

# Lake Bathymetry in Gates of the Arctic National Park and Preserve, Alaska: Data Release Report

## National Park Service, Arctic Inventory and Monitoring Network

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## Introduction

In 2005 the National Park Service funded an expedition to characterize the freshwater resources in the northernmost National Parklands in Alaska (Bowden et al., 2005). The primary purpose of this project was to extend the limited base of data and knowledge about the freshwater resources of the Gates of the Arctic Park and Preserve and the Noatak National Preserve. This initiative is part of the National Park Service's (NPS) Inventory and Monitoring program (Lawler et al., 2009). The 2005 field initiative included landscape and freshwater ecosystem experts from the University of Vermont, the University of Alaska at Fairbanks, the University of Alabama, Utah State University, and the Marine Biological Laboratory. Substantial assistance in preparation and execution of the field work was provided by staff from the NPS Arctic Parks Network (ARCN) in Fairbanks. The study area for the 2005 effort focused on a portion of the Noatak River from 12-Mile Creek to Lake Matcharak in the western region of the Gates of the Arctic Park and Preserve. The team was deployed 13 July, 2005 and operated continuously in the field until taken out on 26 July 2005. Over the course of the two week field period a total of 20 different stream reaches and 11 lakes were assessed. This data release publishes the bathymetric data and digitized polygon lake perimeters for the following lakes: Big Guy Lake, Kipmik Lake, Lake Ermi, Lake Gigi, Lake Pjolene, Matcharak Lake, Omelaktavik Lake, Skeeter Lake, Unknown-1, Unknown-2, Unknown-4,

**Key words:** Lake, Alaska, Bathymetry, Arctic, Pond, Big Guy Lake, Kipmik Lake, Lake Ermi, Lake Gigi, Lake Pjolene, Matcharak Lake, Omelaktavik Lake, Skeeter Lake, Unknown-1, Unknown-2, Unknown-4

## Included Lakes

Table 1, below, lists the lakes included in this data release.

| Lake         | Lon       | Lat      | n   |
|--------------|-----------|----------|-----|
| Big Guy Lake | -155.4216 | 67.66760 | 826 |
| Kipmik Lake  | -156.1537 | 67.95967 | 736 |
| Lake Ermi    | -155.8072 | 67.70823 | 199 |

| Lake             | Lon       | Lat      | n    |
|------------------|-----------|----------|------|
| Lake Gigi        | -155.2765 | 67.63067 | 481  |
| Lake Pjolene     | -155.8053 | 67.70381 | 319  |
| Matcharak Lake   | -156.2112 | 67.74739 | 1886 |
| Omelaktavik Lake | -155.5540 | 67.66069 | 802  |
| Skeeter Lake     | -155.8137 | 67.69915 | 447  |
| Unknown-1        | -155.9529 | 67.69089 | 267  |
| Unknown-2        | -155.9452 | 67.69017 | 207  |
| Unknown-4        | -155.2204 | 67.59876 | 176  |

## Study Area

Lakes selected for the 2005 fieldwork are in Gates of the Arctic National Park and Preserve (Figures 1 and 2) and generally located at lakes with one mile of the Noatak River (Bowden et al., 2005).

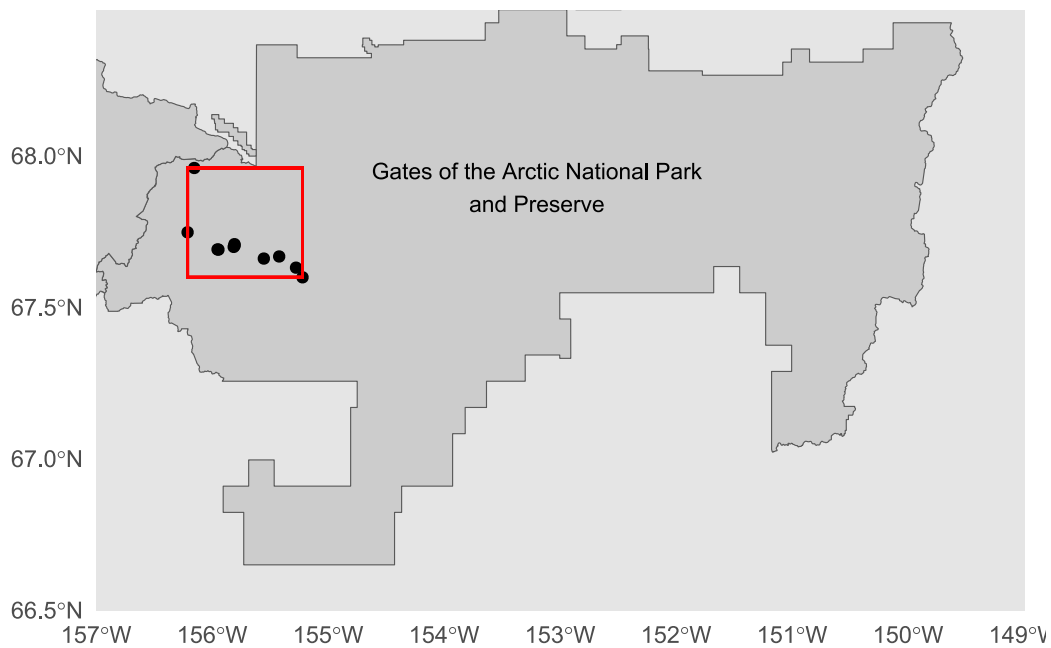


Figure 1. General location of the lakes in Gates of the Arctic National Park and Preserve, Alaska.

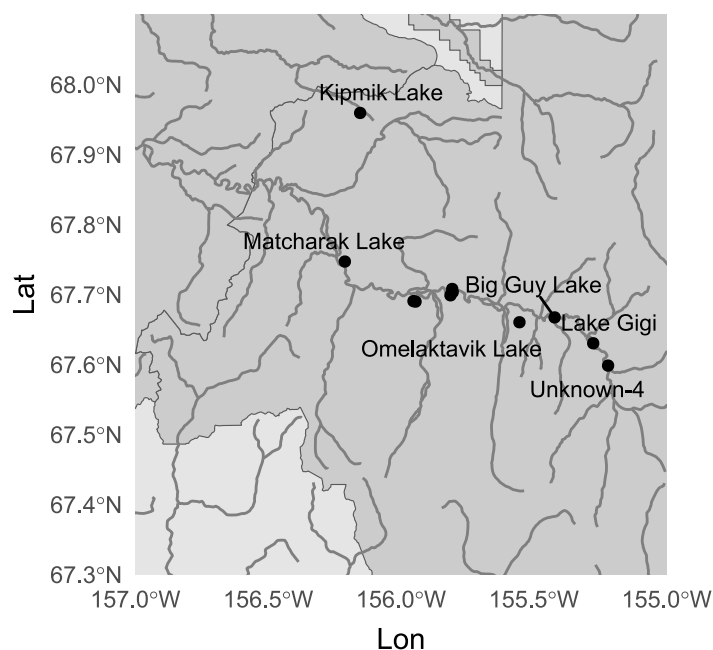


Figure 2. Location of the lakes within the bounding box in Figure 1 above, in relation to each other and with major rivers shown.

## Methods

### Bathymetric Data

Detailed bathymetric surveys were conducted using a GPS-linked, Garmin-153C echosounder attached to an inflatable kayak which was paddled across lakes along specified transect lines. The echosounder recorded water depth as an algorithm of reflections from the bottom of a 70 kHz pulse of sound (0.4 msec in duration) as the GPS unit recorded the corresponding latitude and longitude.

### Lake Perimeters

Lake perimeters were digitized by eye from imagery in Quantum GIS. The perimeter digitizations were added to the bathymetric data with depth values of zero in order to define the edges of the lakes and extend the bathymetric dataset.

## Files

This data release consists of the following files:

| File           | Description      |
|----------------|------------------|
| Bathymetry.csv | Bathymetry data. |

| File                                                      | Description                                                                                                  |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Bathymetry_Metadata.csv                                   | Metadata for Bathymetry.csv including column names, descriptions and units of measure.                       |
| LakePerimeters.geojson                                    | Lake perimeters spatial layer, digitized from imagery. Multipolygon. Geographic Coordinate System, WGS 1984. |
| ARCN-Freshwater-Lakes-Bathymetry-Data-Release-Report.html | This report. HTML format. 2.7 Mb                                                                             |

## Columns and Data Types

| Column-Name | Data Type | Description | UnitsOfMeasure                                          |
|-------------|-----------|-------------|---------------------------------------------------------|
| Lake        | character | Lake name   |                                                         |
| Depth       | numeric   | Lake name   | Meters                                                  |
| Latitude    | numeric   | Latitude    | Decimal Degrees, Geographic Coordinate System, WGS1984. |
| Longitude   | numeric   | Longitude   | Decimal Degrees, Geographic Coordinate System, WGS1984. |
| BID         | integer   | Unique ID   |                                                         |
| Site-Name   | character | Site name   |                                                         |

## Lake Bathymetry Maps

The following sections show the bathymetric maps for each lake in Table 1.

### Big Guy Lake

Figure 3 , below, shows a map of the bathymetric data in this release for Big Guy Lake . Depths are in meters.



Figure 3 . Bathymetric map of Big Guy Lake . Depths are in meters.

### Kipmik Lake

Figure 4 , below, shows a map of the bathymetric data in this release for Kipmik Lake . Depths are in meters.



Figure 4 . Bathymetric map of Kipmik Lake . Depths are in meters.

### Lake Ermi

Figure 5 , below, shows a map of the bathymetric data in this release for Lake Ermi . Depths are in meters.

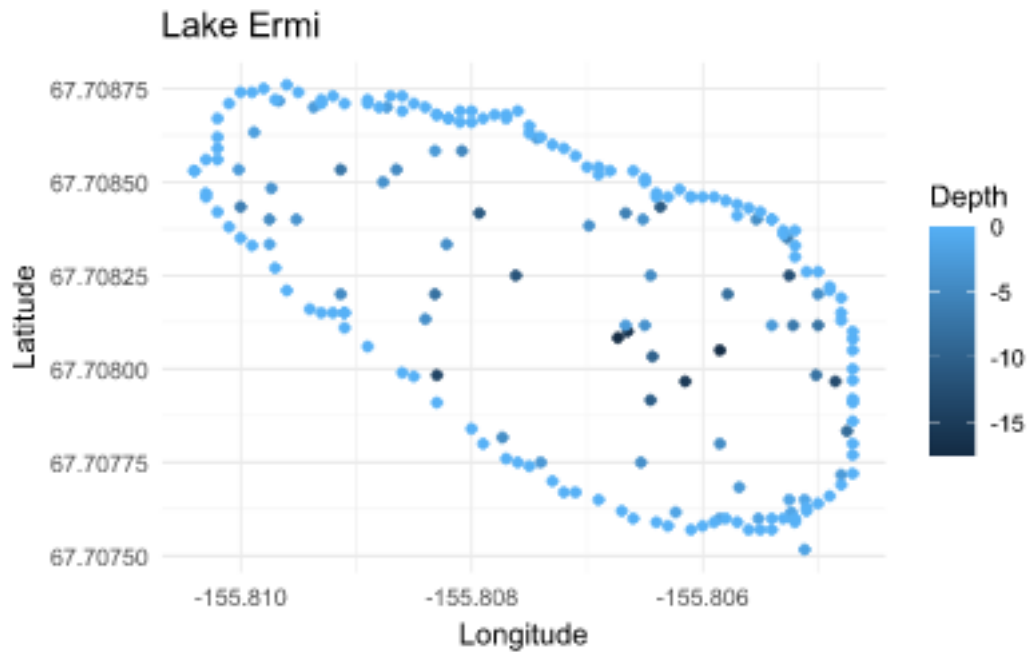


Figure 5 . Bathymetric map of Lake Ermi . Depths are in meters.

### Lake Gigi

Figure 6 , below, shows a map of the bathymetric data in this release for Lake Gigi . Depths are in meters.

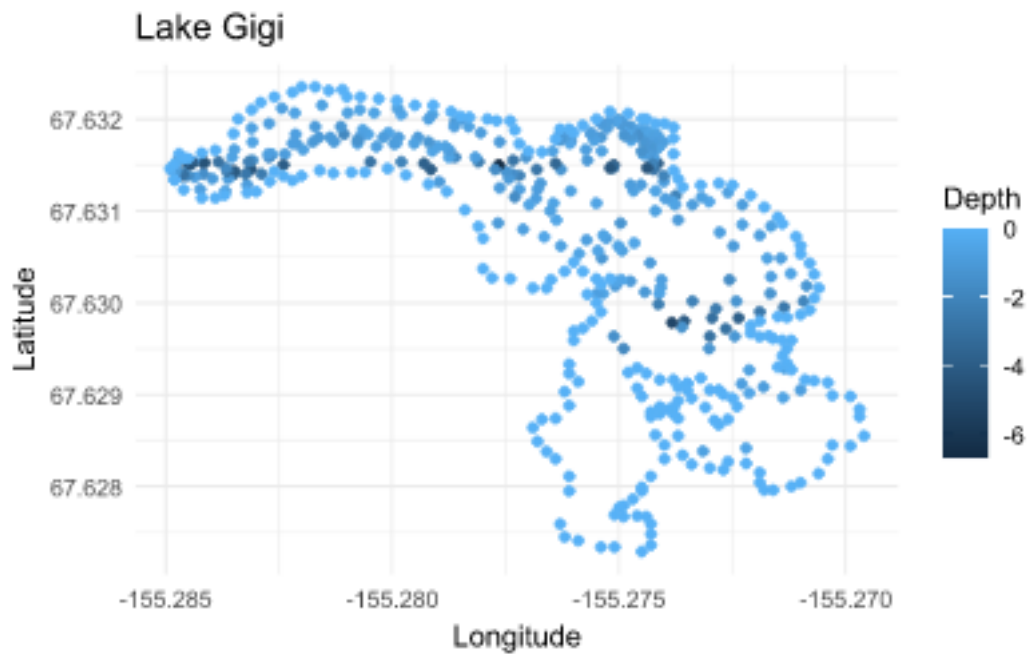


Figure 6 . Bathymetric map of Lake Gigi . Depths are in meters.

### Lake Pjolene

Figure 7 , below, shows a map of the bathymetric data in this release for Lake Pjolene . Depths are in meters.

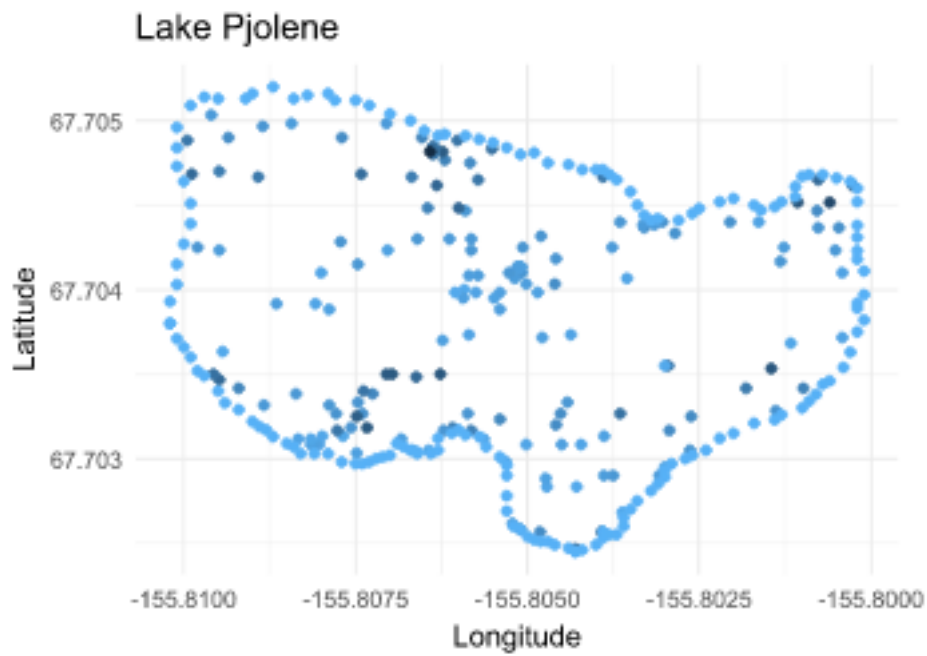


Figure 7 . Bathymetric map of Lake Pjolene . Depths are in meters.

### Matcharak Lake

Figure 8 , below, shows a map of the bathymetric data in this release for Matcharak Lake . Depths are in meters.

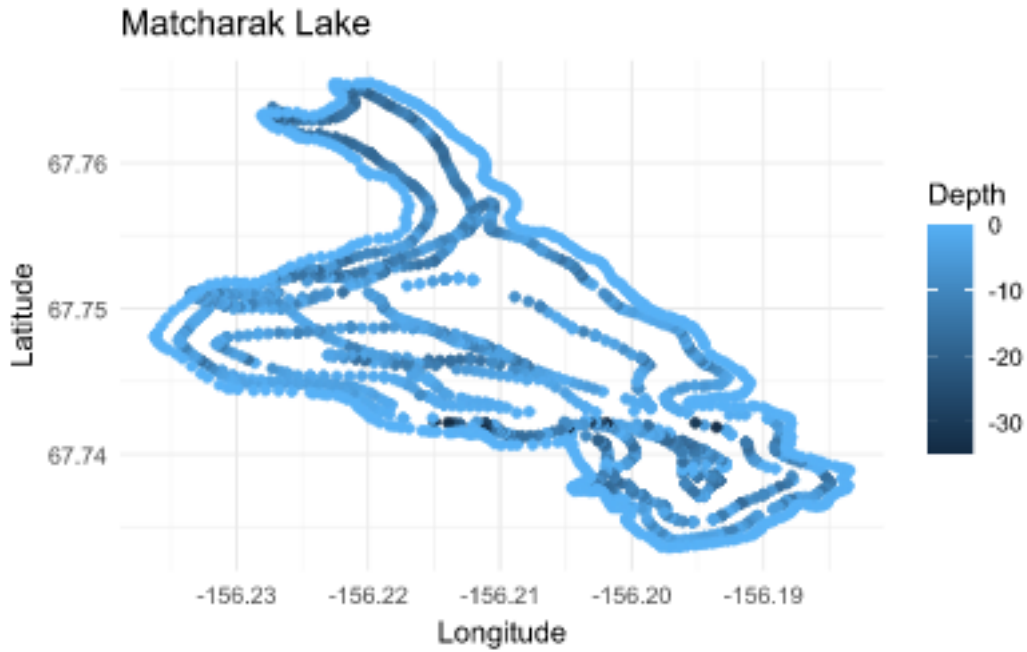


Figure 8 . Bathymetric map of Matcharak Lake . Depths are in meters.

### Omelaktavik Lake

Figure 9 , below, shows a map of the bathymetric data in this release for Omelaktavik Lake . Depths are in meters.

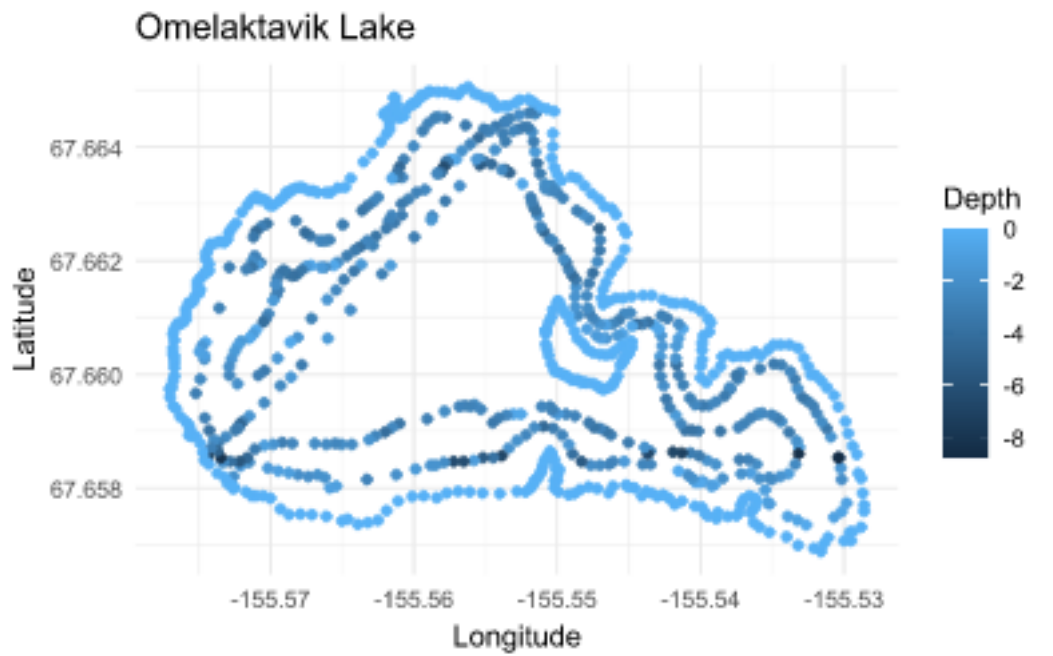


Figure 9 . Bathymetric map of Omelaktavik Lake . Depths are in meters.

### Skeeter Lake

Figure 10 , below, shows a map of the bathymetric data in this release for Skeeter Lake . Depths are in meters.

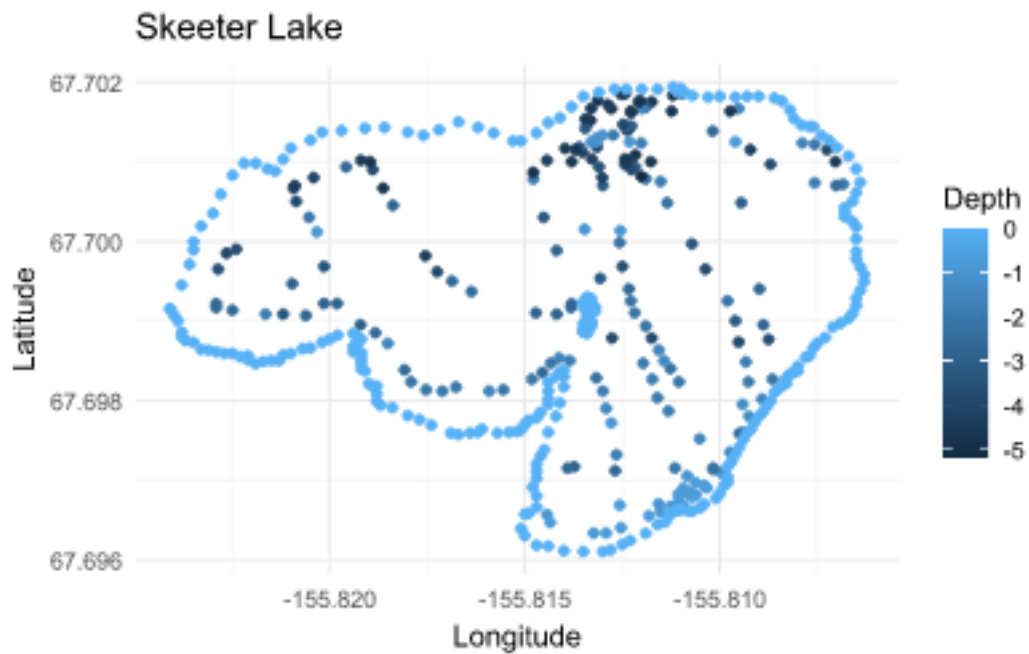


Figure 10 . Bathymetric map of Skeeter Lake . Depths are in meters.

### Unknown-1

Figure 11 , below, shows a map of the bathymetric data in this release for Unknown-1 . Depths are in meters.

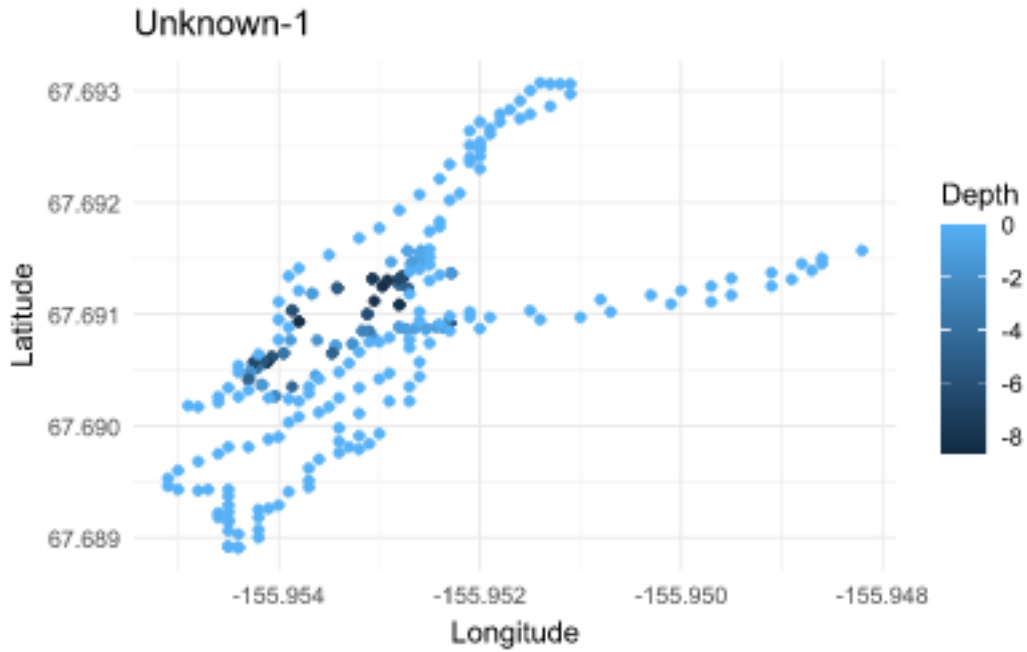


Figure 11 . Bathymetric map of Unknown-1 . Depths are in meters.

### Unknown-2

Figure 12 , below, shows a map of the bathymetric data in this release for Unknown-2 . Depths are in meters.

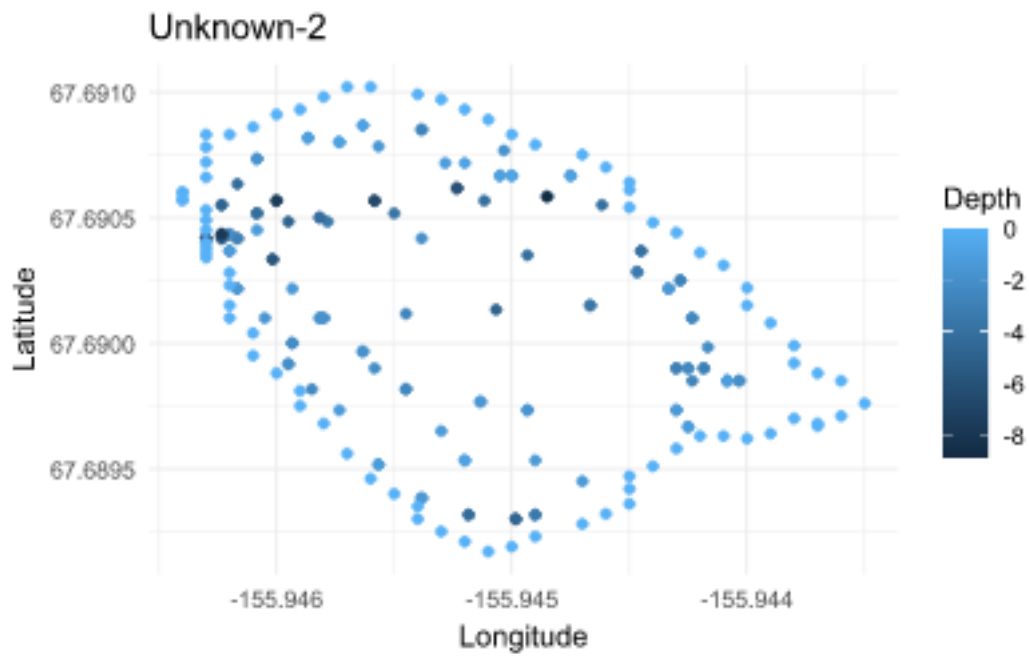


Figure 12 . Bathymetric map of Unknown-2 . Depths are in meters.

### Unknown-4

Figure 13 , below, shows a map of the bathymetric data in this release for Unknown-4 . Depths are in meters.

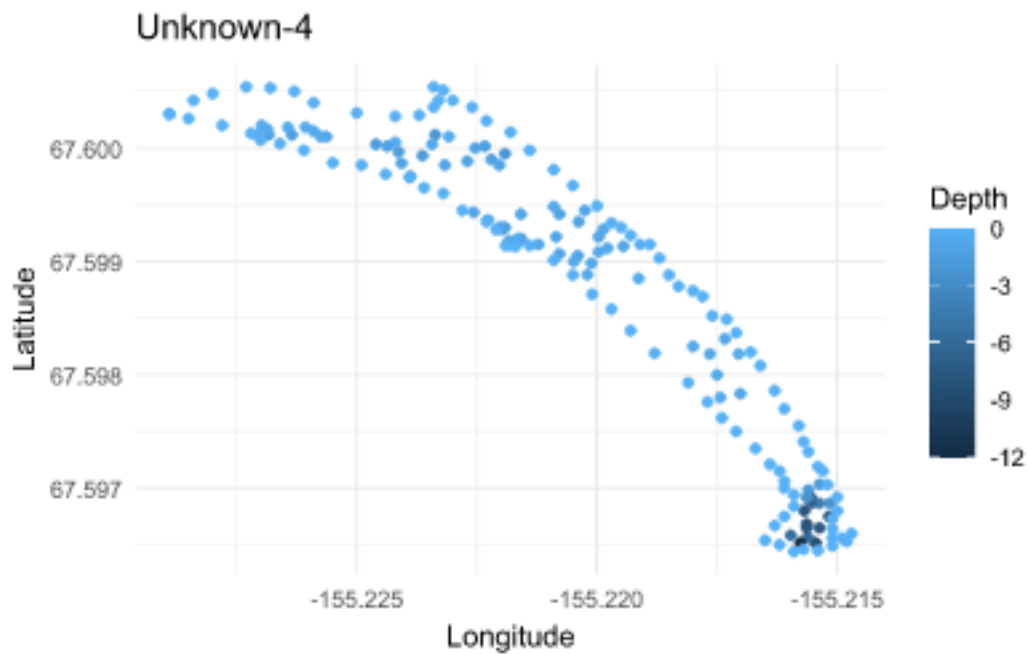


Figure 13 . Bathymetric map of Unknown-4 . Depths are in meters.

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## **References**

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