**Data collection and monitoring manual**

Citizen Science Diving Data Gathering Campaign.

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| Sector/ TOPIC: Marine Coastal Activities  **Components:**  [Tourist Amenities (Id=91)] -> [Diving Sites (Id=93)]  -> [Diving Centre (Id=92)] | | |
| TITLE: Monitoring scheme for touristic coastal amenities, namely Recreational Diving and Touristic Glass Bottom Boats following Ecosystem Based and Integrated Coastal Zone Management on the Jordanian coast of the Gulf of Aqaba | | |
| tARGET AREA  All the gulf of Aqaba interested by the diving activity. | | |
| frequency  Goals a), b), c), e) daily  Goal d), depending on the agreement with ReefCheck. | | |
| **MONITORING RATIONALE (System Component)** | | AMP regulates the diving activities of the 21 diving centres in Aqaba (Wissam Yahia Al-Hayek 2016).  Synergies with ongoing comparable activities, such as the program of ReefCheck and the project “Diving Clean Up” of ASEZA.  FIRST PHASE: training for the field work (protocol about the diving activity AND protocol/s about the status of coral reefs).  SECOND PHASE: application of the protocols (statistics about the diving activity AND monitoring the coral reefs).  Diving routes are not recorded yet, and only locals only locals as diving trainers and guides have this knowledge. |
| **MONITORING GOAL** | | 1. Quantify visitation frequency of diving sites in terms of numbers of daily dives, guiding diving centre, sites visited and dives lengths on the Jordanian sector of the Gulf of Aqaba. 2. Map the distribution of diving loads in terms of divers’ numbers, biographic info, experience, proficiency and observing environmental directives. 3. Provide daily information on the environmental conditions at diving sites through divers’ logs, observations and note taking. 4. Conduct Reef Check monitoring at six selected diving sites agreed on in the proposal. 5. Provide detailed descriptions on diving sites attractions, facilities accessibility and environmental stressors including incidental anthropogenic impacts and incidents encountered observed by divers. 6. Provide historical records on the above if available. |
| **LABORATORY ANALYSIS NEEDS** | | - |
| **Data Analysis and interpretation protocols** | | All the protocols will be collected and entered by the ISP responsible (JREDS). |
| DSS System Diagram & INDICATORS | | |
| **DIAGRAM ELEMENT:** [Diving Centre (Id=92)]   |  |  |  | | --- | --- | --- | | **Indicator** | **Description** | **Data Source and Notes** | | N° of Certified Diving Centres | N° of certified Dive Masters |  | | N° of Divers (Users) | Monthly and/or Yearly N° of Divers |  | | Night Dive Stats |  |  | | Number of diving boats |  | Jordan Maritime committee | | Numbers of daily dives |  | **Added in the ISP** | | Biographic info, experience, proficiency and observing environmental directives | **(to be modified in the ISP)** | **Added in the ISP** | |  |  |  | | | |
| **DIAGRAM ELEMENT:** [Diving Sites (Id=93)]   |  |  |  | | --- | --- | --- | | **Indicator** | **Description** | **Data Source and Notes** | | N° of Sites |  |  | | Sites visited |  | **Added in the ISP** | | Dives lengths |  | **Added in the ISP** | | Type of Sites |  |  | | Artificial Reefs |  |  | | Dive Sites Visitors |  |  | | Environmental conditions of diving sites | **(to be modified in the ISP.** For the ISP, here we need categories or variables expressed as numbers or clusters or categories**)** | **Added in the ISP** | | Diving sites attractions | **(to be specified in the ISP)** | **Added in the ISP** | | Facilities accessibility | **(to be specified in the ISP)** | **Added in the ISP** | | Environmental stressors including incidental anthropogenic impacts and incidents | **(to be modified in the ISP.** For the ISP, here we need categories or variables expressed as numbers or clusters or categories**)** | **Added in the ISP** |   **DIAGRAM ELEMENT:** Fish (Id=33)   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Indicators attached to component: Fish (Id=33)** | | | | | | **Name** | **Description** | **DataSource** | **UpdateFrequency** | **Notes** | | Presence of species |  |  |  |  | | Abundance of Key species |  | Reefcheck |  |  | | Size of the key species |  | Reefcheck |  |  | | RED list species |  |  |  |  |   **DIAGRAM ELEMENT:** [Crustacea (Id=38)]   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Indicators attached to component: Crustacea (Id=38)** | | | | | | **Name** | **Description** | **DataSource** | **UpdateFrequency** | **Notes** | | Chek list |  |  |  |  | | Presence of key species |  |  |  |  |   **DIAGRAM ELEMENT:** [Marine Reptiles (Id=41)]   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Indicators attached to component: Marine Reptiles (Id=41)** | | | | | | **Name** | **Description** | **DataSource** | **UpdateFrequency** | **Notes** | | Presence |  | Reefcheck JREDS |  |  | | Class age |  |  |  |  |   [Mollusca (Id=39)]   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Indicators attached to component: Mollusca (Id=39)** | | | | | | **Name** | **Description** | **DataSource** | **UpdateFrequency** | **Notes** | | Check list |  |  |  |  | | Presence of key species |  | Reefcheck JREDS |  |  | | Size estimation of key species |  | Reefcheck |  |  |   [Marine mammals (Id=44)]   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Indicators attached to component: Marine mammals (Id=44)** | | | | | | **Name** | **Description** | **DataSource** | **UpdateFrequency** | **Notes** | | Presence | Dolphins: seasonal visitors, only during spring  Exception: blue whale (one observation) | JREDS  Reefcheck  National Monitoring programme |  |  | | | |
| Data Collection Procedure | | |
| Staff | Trainers to prepare the diving centres’ operators (first phase)  Diving tourists (volunteers?) and diving centres’ operators willing to participate to the monitoring protocol.  JREDS staff (for the field work and for entering data or both the activities). | |
| Equipment | Other  Camera  iPad (to register the info) | |
| Protocol | **Monitoring goal a):** updating the maps of Wissam Yahia Al-Hayek (2016). In the ISP the database of 2014 reports the “name of the site” and the “name of the diving centre”. As indicators, ISP has both the “number of visitors” for each diving centre and that for each diving site.  **Monitoring goal b):** Divers' number for each site is a deduction from the data collected with the goal a). Biographic info, level of environmental awareness and other is not immediate. It must be anonymous and respect other privacy rules. In the ISP there are data about Gender and Nationality for each diver.  **Monitoring goal c):**  **Monitoring goal d):**  **Monitoring goal e):**  **Monitoring goal f):** In the ISP the data entered dates back only to 2014. So, the target would be collate the same information for the other years.  **General comments:**   * The monitoring outcomes should be published online. * All the materials / outcomes need to be translated in a broad range of relevant languages, to guarantee to support successful and long-term engagement of both operators and their customers. | |
| Quotations |  | |
| **References:**  Wissam Yahia Al-Hayek 2016. Assessing Integrated Coastal Zone Management (ICZM) Status in Aqaba: A Participatory Geographic Information System (PGIS) Approach. PhD Thesis. University of York: 305 pp.  H2020 SOPHIE Consortium (2020) “Pilot Tourism & Citizen Science Programme on Oceans and Human Health: Report on Results & Recommendations”. H2020 SOPHIE Project. Madrid, Spain. DOI 10.5281/zenodo.3859389  Davis L.S., Zhu L. and Finkler W. 2023. Citizen Science: Is It Good Science? Sustainability, 15, 4577. https://doi.org/10.3390/su15054577 | | |