ABOUT:

This data publication effectively releases two datasets as part of a GeoPackage (USGS_GHZD_DB.gpkg). One is referred to as the OI dataset which refers to Offshore Infrastructure (OI). This dataset is comprised of non-proprietary information available from documents submitted by recent developers, for lease sites active in 2023, as part of the permitting process. The OI dataset itself is comprised of two components: a vector feature class (OI_GHZD_Polygons) representing active lease areas, investigation areas, and export cable corridors; and a non-spatial table (OI_GHZD_Table) containing geohazard classifications and descriptions derived from developer-submitted documents. There is a one-to-many relationship between the polygon feature class and the table information. The attribute UNID_P, present in both datasets is used to relate the information presented in a join view (OI_GHZD_Join_View) in the GeoPackage. The second dataset is referred to as the TD dataset which refers to Trusted Datasets (TD). This dataset represents all the other studies examined as part of this work that are publicly available. This includes a wide range of publications and information available online. The TD dataset (TD_GHZD_FC) is a single feature class within the GeoPackage. The GeoPackage can be viewed in both ArcGIS Pro and QGIS. The published work was completed in ArcGIS Pro 3.2. Although the data are intended to be used in a GIS, the tables of the GeoPackage can also be viewed using a variety of database software such as SQLite Browser. All links for cited references and data portals were valid at the time of the work, but support for these web resources may change overtime.

THE METADATA ARE NECESSARY TO UNDERSTAND AND USE THIS GEOPACKAGE. ALL ATTRIBUTES ARE DEFINED IN THE METATDATA (USGS_GHZD_DB_meta.xml)

HOW TO OPEN THE GEOPACKAGE AND ASSOCIATED SYMBOLOGY FILES:

1. Create, or designate a folder in which to place the GeoPackage and associated files.

2. Download the metadata (USGS_GHZD_DB_meta.xml), GeoPackage (USGS_GHZD_DB.gpkg), and symbology files (symbology_files.zip) and place them in the designated folder.

3. Unzip the symbology folder (symbology_files.zip).

4. Within the symbology folder there are two folders, 'OI' and 'TD.' There is also a PNG file (symbology_folder_structure.png). Symbology_folder_structure.png shows the desired folder structure. Depending on how one initially placed the folders, one

might have to move the 'OI' and 'TD' folders after they're unzipped to have the relationship shown in symbology_folder_structure.png.

5. Open a geographic information system (GIS) and navigate to the designated folder containing the GeoPackage and symbology files.

6. In the GIS, open whatever aspects of the GeoPackage and symbology files one is most interested in. Methods for searching the GeoPackage are described below. The OI folder contains symbology files associated with the OI dataset, while the TD folder contains symbology files associated with the TD dataset. Adding the symbology files will allow a quick view of the presence/absence/NA of seabed hazards. More details on symbology files are provided below and available in the metadata.

POTENTIAL STARTING POINTS FOR SEARCHING THE GEOPACKAGE:

The GeoPackage contains a bounty of information, and the feature classes and table can be searched in a variety of ways. Below we: 1) describe how to visually see all the hazards in a specific lease site, or cable corridor using ArcGIS Pro; 2) provide examples of queries that can be performed on the GeoPackage; and 3) describe how to view the symbology files for the OI and TD datasets. THESE ARE ONLY SUGGESTIONS. Individual users will likely develop their own search methods based on their interests.

1) HOW TO SEE THE HAZARDS IN A GIVEN LEASE SITE USING ARCGIS PRO

Add the OI feature class (main.OI_GHZD_Join_View) to the map view.

Click on a lease site or cable corridor in the map, so that a pop-up window displays.

The pop-up window will display 34 entries for the lease site or cable corridor. Each entry gives information about the occurrence of a specific hazard (e.g., Ripples, Megaripples, Sand waves, etc.) in the lease site or cable corridor.

To review available information on each hazard, click or scroll using the keypad on the entries in the pop-up window.

2) EXAMPLES OF HOW TO QUERY THE GEOPACKAGE

Example 1: How to query the OI feature class (main.OI_GHZD_Join_View) for information on geohazards present in a specific lease site or cable corridor, using lease site OCS-A 0490 as an example.

In ArcGIS Pro click the Select by Attributes. In QGIS open the attribute table then click Select Features Using an Expression.

Compose and apply an SQL compatible query where:

"LEASE_NUMB" = 'OCS-A 0490' and "NOTE" is not NULL

This will highlight all the hazards mentioned in the non-proprietary documents about the lease site OCS-A 0490. A user can then explore and engage with those results as they wish. Such a query could be executed for any of the 25 lease sites or cable corridors in the OI feature class.

Example 2: How to explore the OI feature class (main.OI_GHZD_Join_View) for information on a specific geohazard, using buried channels as an example.

In ArcGIS Pro click the Select by Attributes. In QGIS open the attribute table then click Select Features Using an Expression.

Compose and apply a query where:

"GHZD" = 'buried channels' and "NOTE" is not NULL

This will highlight all the studies that provided information on buried channels. A user can then explore and engage with those results as they wish. Such a query could be executed for any of the 34 classified hazards in the OI feature class.

Example 3: How to explore the TD feature class (main.TD_GHZD_FC) for observations of gas.

In ArcGIS Pro click the Select by Attributes. In QGIS open the attribute table then click Select Features Using an Expression.

Compose and apply an SQL compatible query where:

"GAS" = 'Y'

This will highlight all the studies where the classified hazard GAS occurs. A user can then explore and engage with those results as they wish. Such a query could be executed for any of the seven broadly classified hazards in the TD feature class.

3) HOW TO USE THE SYMBOLOGY FILES FOR THE OI AND TD DATASETS

Symbology files, *.lyrx (ArcGIS Pro) and *.qlr (QGIS), for both the OI and TD datasets are located in the OI and TD folders, respectively.

Adding the symbology files to the map view allows a quick view of the presence/absence/NA of seabed hazards in the lease sites (OI) and the broader region (TD).

Notes on OI Symbology: Symbology for the OI dataset depicts seven general groupings of geohazards (Anthropological, Gas, Hardbottom, Slope, Mobile seabed, Structural and Subsurface) associated with the lease sites and cable corridors. Each hazard grouping has a distinct *.lyrx file (ArcGIS Pro), and *.qlr file (QGIS). These files symbolize the OI dataset based on the seven general classification groups that encompass the 34 individual geohazard classifications made in the OI dataset.

The general hazard classification groups and their associated symbology files are ANTHR (OI_ANTHR.lyrx; oi_anthr.qlr), GAS (OI_GAS.lyrx; oi_gas.qlr), HARDBOT (OI_HARDBOT.lyrx; oi_hardbot.qlr), SLOPE (OI_SLOPE. lyrx; oi_slope.qlr), MOBBED (OI_MOBBED.lyrx; oi_mobbed.qlr), STRUCT (OI_STRUCT.lyrx oi_struct.qlr) and SUBSURF (OI_SUBSURF.lyrx; oi_subsurf.qlr).

A symbology file includes the polygons associated with the lease sites and cable corridors. The color of the displayed polygons indicates whether a hazard group was identified in a lease site (Y) or was not (N).

Each symbology file can also be searched for the more specific hazards within a grouping by conducting an attribute query, or by clicking on a polygon and viewing the pop-up display (ArcGIS Pro). For example, the SQL definition queries for the OI_SUBSURF.lyrx are as follows: (GHZD = 'Buried channels' Or GHZD = 'Glauconite' Or GHZD = 'Organic soil' Or GHZD = 'Peat' Or GHZD = 'Subsurface deformation') And (IDEN = 'Y' Or IDEN = 'N')

A full list of the SQL definition queries for the OI symbology files can be found in the metadata (USGS_GHZD_DB_meta.xml).

Notes on TD Symbology: The symbology for the TD dataset is for the definitive 'Y' for the unique seven identified geohazards: ANTH (Anthropogenic.lyrx; anthropogenic.qlr), GAS

(Gas.lyrx; gas.qlr), HARDBOT (Hard_Bottom.lyrx; hardbottom.qlr), SLOPE (Slope_Properties.lyrx; slope_properties.qlr),MOBBED (Mobile_Bedforms.lyrx; mobile_bedforms.qlr), STRUCT (Structural.lyrx; structural.qlr), and SED (Sediment_challenge.lyrx; sed_challenge.qlr). This means that the polygons associated with a given .lyrx (or .qlr) file indicate the presence of the given geohazard. For example, polygons associated with the Structural.lyrx indicate studies that contained information about structural hazards (e.g., faults, folds).