

**Offshore Seafloor and Seep
Sampling Program (2017-
2027): Project Description**



Prepared for:
Fugro GeoSurveys, a div. of
Fugro Canada Corp.

Prepared by:
Stantec Consulting Ltd.
141 Kelsey Drive
St. John's, NL A1B 0L2
Tel: (709) 576-1458
Fax: (709) 576-2126

File No: 121414743

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Abbreviations

ASP	Atlantic Seafood Producers
C-NLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board
FFAW-Unifor	Fish Food & Allied Workers-Unifor
HSSE	Health, Safety, Security and Environment
MBES	Multi-beam echosounder
NAFO	Northwest Atlantic Fisheries organization
OCI	Ocean Choice International
SBP	Sub-bottom profiler

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INTRODUCTION

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1.0 INTRODUCTION

1.1 Background

Fugro GeoSurveys, a division of Fugro Canada Corp. (Fugro), a geophysical survey company, is proposing to conduct seafloor mapping and seep sampling exploration activities in the eastern Newfoundland offshore area, northern Grand Banks / Orphan Basin. Fugro will be the operator of the program.

Interactions with the environment and commercial fisheries will be limited given the restricted nature of the proposed Project (surveying with a multibeam echosounder (MBES), deploying and fully recovering a core sampler and heat-flow probe, potentially using a fishing line cast-system for surface samples).

Fugro provides geoscience data of various types to oil and gas exploration and production companies worldwide. These include geohazard and engineering datasets for production and development. In recent years Fugro has also conducted considerable seeps investigations to provide data for integration into exploration programs. Multi-client programs, such as the one proposed, are routinely conducted by Fugro throughout the world. Fugro also offers advanced data processing, analysis and visualization/presentation methods, for integration with client data.

1.2 Study / Environmental Assessment Area

Exploration activities are to be conducted in the Newfoundland and Labrador offshore area to identify those areas that have the potential to contain oil-bearing structures/basins. The proposed Project is a multi-year program (2017 to 2027) to be conducted within the Project Area / Study / Environmental Assessment Area illustrated in Figure 1-1 (coordinates for the Study / Environmental Assessment Area are provided in Appendix A). The 2017 program focuses on the Canada-Newfoundland Offshore Petroleum Board (C-NLOPB) eastern Newfoundland Land Tenure Region, specifically the southwestern region of the Orphan Basin. An alternate 2017 area has also been defined.

The proposed Project includes the following non-invasive research activities: sampling of natural seabed seeps, conducting seabed heat flow measurements, collection of shallow seabed cores, high resolution bathymetry and backscatter, and sub-bottom profiles. The 2017 Primary and Alternate Work Areas are illustrated in Figure 1-1 and corner coordinates are provided in Table 1.1.

The Project Area is synonymous with the Study / Environmental Assessment Area for activities in 2017 to 2027.

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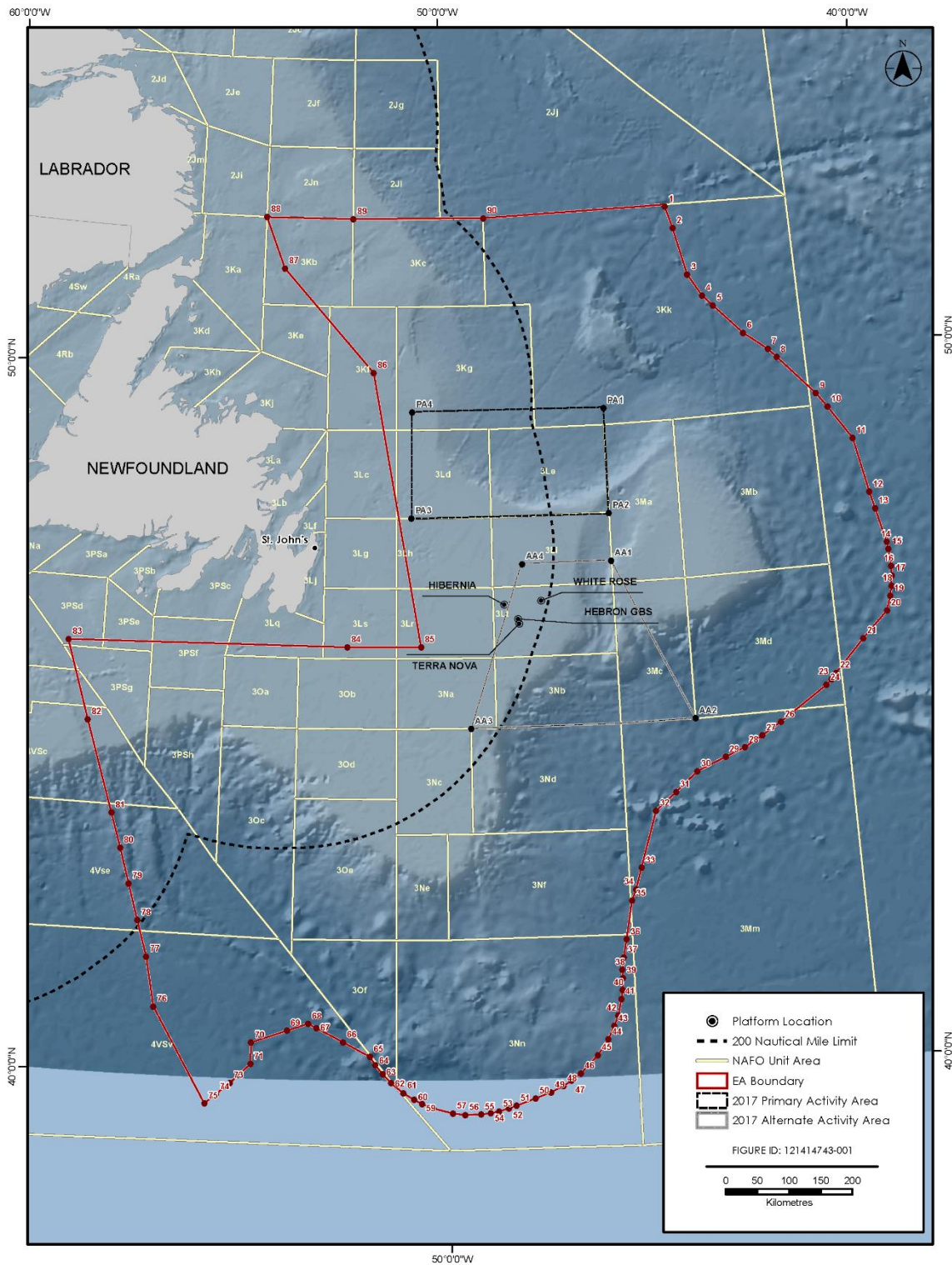


Figure 1-1 Multi-year Study / Environmental Assessment Area, including 2017 Program Area

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Table 1.1 2017 Program Area Coordinates

Vertex ID	X_coord	Y_coord
PA1	46° 29' 18.212" W	49° 28' 33.361" N
PA2	46° 30' 21.950" W	47° 59' 26.810" N
PA3	50° 41' 28.138" W	47° 59' 50.666" N
PA4	50° 39' 35.395" W	49° 30' 22.924" N
AA1	46° 30' 53.320" W	47° 18' 53.365" N
AA2	45° 0' 11.687" W	45° 0' 6.554" N
AA3	49° 30' 26.180" W	44° 59' 50.493" N
AA4	48° 22' 38.166" W	47° 19' 12.968" N

1.3 Regulatory Framework

The proposed Project activities include seabed mapping with an MBES, the sampling of potential natural seabed seeps, collection of shallow seabed cores, and conducting seabed heat flow measurements.

An environmental assessment must be conducted on any proposed technical programs in the Newfoundland and Labrador Offshore Area according to the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2017)).

The limited nature of the proposed Project activities would suggest the requirement for a C-NLOPB review under the Accord legislation only, and that based on the activities as described, an environmental assessment pursuant to the *Canadian Environmental Assessment Act, 2012* is not required.

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2.0 THE PROPOSED PROJECT

Natural seeps accounted for 160,000 of the 260,000 tonnes of petroleum released into the marine environment in North America from 1990 to 1999 (National Academy of Sciences 2002). The location, nature, and composition of hydrocarbon seeps can provide valuable information to optimize oil and gas exploration programs, and reduce the number of exploratory wells drilled.

Fugro is proposing to conduct a sampling program to identify areas of potential natural seabed seeps, involving the collection of the following data in 2017:

- multi-beam bathymetry;
- conducting seabed heat flow measurements using a thermal probe for shallow seabed core locations;
- collection of seabed cores using a gravity core method;
- acoustic sub-bottom profiling.
- sampling of potential natural seabed seeps (by collecting water samples);

Any combination of the data could be collected in 2017 to 2027.

2.1 High-resolution Multibeam Sonar Data

An MBES will be used to collect high-resolution sonar data along a swath of the seafloor, as the vessel transits. The intent is to generate full coverage high-resolution bathymetry and backscatter maps of the seabed throughout the approximately 18,000 km² of the area defined for 2017 work. Additional multibeam data may be acquired over other areas within the Study / Environmental Assessment Area extents in subsequent years.

The multibeam sonar data will distinguish pockmarks, seabed mounds, acoustic reflection properties, and other possible indicators of natural seep activity. The data are of higher resolution than 3D seismic data. Multibeam bathymetry data can also resolve gas plumes rising from active seep localities.

The vessel (see Section 2.6) will have a hull-mounted MBES, able to acquire bathymetry, backscatter, and water column data at normal transit speeds. The survey line spacing and resulting coverage will be varied on the basis of water depth.

2.2 Heat Flow Measurements

The potential for hydrocarbons beneath the surface can be indicated by the thermal state (temperature profile) of the sub-seabed. Heat flow measurements will be taken using a 3.5 to 6 m length, traditional Lister-type violin bow heat flow probe capable of measuring sediment thermal conductivity *in situ*. This unit is deployed in a similar manner to a sediment corer, and is recovered from the seabed after data are acquired.

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The locations for heat-flow measurements are selected on the basis of sub-bottom profiler (SBP) data, to ensure suitable sediment types.

Heat flow measurements are anticipated to be collected at up to 100 locations in 2017, with potential for additional sampling in 2017 or subsequent years.

2.3 Core Collection

A gravity corer will be used to collect substrate cores up to a depth of 6 m. The gravity corer will be lowered to within a set height (a few tens of metres) above the seabed, and once location is confirmed with acoustic positioning (ultra-short baseline system), the corer will be triggered to release and penetrate the seabed. The barrel (and hole) are 10 cm in diameter. The corer is fully recovered from the seabed.

Core locations are selected on the basis of the multibeam data, and fine-tuned by using SBP data.

Gravity core samples are expected to be collected at up to 200 locations during the 2017 program.

2.4 Sub-bottom Profiling

A SBP generates high resolution 2D profiles of the seabed, to depths of up to 100 m below seafloor (depending on sediment type). Sub-bottom profiling helps identify areas of soft sediment for coring and heat flow work, and can also identify where there may be shallow gas in the shallow sub-seabed.

The SPB will likely be a hull-mounted CHIRP system, rated for full ocean depth. Power levels and frequencies can be modified to suit water depths and seabed conditions in study areas. Output power will be less than the threshold (less than 246 dB measured 1 m from the energy source) stated in the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2017).

2.5 Detection of Natural Seabed Seeps

Specialized sampling kits, using oil-absorbing materials may be utilized to detect the presence of oil from natural seabed seeps on the ocean surface. The system uses small piece of hydrophobic (water repellent) material that absorbs hydrocarbons. The deployment / retrieval mechanism is composed of a casting device (similar to a fishing rod), fishing line and the individual sampler containers. The containers are deployed for a short period (few minutes) and then recovered for analysis.

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2.6 Vessel

Survey vessel(s) will be able to conduct MBES, SBP, Heat Flow and Piston Coring elements. It is anticipated that the vessel(s) will be equipped with dynamic positioning, an A-frame, deep water MBES and SBP.

The vessel will have suitable systems on board, and all procedures in place, to successfully and safely complete the work. It will be capable of working in harsh offshore conditions and will have equipment, protocols, and procedures in place for prevention of pollution by oil, sewage, and garbage in accordance with the *Canada Shipping Act* and international standards and certification authorities. At no time will the survey vessel enter or attempt to conduct survey work in restricted or protected areas.

Fugro will consult (in conjunction with One Ocean) with the Fish Food and Allied Workers-Unifor (FFAW-Unifor), Ocean Choice International (OCI), and the Atlantic Seafood Producers (ASP) on the location of their members who fish in the area and contact the local FFAW-Unifor representative to provide information on vessel movements during the survey program.

2.7 Schedule

Fugro is proposing to conduct the initial round of seabed mapping, natural seabed seep collection, heat probe, and gravity core sample collection components of the research program in the open water / ice-free season of 2017. The program is anticipated to require 35 to 40 days to conduct all sample collections. Fugro has scheduled a seven to eight week period to conclude the program, allowing for weather delays. Future programs (2018 to 2027) will also be conducted in open / ice-free waters.

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3.0 ENVIRONMENTAL SETTING

Given the generally non-intrusive nature of the proposed Project, few Project-environment interactions are anticipated. If Project-environment interactions do occur, the components of the environment most likely to be potentially affected by the Project are species at risk, fish habitat (sediment) and commercial fisheries (vessel survey). The C-NLOPB has published Strategic Environmental Assessments for Eastern Newfoundland and Labrador (Amec 2014) and Southern Newfoundland and Labrador (LGL 2010); these documents provide the basis for the high-level environmental setting described below.

The Study / Environmental Assessment Area encompasses the eastern and southern Newfoundland and Labrador offshore areas. The Study / Environmental Assessment Area extends from the Newfoundland-Labrador Shelf, over the Grand Bank, into the Flemish Pass and Cap and oceanic waters beyond the continental shelf break, and the Laurentian sub-basin/eastern Scotian Shelf. The 2017 survey will be conducted in the eastern Newfoundland offshore area, in the waters of the southern Flemish Pass and Eastern Canyon.

Sea surface temperatures in the region are warmest in August-September and coldest in January to March. Air temperatures are warmest in August and coldest in February. The average number of foggy days is highest in spring and summer. Seasonal sea or pack ice can occur from January to April in the Orphan Basin and Grand Bank areas, with the maximum southern extent occurring from February to the middle of March. The Flemish Pass and Tail of the Grand Banks areas rarely experience sea ice (typically one or two weeks in mid-March when it is present). Icebergs can occur in the Orphan Basin, Grand Bank and Flemish Pass areas from February to July, especially in the region nearest the Grand Banks. Large icebergs are rarely seen in the Tail of the Grand Banks area.

The Study / Environmental Assessment Area encompasses Northwest Atlantic Fisheries Organization (NAFO) Unit Areas 3KLMNO and 4V. Fish in the Study / Environmental Assessment Area include:

- groundfish (American plaice, Atlantic cod, Atlantic halibut, Atlantic wolffish, barndoor skate, black dogfish, blue hake, cusk, Greenland halibut, haddock, longnose eel, longfin hake, marlin-spike, monkfish, northern wolffish, Pollock, redfish, Roughhead grenadier, Roundnose grenadier, spotted wolffish, sculpin, smooth skate, spiny dogfish, spinytail skate, thorny skate, Vahl's eelpout, white hake, winter skate, witch flounder and yellowtail flounder);
- pelagic species (alewife, American eel, Atlantic herring, Atlantic mackerel, Atlantic salmon, Atlantic saury, basking shark, blue shark, bluefin tuna, capelin, Greenland shark, lanternfish, porbeagle shark, shortfin mako shark, spiny eel, swordfish and white shark); and
- shellfish (snow crab, northern shrimp, shortfin squid, molluscs).

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Commercially important species include snow crab, northern shrimp, Greenland halibut, Atlantic halibut, cod, yellowtail flounder, redfish, white hake, skates, monkfish, pollock, hagfish, swordfish, and molluscs (e.g., whelks).

Marine mammals and sea turtles that can occur in the Study / Environmental Assessment Area include:

- Mysticetes (baleen whales) (North Atlantic right whale, blue whale, fin whale, humpback whale, sei whale, and minke whale);
- Odontocetes (toothed whales) (sperm whale, northern bottlenose whale, killer whale, long-finned pilot whale, Sowerby's beaked whale, harbour porpoise, common bottlenose dolphin, short-beaked common dolphin, Atlantic white-sided dolphin, white-beaked dolphin, striped dolphin and Risso's dolphin);
- Seals (harp, hooded and grey); and
- Sea turtles (leatherback, loggerhead and Kemp's ridley).

A variety of birds either feed or migrate through the Study / Environmental Assessment Area, including:

- seabirds (cormorants, gannets, phalaropes, gulls, terns, alcids, jaegers and skuas, fulmars and shearwaters, and storm-petrels);
- coastal waterfowl (including loons and grebes); and
- shorebirds.

A number of species at risk (as listed under the *Species at Risk Act* or assessed as at risk by the Committee on the Status of Endangered Wildlife in Canada) have potential to occur throughout the proposed Study / Project Area (see Figure 1-1), either as occasional visitors or regular inhabitants. The following species are listed under Schedule 1 of the *Species at Risk Act*:

- Atlantic salmon- inner Bay of Fundy population (Endangered);
- Atlantic wolffish (Special Concern);
- northern wolffish (Threatened);
- spotted wolffish (Threatened);
- banded killifish (Special Concern);
- beluga whale- St. Lawrence Estuary population (Threatened);
- blue whale – Atlantic population (Endangered);
- fin whale- Atlantic population (Special Concern);
- North Atlantic right whale (Endangered);
- northern bottlenose whale - Scotian Shelf population (Endangered);
- Sowerby's beaked whale (Special Concern);
- leatherback sea turtle (Endangered);
- ivory gull (Endangered);
- piping plover- *melodus* subspecies (Endangered);

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- red knot Rufa subspecies (Endangered); and
- roseate tern (Endangered).

Barrow's goldeneye (eastern population) (Special Concern) and harlequin duck (eastern population) (Special Concern) are two primarily coastal species that could occur in the Study / Project Area.

The Study / Environmental Assessment Area is within the Large Ocean management Area – Placentia Bay-Grand Banks. Within that are a number of sensitive and special areas, including Ecologically and Biologically Significant Areas, Vulnerable Marine Ecosystems, NAFO identified coral and sponge closure areas, seamounts, Bonavista Cod Box, Important Bird Areas, Marine Protected Areas and Areas of Interest, and preliminary Representative Marine Areas.

4.0 HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT

Fugro's global Health, Safety, Security and Environment (HSSE) structure allows focused safety leadership with continuous cultural improvement. Safety performance is paramount, and Fugro and their project partners will provide a safe and incident-free project, achieving the stated operational goals in the safest manner possible. Fugro will create a project-specific, achievable HSSE Plan, an HSSE Interface Plan, and an Emergency Response Plan that demonstrates Fugro's company-wide safety commitment.

As noted above, the vessel(s) will be fully compliant with local and international pollution prevention protocols, safety and collision regulations, and will meet C-NLOPB regulatory expectations. Marine and technical crew will meet all local regulatory and corporate safety training requirements.

Fugro GeoSurveys, based in St. John's, has been conducting offshore survey operations under C-NLOPB regulatory oversight for nearly 20 years, with an unblemished safety and environmental record. Fugro will once again bring a high quality global safety system, as well as local experience to the project.

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STAKEHOLDER CONSULTATION

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5.0 STAKEHOLDER CONSULTATION

Fugro will consult with the C-NLOPB during the preparation of the environmental assessment to discuss potential issues that should be addressed in the environmental assessment. The official start of the consultation process is initiated with the submission of this Project Description.

Fugro proposes to meet with the FFAW-Unifor, OCI, and the ASP prior to the submission of the environmental assessment to provide details on the proposed Project to the commercial fishing community. A liaison / representative from One Ocean will be invited to all meetings. Fugro will also contact via phone or email any local FFAW-Unifor staff representative as suggested / identified by the FFAW-Unifor Petroleum Industry liaison.

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REFERENCES

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6.0 REFERENCES

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Amec Environment and Infrastructure. 2014. Eastern Newfoundland Strategic Environmental Assessment. Final Report, 2014. Available at: <http://www.cnlopb.ca/sea/eastern.php>. Accessed March 16, 2016.

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APPENDIX A

Study / Environmental Assessment Area Coordinates

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Study / Environmental Assessment Area Coordinates

Vertex_ID	X_coord	Y_coord
1	44° 47' 9.679" W	52° 15' 50.655" N
2	44° 39' 3.010" W	51° 57' 0.917" N
3	44° 24' 50.478" W	51° 16' 50.179" N
4	44° 7' 28.376" W	50° 57' 49.443" N
5	43° 54' 8.367" W	50° 48' 41.919" N
6	43° 17' 35.922" W	50° 22' 46.715" N
7	42° 47' 25.623" W	50° 7' 2.215" N
8	42° 36' 52.983" W	49° 59' 28.677" N
9	41° 51' 27.908" W	49° 25' 9.222" N
10	41° 38' 44.908" W	49° 12' 42.530" N
11	41° 11' 33.547" W	48° 43' 29.976" N
12	40° 59' 27.434" W	47° 56' 22.941" N
13	40° 55' 4.612" W	47° 42' 12.070" N
14	40° 45' 58.751" W	47° 12' 38.809" N
15	40° 44' 52.127" W	47° 6' 15.611" N
16	40° 44' 16.290" W	46° 51' 46.229" N
17	40° 45' 18.334" W	46° 43' 35.652" N
18	40° 47' 4.510" W	46° 35' 17.313" N
19	40° 50' 21.073" W	46° 26' 47.866" N
20	40° 56' 27.154" W	46° 15' 2.579" N
21	41° 29' 1.378" W	45° 53' 59.824" N
22	42° 6' 35.426" W	45° 27' 33.768" N
23	42° 13' 0.662" W	45° 22' 36.924" N
24	42° 19' 51.230" W	45° 18' 20.114" N
25	43° 4' 45.614" W	44° 57' 42.215" N
26	43° 18' 42.130" W	44° 50' 53.189" N
27	43° 42' 8.148" W	44° 40' 56.430" N
28	44° 4' 24.949" W	44° 32' 7.904" N
29	44° 27' 57.736" W	44° 25' 33.004" N
30	45° 3' 1.556" W	44° 14' 54.786" N
31	45° 29' 24.668" W	43° 58' 44.718" N
32	45° 54' 39.213" W	43° 43' 46.146" N
33	46° 15' 21.755" W	42° 56' 8.684" N
34	46° 22' 59.866" W	42° 37' 59.903" N

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Vertex_ID	X_coord	Y_coord
35	46° 28' 32.652" W	42° 28' 32.497" N
36	46° 36' 52.265" W	41° 55' 58.997" N
37	46° 40' 54.916" W	41° 40' 33.616" N
38	46° 43' 40.109" W	41° 29' 57.492" N
39	46° 43' 22.590" W	41° 23' 4.037" N
40	46° 44' 32.081" W	41° 12' 48.629" N
41	46° 46' 11.886" W	41° 5' 7.245" N
42	46° 50' 43.900" W	40° 51' 18.302" N
43	46° 55' 35.541" W	40° 42' 40.294" N
44	47° 2' 52.837" W	40° 31' 32.260" N
45	47° 15' 7.077" W	40° 18' 28.911" N
46	47° 34' 56.236" W	40° 3' 24.929" N
47	47° 45' 52.753" W	39° 57' 29.270" N
48	47° 54' 57.567" W	39° 53' 10.575" N
49	48° 9' 4.481" W	39° 48' 5.494" N
50	48° 26' 8.213" W	39° 43' 18.152" N
51	48° 47' 21.527" W	39° 37' 36.114" N
52	48° 55' 50.284" W	39° 35' 17.205" N
53	49° 6' 50.141" W	39° 33' 3.470" N
54	49° 16' 6.156" W	39° 31' 39.052" N
55	49° 26' 49.690" W	39° 30' 39.493" N
56	49° 44' 26.726" W	39° 30' 32.082" N
57	49° 57' 46.238" W	39° 31' 50.271" N
58	50° 19' 49.780" W	39° 36' 14.970" N
59	50° 31' 58.345" W	39° 40' 18.240" N
60	50° 40' 49.941" W	39° 43' 46.756" N
61	50° 52' 36.138" W	39° 49' 27.125" N
62	51° 6' 22.676" W	39° 58' 8.112" N
63	51° 15' 43.207" W	40° 5' 37.853" N
64	51° 23' 46.958" W	40° 13' 20.356" N
65	51° 30' 5.654" W	40° 20' 27.971" N
66	52° 0' 4.745" W	40° 32' 40.375" N
67	52° 30' 8.229" W	40° 44' 19.606" N
68	52° 39' 45.956" W	40° 48' 2.606" N
69	53° 3' 13.652" W	40° 41' 55.406" N

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Vertex_ID	X_coord	Y_coord
70	53° 43' 1.010" W	40° 30' 50.325" N
71	53° 43' 10.841" W	40° 12' 30.558" N
72	53° 55' 16.261" W	40° 3' 11.368" N
73	54° 5' 9.945" W	39° 55' 58.474" N
74	54° 20' 4.005" W	39° 45' 50.877" N
75	54° 32' 40.816" W	39° 37' 40.241" N
76	55° 34' 18.263" W	40° 58' 4.960" N
77	55° 45' 24.990" W	41° 40' 21.239" N
78	55° 58' 4.356" W	42° 10' 56.500" N
79	56° 10' 30.138" W	42° 41' 39.077" N
80	56° 22' 49.174" W	43° 11' 39.175" N
81	56° 35' 49.658" W	43° 40' 58.949" N
82	57° 11' 42.021" W	44° 58' 35.303" N
83	57° 42' 46.293" W	46° 5' 15.553" N
84	52° 0' 33.791" W	46° 9' 54.491" N
85	50° 30' 10.708" W	46° 9' 57.849" N
86	51° 30' 33.511" W	50° 3' 58.008" N
87	53° 32' 44.854" W	51° 31' 29.616" N
88	54° 0' 2.614" W	52° 14' 51.680" N
89	52° 0' 16.358" W	52° 14' 51.680" N
90	49° 0' 2.430" W	52° 14' 51.680" N