per sampling trip	long term access	Updated regularly as biodiversity data are extracted from video footage.
Calibration files	.Cam, .CamCAL, .PtsCAL, .obsCAL, .projCAL	approx. 30KB per sampling trip		Only .Cam files essential. All others may not be needed to be saved on more than one storage system (will always be saved on institute's storage system)
EventMeasure EMOBs (or if analysed using VLC software, an Excel file will be produced)	.EMObs or .xlsx	approx. 3MB per sampling trip		Updated regularly as biodiversity data are extracted from video footage.
TransectMeasure TMOBs or Coral Point Count files	.TMOBs or .CPCe	approx. 210KB per sampling trip		Updated regularly as biodiversity data are extracted from video footage.
Raw temperature data	.hobo, .xlsx, .txt	approx. 480KB	long term access	Raw .hobo files and .txt files may not be needed to be saved on two storage systems (will always be saved on institute's storage system). Processed data are entered into metadata/sample data Excel file
GPS & Mapping data (depth data, GPS coordinates)				

### How will the data be collected or created?

<b>Data type</b>	<b>Data collection/storage</b>
Video (samples & calibration)	Deployment of stereo-BRUVs for a minimum of one hour according to SOPs & named according to unique sample code. Quality assurance when downloading videos is carried out according to SOPs & video is generally left in original format (no versioning).
Image (benthic habitat & field of view)	Extracted from each left stereo-BRUVs video once system has settled on seafloor according to SOPs & named according to unique sample code. Quality assurance of images is carried out when storing data according to SOPs & only the original image is used throughout project.
Metadata/sample data & backup	Recorded on hard copy sheet during sampling trip and transcribed into Excel template file according to SOPs & named according to unique sample code. Quality assurance at multiple stages of project are carried out according to SOPs & multiple versions are created using standardised naming system according to date and sample code
Species, MaxN, fish length and benthic habitat data	Extracted from videos using specialised software according to SOPs & named according to unique sample code. Quality assurance at multiple stages of project are carried out according to SOPs & multiple versions are created using standardised naming system according to date and sample code
Calibration files	Extracted from videos using specialised software according to SOPs & named according to unique sample code. Quality assurance at multiple stages of project are carried out according to SOPs & original files are used throughout project.
EventMeasure EMOBs (or if analysed using VLC software, an Excel file will be produced)	Exported from specialised software according to SOPs & named according to unique sample code. Quality assurance at multiple stages of project are carried out according to SOPs & multiple versions are created using standardised naming system according to date and sample code
TransectMeasure TMOBs or Coral Point Count files	Exported from specialised software according to SOPs & named according to unique sample code. Quality assurance at multiple stages of project are carried out according to SOPs & multiple versions are created using standardised naming system according to date and sample code
Raw temperature data	Downloaded from temperature probes at the end of sampling trips according to SOPs & named according to unique sample code. Quality assurance at multiple stages of project are carried out according to SOPs & original file is used throughout project
GPS & Mapping data (depth data, GPS coordinates)	Downloaded from vessel's echo-sounder and GPS system at the end of sampling trips according to SOPs & named according to unique sample code. Quality assurance at multiple stages of project are carried out according to SOPs & original file is used throughout project

## Documentation and Metadata

### What documentation and metadata will accompany the data?

Additional Excel worksheets saved as text files can accompany the metadata, which include project details, fieldtrip details, equipment details and calibration details. Metadata is saved in a template Excel file according to SOPs to ensure standardisation and user-friendliness.

## Ethics and Legal Compliance

### How will you manage any ethical issues?

Data sharing agreements put in place should cover consent for data sharing/preservation.

Need to elaborate on how to protect the identity of participants if required & how sensitive data will be handled to ensure it is stored and safely transferred

### How will you manage copyright and Intellectual Property Rights (IPR) issues?

Who owns the copyright and IPR of any data that is collected and stored, along with the licence for it's use/reuse needs to be elaborated on. As well as possible consortium agreements for multi-partner projects.

Data sharing will be immediate once available. However, for student datasets, the data will only become available after an embargo period of two years once the student has completed their degree. This period is flexible and is agreed upon for specific projects.

## Storage and Backup

### How will the data be stored and backed up during the research?

Need to elaborate on whether there is sufficient storage and requirements?

Datasets are originally stored on mobile hard drives (one primary and one back up copy). Immediately after each sampling trip, the project administrator will ensure data are backed up on a restricted access institute's storage system in a template folder system. Only a single copy is uploaded and after quality control procedures are carried out to ensure datasets on mobile hard drives and institute's storage system are identical, will the copies on the mobile hard drives be deleted.

In the event of an incident and the data needs to be recovered, the IT manager will recover the data from the back up system for the institute's storage system.

### How will you manage access and security?

Need to elaborate on the risks to data security and management options and ensuring collaborators can access data securely.

A back up of the data collected in the field is carried on a separate mobile hard drive back to the institute. A quality controller works through quality control SOPs to ensure that the data are backed up securely and correctly onto the institute's storage system. Contents on all storage devices are checked that they are identical before removing datasets off of mobile hard drive systems.

## Selection and Preservation

### Which data are of long-term value and should be retained, shared, and/or preserved?

Need to elaborate on any data that needs to be retained/destroyed for contractual, legal or regulatory purposes.

The raw data and processed data are both retained. The raw data acts as a back up and due to the lengthy process time required to extract biodiversity data from the raw data, the processed data are also retained. The raw data (video footage) is also retained because it has a high reuse value, can be used to validate research findings, conduct new studies and can be applied in education/media/teaching opportunities.

Need to elaborate on how long the data needs to be retained and preserved.

### What is the long-term preservation plan for the dataset?

Complete datasets will be saved in institute's storage system and only the metadata and processed biodiversity data will be preserved in Specify, GBIF and OBIS. Costs for the selected data repository or archive need to be elaborated on.

With strict adherence to SOPs and templates with strict quality control procedures in place, the costs in time and effort to prepare the data for sharing/preservation are minimal. They do, however, require human operation.

## Data Sharing

### How will you share the data?

Metadata will be published and shared on GBIF and OBIS as soon as possible after sampling trips. Biodiversity data will be published and shared on GBIF and OBIS as soon as they become available or immediately after a specified embargo period, for certain projects. For student projects, the embargo period will commence from the time that the student graduates. The length of the embargo period will be two years, however, this is flexible and will be agreed upon by the project partners.

Access to data will be free and available to anyone via GBIF/OBIS. Access to videos, which are stored on the institute's storage system, will be controlled manually by the IT manager.

**Are any restrictions on data sharing required?**

Videos and biodiversity datasets need to be exclusive for the specified embargo period, for certain projects, to provide sufficient time for the student to complete required outputs before making the data available to the public. This embargo period will be two years from the date of graduation. This period, however, is flexible and will be agreed upon for each project.

Data sharing agreements will be required.

**Responsibilities and Resources****Who will be responsible for data management?**

Principal researcher (Dr Anthony Bernard) and research team are responsible for video and metadata capture and production. The project administrator (quality controller-Roxanne Juby) is responsible for the data quality and primary storage of data in the institute's storage system. The management and maintenance of the institute's storage system is under the control of the institute's IT department (Wesley Phillips). Data archiving and sharing is in control of the data manager (Willem Coetzer). The principal researcher and data manager are in control of required policies and agreements.

**What resources will you require to deliver your plan?**

To be confirmed