What is CMAP?

The RESTORE Council Monitoring and Assessment Program (CMAP), administered by the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Geological Survey (USGS), spatially and temporally inventoried programs in the Gulf of Mexico focused on water quality and habitat monitoring and mapping.

The Inventory

Over 12,500 program and project records were evaluated for inclusion in the Inventory. A total of 544 monitoring and mapping programs met the CMAP criteria (e.g., located in the Gulf of Mexico region, established since 1980, minimum data record of five years) and are cataloged in the Inventory. For more information, please see the Inventory report (NOAA and USGS, 2019).

Number of habitat monitoring programs found within the CMAP Area of Interest. Of the 243 habitat monitoring programs found in the Inventory, most are found in the state of Florida (n = 144).

Note: Programs can occur in multiple states.

General Parameter Group
- Abiotic
- Plants/Macroalgae
- Submerged habitat-building animals (SHBA)
  (Comprised of animals such as corals, sponges, tube worms, or bivalves/oysters)

Occurrence of habitat monitoring parameters in the Inventory (NOAA and USGS, 2019)

243 habitat monitoring programs
27 detailed parameters
3 general parameter groups


Project website | https://restorethegulf.gov/cmap
Common Monitoring Information

Protocol information from the Inventory programs and guidance documents was synthesized and evaluated to determine which parameters, methods, and units were most commonly measured and implemented within each habitat type. For example, 43 programs measured density in the SHBA group. Within the SHBA group, 19 programs measured density in the oyster/bivalve bed habitat type, and 13 of those programs had a single documented collection method (visual observation).

In order to evaluate each of the programs in the Inventory, documentation level for each program was assessed. Programs are considered having Complete Documentation if all 7 Monitoring Program Elements (MPEs) are accessible:

- **Point of contact**
- **Web accessible data**
- **Machine readable data**
- **Accessible metadata**
- **Analytical procedures**
- **Collection procedures**
- **Quality assurance protocol**

Gap Assessment: A Workflow

Where are oyster/bivalve bed habitats monitored in the Gulf of Mexico?

Parameter(s) of interest?

SHBA density

What is the area of interest and spatial unit?

Gulf-wide, estuarine zone, hexagon grid

Where is this information found?

CMAP reports and Inventory

Spatial and informational distribution of SHBA density monitoring in oyster/bivalve bed habitats (n = 19):

Temporal monitoring

SHBA density in oyster/bivalve bed habitats in the Gulf of Mexico (n = 19):

<table>
<thead>
<tr>
<th>Temporal Period</th>
<th>Program Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1990</td>
<td>3</td>
</tr>
<tr>
<td>1990-2010</td>
<td>7</td>
</tr>
<tr>
<td>Post-2010</td>
<td>17</td>
</tr>
</tbody>
</table>

Note: Programs can occur in multiple temporal categories

SHBA density methodology and units identified within the Inventory and additional guidance documents for the oyster/bivalve bed habitat type:

<table>
<thead>
<tr>
<th>Method</th>
<th>Units</th>
<th># programs documenting method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual observation</td>
<td># individuals/m²</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td># live individuals/ft²</td>
<td></td>
</tr>
<tr>
<td></td>
<td># live or dead/m²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>% live of mean</td>
<td></td>
</tr>
<tr>
<td></td>
<td># seed (spat/seed/sack)/acre</td>
<td></td>
</tr>
<tr>
<td></td>
<td># seed (spat/seed/sack)/m²</td>
<td></td>
</tr>
</tbody>
</table>


Webtool: https://restorethegulf.gov/cmap

Searchable online database providing reports, data releases, and information collected and analyzed by CMAP

Where do you go for more information?

What are other avenues we can explore after the initial gap assessment?

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