Guide to writing an

Environmental Monitoring Plan

# Use this guide as a scoping exercise to assist in developing the environmental stress reduction activity monitoring plan. Use this with the national results framework and/or workplan. The toolkit for environmental monitoring includes the following:

|  |  |
| --- | --- |
| **Document Name** | **Purpose** |
| **Guidelines and Templates** | |
| Baseline and Monitoring Guidelines (and abridged) | A comprehensive paper that examines the different aspects of monitoring including site selection, schedule, data management and methods. |
| Guide to Writing and Environmental Monitoring Plan | To assist managers thinking about monitoring objectives, what parameters and methods are most suitable, timing and data management. |
| Environmental Monitoring Plan Template   * Dry Litter Piggery * Restoration | A generic template that can be completed using the guide. Additionally, templates specific to dry litter technology for pig waste management, and restoration |
| **Standard Operating Procedures** | |
| Compost System SOP | Guide monitoring of compost systems, primarily the waste from the dry litter technology, however, can be used in the Ecosan compost |
| Water Quality Monitoring Guide | Guide monitoring of coastal water sites, primarily for municipal waste reduction and catchment protection activities |
| Wastewater and Ecosan Monitoring Guide | Guide for monitoring the application of eco sanitation and updated on-site sanitation systems |
| Multimeter Manufacturer Manuals | Contains specific instruction for the YSI ProDSS and 3900 Photometer |
| **Field Activity Proformas** | |
| Pilot Project Site Description |  |
| On-ground Works – Dry Litter Technology |  |
| On-Ground Works – Regrowth Management |  |
| On-Ground Works – Remnant Enhancement |  |
| On-ground Works – Revegetation |  |
| Water Quality Field Data |  |
| Compost Monitoring Log |  |

# The information provided here is intended as a starting point only. All monitoring plans are unique based on specifications such as location, objectives, activities etc. and additional modification and adaptation of these resources will be applied as necessary.

# Step 1

## Program design considerations

**Existing information**

|  |  |
| --- | --- |
| **Project Details** | |
| Project Name |  |
| Project Manager |  |

|  |  |
| --- | --- |
| **Study Area Information** | |
| Surrounding land use |  |
| Dominant adjacent land use |  |
| **Sources of Pollution** | |
| Human-induced |  |
| Natural variation |  |
| **Government Bodies** | |
| Traditional |  |
| District |  |
| Municipal |  |
| Provincial |  |
| National |  |
| **Related Non-Government Organisations** | |
| Stewardship Groups |  |
| Other |  |
| **Are there other groups (including polluters) conducting monitoring in the area?** | |
| Name and type of monitoring |  |
| Other |  |

**1. What are the geographical sites you want to monitor? (River, stream, lagoon, coast, watershed, forest area etc.)**

Click or tap here to enter text.

**2. Are there known issues in this area? What are they?**

Click or tap here to enter text.

**3. Is there existing environmental monitoring data in this area? In adjacent areas? Please describe what and who has this data**

Click or tap here to enter text.

# Step 2

## Purpose

**1. What are the activities in this site that the IW project is conducting?**

|  |  |  |  |
| --- | --- | --- | --- |
| **Project component** | **Outcome** | **Target** | **Indicator** |
|  |  |  |  |
|  |  |  |  |
| **Year activities commenced:** | (*if not commenced, detail expected date of commencement*) | | |
| **Total number of sites within this activity:** |  | | |

**2. Are these activities for restoration, protection, enhancement purposes, or other? Please describe, can be more than one**

Click or tap here to enter text.

**3. What do you hope to achieve through this activity? What are the overall goals?**

Click or tap here to enter text.

1. **What are your activity objectives?**

|  |  |  |
| --- | --- | --- |
| **Main objective** of this activity  (*check one most relevant objective*) | Biodiversity conservation/ restoration  Stream bank stabilisation  Improved catchment management  Sustainable farming practices  Fisheries protection | Water quality improvement  Improved domestic animal waste management  Improved human waste management  Other (describe)…………………………. |
| **Other objectives**  (check any that apply) | Biodiversity conservation/ restoration  Stream bank stabilisation  Improved catchment management  Sustainable farming practices  Fisheries protection | Water quality improvement  Improved domestic animal waste management  Improved human waste management  Other (describe)…………………………. |

**5. List the questions you would like to address with the baseline assessment and monitoring of your project activities**

|  |  |
| --- | --- |
| **Questions or issues to be addressed** | **Information needed** |
|  |  |
|  |  |

# Step 3

## Selecting an activity and monitoring site/s

**1. Have the sites for activities been selected already? Please detail the method that has or will be used for choosing sites** (*for example was a criterion applied and different sites ranked*)

Click or tap here to enter text.

**2. If no site selection criteria have been established, what are some criteria that could be applied for choosing a priority site?**

Click or tap here to enter text.

**3. Where will you monitor? Including reference and target site as appropriate.**

|  |  |  |
| --- | --- | --- |
| **Site name** | **Brief description of location** | **Site type (target, reference, pilot)** |
|  |  |  |
|  |  |  |

Things to consider when choosing a site

* *Does the site have access issues? Is it on public or custodial land?*
* *How is the location situated in relation to project activities? Is it a reliable site to show the impact of activities?*
* *Will the site have reliable access at different times of day, of the year?*

# Step 4

## Maintenance

**1. What are the maintenance measures required for this activity? (weed clearing, fencing, compost turning etc.)**

# Step 5

## Selecting monitoring parameters

What parameters and conditions will you monitor? (*Refer to your logframe targets and GEF indicators. Not every country is covering all that is suggested below*)

**Water quality**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Why will you monitor this?** | **Sampling method** |
|  | Dissolved Oxygen |  |  |
|  | Conductivity |  |  |
|  | pH |  |  |
|  | BOD |  |  |
|  | Salinity |  |  |
|  | Total Dissolved Solids |  |  |
|  | Turbidity |  |  |
|  | Temperature |  |  |
|  | Chlorophyll |  |  |
|  | Blue green algae |  |  |
|  | Phosphate |  |  |
|  | Nitrate |  |  |
|  | Coliform |  |  |
|  | Benthic Macroinvertebrates |  |  |
|  |  |  |  |

**Catchment Revegetation and/or Habitat Restoration**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Sampling method** | **Why will you monitor this?** |
|  | Survivorship | Line intercept |  |
|  | Photo point | photo imaging |  |
|  | Problem weeds | Line intercept |  |
|  | Recruitment seedlings | Line intercept |  |
|  | Special lifeforms | Observation |  |
|  |  |  |  |

**Catchment Protection Measures**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Sampling method** | **Why will you monitor this?** |
|  | Native vegetation extent | Line intercept and observation |  |
|  | Native Vegetation Quality | Line intercept and observation |  |
|  | Voluntary management activities by stakeholders and/or landowners | Attendance at trainings. Site visits |  |
|  | On-ground operational works by the catchment authority | Activity tracking and reports |  |
|  | Community Engagement Activities | Activity tracking and reports |  |
|  | Planning Controls Implemented | Planning and implementation documents |  |
|  | Data collection and control | number of continual and complete metadata sets |  |
|  |  |  |  |

**Conserved/protected MPAs, and fish refugia habitat**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Sampling method** | **Why will you monitor this?** |
|  | Abundance of juveniles in fishery refugia areas | Line intercept and observation. Creel survey |  |
|  | Volume and size composition of commercially important fish | Creel survey |  |
|  |  |  |  |

# Step 6

## Sampling

**1.** **When will you sample?**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Site** | **Parameter** | **Frequency** | **Time of year** | **Time of day** | **Special weather conditions** |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

To consider in choosing frequency and duration: \*Consider these in relation to achieving monitoring goals and objectives

*What time of day is best for sampling? (Temperature, for example, can fluctuate naturally as the sun rises)*

*What time of year is best for sampling?*

*How frequently should monitoring take place?*

**2. Who will collect samples and/or data?**

|  |  |  |  |
| --- | --- | --- | --- |
| **Site** | **Parameter** | **Person Responsible** | **Agency** |
|  |  |  |  |
|  |  |  |  |

**3. What potential partnerships can be established to conduct activity and/or monitoring?**

Click or tap here to enter text.

**4. What resources will you need to conduct monitoring?**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Personnel** | **Training** | **Equipment** |
|  |  |  |  |
|  |  |  |  |

# Step 7

## Data use and management

**1. Who will use data from this monitoring program?**

|  |  |  |
| --- | --- | --- |
| **Data user** | **How will they use data** | **Level of data required** |
|  |  |  |
|  |  |  |

**2. Who will manage and analyse the data?**

Click or tap here to enter text.

**3. Who will data be available to and how?**

Click or tap here to enter text.

**4. Where will the data be stored? In what format?**

Click or tap here to enter text.

**5. Who will transcribe/transfer field data to permanent storage?**

Click or tap here to enter text.

**6. Where will you keep the hard copies of data?**

Click or tap here to enter text.

# Step 7

## Quality Assurance, quality control and safety

**1. What (if any) training is required to conduct sampling? (initial and refresher training requirements)**

Click or tap here to enter text.

**2. Who will calibrate and/or maintain monitoring equipment? What training is required?**

Click or tap here to enter text.

**3. Have a site survey and risk assessment been conducted? Were any risks identified? What are they? How will they be mitigated?**

Click or tap here to enter text.

**4. Is any safety training required?**

Click or tap here to enter text.

**5. Is any specific equipment or resources required to safely work at the sampling location? (First Aid kit, life jackets, footwear, reflective jackets, MSDS sheets) How will they be provided?**

Click or tap here to enter text.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Attachment 1** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Municipal Wastewater Pollution Reduction - M&E Workplan** | | | | | | | | | | | | |  |  |  |  |  |  |  |  |
| Name: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Project: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Date: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Activity** | **Year 1** | | | | **Year 2** | | | | **Year 3** | | | | **Year 4** | | | |  |  |  |  |
|  |  |  |  |
| **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | **Q2** | **Q3** | **Q4** | **Labour** | | **Materials** | |
| **Data Collection and Analysis** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | hr | $/hr\* | unit | $/unit |
| Develop monitoring tools | x | x | x | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Baseline Assessment Data collection (target, reference, management sites) |  |  | x | x |  |  |  |  |  |  |  |  |  |  |  |  | 16 | 224 |  |  |
| Revision of survey tools |  |  |  |  | x |  |  |  |  |  |  |  | x |  |  |  |  |  |  |  |
| Data Analysis and Management | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | 48 | 672 |  |  |
| Indicator Monitoring |  |  |  |  | x | x | x | x | x | x | x | x | x | x | x | x | 24 | 336 |  |  |
| Site Condition Surveys |  |  |  |  |  |  | x |  |  |  | x |  |  |  | x |  | 6 | 84 |  |  |
| Site maintenance (and as required) |  |  |  |  | x |  | x |  | x |  | x |  | x |  | x |  | 18 | 252 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Report Development** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 112 | 1568 |  |  |
| Develop database & establish reporting system | x | x | x | x |  |  |  |  | x |  |  |  |  |  |  |  |  |  |  |  |
| Baseline Assessment Report (target, reference, management sites) |  |  |  | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction Report |  |  |  | x |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Site Condition Report (target, reference, management sites) |  |  |  |  |  |  |  |  |  |  |  |  |  |  | x |  | 5 | 70 |  |  |
| Quarterly Monitoring Report (management site) |  |  |  |  | x | x | x | x | x | x | x | x | x | x | x | x | 24 | 336 |  |  |
| Mid-term Evaluation report |  |  |  |  |  |  |  |  | x |  |  |  |  |  |  |  | 5 | 70 |  |  |
| Dissemination |  |  | x |  | x |  |  |  | x |  |  |  | x |  |  | x | 16 | 224 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 700 |  |  |
| **Data Management** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Generating fact sheets and other communication materials |  |  |  |  | x |  |  |  | x |  |  |  | x |  |  |  |  |  |  |  |
| Assess and consolidate previous existing data | x | x | x | x |  |  |  |  |  |  |  |  |  |  |  |  | 40 | 560 |  |  |
| Populate regional and national database |  |  |  | x |  | x |  | x |  | x |  | x |  | x |  | x |  |  |  |  |
| Data Sharing |  |  |  |  | x | x | x | x | x | x | x | x | x | x | x | x |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 560 |  | \*$14/hr |

**Attachment 2**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Habitat Restoration - M&E Workplan** | | | | | | | | | | | | | |  | |  | |  | |  | |  | |  | |  | |  | |
| Name: |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |
| Project: |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |
| Date: |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |
| **Activity** | **Year 1** | | | | **Year 2** | | | | **Year 3** | | | | | **Year 4** | | | | | | | |  | |  | |  | |  | |
|  | |  | |  | |  | |
| **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | | **Q2** | | **Q3** | | **Q4** | | **Labour** | | | | **Materials** | | | |
| **Data Collection** |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | |  | |  | | hr | | $/hr\* | | unit | | $/unit | |
| Develop monitoring tools | x | x | x | x |  |  |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |
| Baseline Assessment data collection (target, reference, management sites) |  |  | x | x |  |  |  |  |  |  |  |  |  | |  | |  | |  | | 10 | | 140 | | 1 | | 1250 | |
| Revision of survey tools |  |  |  |  | x | x |  |  |  |  |  |  |  | | x | | x | |  | |  | |  | |  | |  | |
| Data Analysis and Management | x | x | x | x |  |  |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |
| Indicator Monitoring |  |  |  |  |  | x |  |  |  | x |  |  |  | | x | |  | |  | | 15 | | 210 | |  | |  | |
| Site Condition Surveys |  |  |  |  |  | x |  |  |  | x |  |  |  | | x | |  | |  | | 15 | | 210 | |  | |  | |
| Site maintenance (and as required) |  |  |  |  |  | x |  |  |  | x |  |  |  | | x | |  | | x | | 20 | | 280 | |  | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | |  | |  | | 60 | | 840 | |  | |  | |
| **Report Development** |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |
| Develop database & establish reporting system | x | x | x | x |  |  |  |  | x |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |
| Baseline Assessment Report (target, reference, management sites) |  |  | x | x |  |  |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |
| Activity Report |  |  |  | x |  |  |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |
| Site Condition Report (target, reference, management sites) |  |  |  |  |  | x |  |  |  |  |  |  |  | |  | | x | |  | | 10 | | 140 | |  | |  | |
| Half-Yearly Monitoring and/or Maintenance Report (management site) |  |  |  |  |  | x |  | x |  | x |  | x |  | | x | |  | | x | | 30 | | 420 | |  | |  | |
| Mid-term Evaluation report |  |  |  |  |  |  |  |  | x |  |  |  |  | |  | |  | |  | | 10 | | 140 | |  | |  | |
| Dissemination |  |  | x |  | x |  |  |  | x |  |  |  | x | |  | |  | | x | | 25 | | 350 | |  | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | |  | |  | | 75 | | 1050 | |  | |  | |
| **Data Management** |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |
| Generating fact sheets and other communication materials |  |  |  |  | x |  |  |  | x |  |  |  | x | |  | |  | |  | |  | |  | |  | |  | |
| Assess and consolidate existing data | x | x | x | x |  |  |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |
| Populate regional and national database |  |  |  | x |  | x |  | x |  | x |  | x |  | | x | |  | | x | |  | |  | |  | |  | |
| Data Sharing |  |  |  |  |  | x |  | x |  | x |  | x |  | | x | |  | | x | |  | |  | |  | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  | | \*$14/hr | |

**Attachment 3**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |
| Project: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |
| Date: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |
| **Activity** | **Budget** | | | | **Year 1** | | | | **Year 2** | | | | **Year 3** | | | | | **Year 4** | | | |
|  | |
| **Personnel** | **Equipment/Material** | **Analysis** | **Other (provide detail)** | **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | | **Q2** | **Q3** | **Q4** |  |
| **Data Collection** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Develop monitoring tools |  |  |  |  | x | x | x | x |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Baseline Assessment data collection (target, reference, management sites) |  |  |  |  |  |  | x | x |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Revision of survey tools |  |  |  |  |  |  |  |  | x | x |  |  |  |  |  |  |  | | x | x |  |  |
| Data Analysis and Management |  |  |  |  | x | x | x | x |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Indicator Monitoring |  |  |  |  |  |  |  |  |  | x |  |  |  | x |  |  |  | | x |  |  |  |
| Site Condition Surveys |  |  |  |  |  |  |  |  |  | x |  |  |  | x |  |  |  | | x |  |  |  |
| Site maintenance (and as required) |  |  |  |  |  |  |  |  |  | x |  |  |  | x |  |  |  | | x |  | x |  |
| **Report Development** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Develop database & establish reporting system |  |  |  |  | x | x | x | x |  |  |  |  | x |  |  |  |  | |  |  |  |  |
| Baseline Assessment Report (target, reference, management sites) |  |  |  |  |  |  | x | x |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Activity Report |  |  |  |  |  |  |  | x |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Site Condition Report (target, reference, management sites) |  |  |  |  |  |  |  |  |  | x |  |  |  |  |  |  |  | |  | x |  |  |
| Half-Yearly Monitoring and/or Maintenance Report (management site) |  |  |  |  |  |  |  |  |  | x |  | x |  | x |  | x |  | | x |  | x |  |
| Mid-term Evaluation report |  |  |  |  |  |  |  |  |  |  |  |  | x |  |  |  |  | |  |  |  |  |
| Dissemination |  |  |  |  |  |  | x |  | x |  |  |  | x |  |  |  | x | |  |  | x |  |
| **Data Management** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Generating fact sheets and other communication materials |  |  |  |  |  |  |  |  | x |  |  |  | x |  |  |  | x | |  |  |  |  |
| Assess and consolidate existing data |  |  |  |  | x | x | x | x |  |  |  |  |  |  |  |  |  | |  |  |  |  |
| Populate regional and national database |  |  |  |  |  |  |  | x |  | x |  | x |  | x |  | x |  | | x |  | x |  |
| Data Sharing |  |  |  |  |  |  |  |  |  | x |  | x |  | x |  | x |  | | x |  | x |  |