Bureau of Ocean Energy Management Atlantic Sand Assessment Project Reconnaissance Data Processing and Interpretation Report of Findings

FDEP Contract Number BS028, Task Assignment Number 5

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CB&I Coastal Planning & Engineering, Inc.

BUREAU OF OCEAN ENERGY MANAGEMENT ATLANTIC SAND ASSESSMENT PROJECT RECONNAISSANCE DATA PROCESSING AND INTERPRETATION

REPORT OF FINDINGS

PREPARED FOR:

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ACRONYMS

ABA/PBA	Authorized Borrow Area/Potential Borrow Area
AGC	Automatic Gain Control
ASAP	Atlantic Sand Assessment Project
ASTM	American Society For Testing And Materials
AVS	American Vibracore Services
BCS	Bottom Of Clean Sand
BOEM	Bureau Of Ocean Energy Management
BP	Before Present
CB&I	Chicago Bridge And Iron
cm	centimeter
CMEC	Construction Materials Engineering Council, Inc.
CPE	Coastal Planning And Engineering
CRM	Coastal Relief Model
CTD	Conductivity, Temperature And Depth
cy	cubic yards
DEMs	Digital Elevation Models
DGNSS	Differential Global Navigation Satellite System
DGPS	Differential Global Positioning System
EPA	Environmental Protection Agency
FDEP	Florida Department Of Environmental Protection
FGS	Florida Geological Survey
FM	Frequency Modulated
ft	feet
g	Gammas
GAMS	GPS Azimuth Measurement System
GIS	Geographical Information System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HTML	Hypertext Markup Language
Hz	Hertz
IMU	Inertial Measurement Unit
kHz	kilohertz
km	kilometer
kW	kilowatt
m	meter
MEC	Munitions Of Explosive Concern
mm	millimeter
NAD83	North American Datum Of 1983
NAVD88	North American Vertical Datum, 1988
nm	Nautical Miles
NOAA	National Oceanic And Atmospheric Administration
nT	Nanotesla Or Gamma
OCS	Outer Continental Shelf
ODMDS	Offshore Dredge Material Disposal Site
P-P	Peak to Peak
PSO	Protected Species Observers
ROSS	Reconnaissance Offshore Sand Search
ROSSI	Regional Offshore Sand Source Inventory
RTG	Real Time Gypsy
SAND	Southeast Florida Assessment And Needs Determination
SV	Sound Velocity
TAR	Tidewater Atlantic Research
TVG	Time-Varying Gain
USACE	United States Army Corps Of Engineers
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VAC	Volts Alternating Current

EXECUTIVE SUMMARY

CB&I Coastal Planning & Engineering, Inc. (CB&I) was contracted by the Florida Department of Environmental Protection (FDEP) to process and interpret both the geophysical and geotechnical data collected during the 2015 reconnaissance survey conducted by CB&I Federal Services, LLC, (CB&I) for the Bureau of Ocean Energy Management (BOEM) Marine Minerals Program. The purpose of the BOEM Atlantic Sand Assessment project (ASAP) was to conduct a sand resource investigation along the Atlantic Outer Continental Shelf (OCS) from Florida to Massachusetts. The boundaries of the survey area were 5.6 kilometers (km) (three nautical miles) to 14.8 km (eight nautical miles) offshore U.S. coastlines on the Atlantic OCS within water depths of -30 meters (m). As per CB&I's contract with BOEM, CB&I was not tasked with conducting analysis and interpretation of the geophysical data, nor tasked with delineating potential resources within the Atlantic OCS, therefore the FDEP contracted CB&I to delineate any potential sand sources in the surveyed areas along the Florida coastline and develop preliminary borrow areas.

During the BOEM ASAP reconnaissance data collection phase in Florida, CB&I surveyed along Florida's Atlantic coast offshore Nassau, St. Johns, Volusia, Brevard, Indian River, and Martin County collecting a total of approximately 522 line-km of geophysical (chirp sub-bottom, sidescan sonar, magnetometer and swath bathymetry) data and 30 geotechnical samples (surface grab samples and vibracores). Geophysical survey operations took place between April 19, 2015 and May 1, 2015, starting in Martin County and ending in Nassau County. Geologic sample locations were evaluated and adjusted in the field on a case by case basis based on real time data collection. The geologic sampling cruise commenced on July 29, 2015 and progressed north, completing survey operations on August 16, 2015.

Under the contract with FDEP, CB&I was tasked with delineating preliminary borrow areas in all six counties (eight study areas) that met a minimum cut thickness of 3 feet after applying a 2 ft buffer over incompatible material. In order to achieve this task, CB&I processed all chirp sub-bottom data collected offshore Florida as part of the ASAP project and provided an interpretation, including plotting of vibracore samples on the chirp sub-bottom data, maps with delineation and interpretation of potential sand thicknesses, and output of interpreted thickness for each area. Sidescan sonar and magnetometer data were processed to identify and avoid any areas containing sensitive benthic habitats, debris fields, environmental hazards, shipwrecks and any areas containing cultural resources, resting on or just below the seafloor. In addition, CB&I computed composite mean grain size, percent silt content and sorting statistics for each geologic sample within the preliminary borrow areas by calculating the weighted average (sample weighted by representative lengths of the sampled layer within the core).

Out of the eight study areas offshore six Florida counties, CB&I was able to delineate 16 preliminary borrow areas consisting of potential beach-compatible sand resources with a total net volume of 54,477,396 cubic yard (cy). Offshore Nassau County, CB&I identified six preliminary borrow areas with a total volume of 4,928,511 cy. One preliminary borrow area was delineated offshore St. Johns County with a total volume of 20,836,060 cy. Preliminary borrow area delineation in Volusia County yielded three areas with a total of 5,010,573 cy of sand. Data interpretation in Brevard County resulted in five preliminary borrow areas with a total volume of

6,286,051 cy. The single preliminary borrow area identified in Indian River county has a potential volume of 17,416,202 cy.

Finally, each preliminary borrow area was reviewed and classified as a "Potential" or "Unverified" sand resource in accordance with the Southeast Florida Assessment and Needs Determination (SAND) study conducted by the USACE and FDEP. Of all 16 delineated preliminary borrow areas, five preliminary borrow areas offshore Volusia, St. Johns and Nassau Counties received a final SAND classification of "2 Potential" yielding 27,460,426 cy of likely beach compatible sand. Five other preliminary borrow areas offshore Martin, Indian River, Volusia and Nassau County were classified as "3A Unverified" totaling 17,966,114 cy of likely beach-compatible sand. Eight preliminary borrow areas offshore Brevard, Volusia and Nassau Counties were classified as "3B Unverified" with 9,050,856 cy of potentially beach-compatible sand.

Based off CB&I's interpretation of the geophysical and geotechnical data collected for the BOEM ASAP project, it is evident that there are several viable sand sources along the Florida Atlantic OCS which would benefit from additional data coverage to further delineate and design preliminary borrow areas. In order to refine, design, permit, and/or lease any of these actual sand resources, additional phased geophysical and geotechnical data would need to be collected over all of the study areas under consideration for final design and usage.

PROJECT INTRODUCTION

The Florida Department of Environmental Protection (FDEP) is Florida's lead agency for environmental management and stewardship, protecting the state's air, water and land. As part of this mission, FDEP is the lead regulatory agency charged with managing the state's coastal resources, including its 1,328 kilometers (km) of sandy coastline fronting the Atlantic Ocean, the Gulf of Mexico and the Straits of Florida, including permitting, monitoring, and implementing the State's assistance programs for beach nourishment projects. Beach nourishment provides shore protection and benefits important habitats and ecosystems, community rebuilding efforts (residential and commercial), and Federal and state economies through tourism and tax revenues. Identifying sand resources is the first step in providing these resources to agencies that require them for nourishment projects promoting the long-term sustainability of communities and ecosystems.

CB&I Federal Services, LLC (CB&I), under contract with the Bureau of Ocean Energy Management (BOEM) Marine Minerals Program, is in the process of conducting a three-year sand search investigation on the eastern Outer Continental Shelf (OCS). The first year of the program, in 2015, involved the collection of widely spaced geophysical and geotechnical data from Florida to Massachusetts. The goal of this phase of the project was to identify OCS sand resources and provide this information to multiple federal, state, and local agencies and stakeholders for use in the planning and execution of future beach nourishment projects. The second and third year of the project consisted of collecting additional geophysical and geotechnical data at a design-level offshore New York and New Jersey, as well as additional reconnaissance data offshore Delaware. The second and third years of the project did not include any additional data collection offshore Florida. Upon completion of the reconnaissance survey along the Florida coast in 2015, FDEP contracted CB&I Coastal Planning & Engineering, Inc. (CB&I), as part of the FDEP's cooperative agreement funding with BOEM, to perform a detailed interpretation of the BOEM ASAP data collected along the Florida Atlantic OCS and provide a preliminary assessment on the location and volume of potential offshore sand sources. This Report of Findings presents the results of CB&I's processing and interpretation of the BOEM ASAP data collected during the reconnaissance offshore investigation conducted for BOEM in 2015, culminating in the identification and characterization of preliminary borrow areas along the Florida Atlantic OCS.

CB&I was contracted by BOEM on September 10, 2014, to conduct the Inventory of Potential Beach Nourishment and Coastal Restoration Sand Sources on the Atlantic Outer Continent Shelf of the United States project, later named the Atlantic Sand Assessment Project (ASAP). Following the award, CB&I conducted an extensive review of existing internal and external databases (including but not limited to U.S. Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA), BOEM, United States Army Corps of Engineers (USACE), and various state agencies and academic institutions) to identify areas of potential beach compatible sand sources in proximity to coastal areas where those resources are likely to be needed. In addition, CB&I's comprehensive internal database, which was developed based on historic CB&I projects, along with online resources and information gathered from state coordination meetings allowed

CB&I to draft reconnaissance geophysical tracklines and geotechnical (geologic) sample locations along the Atlantic OCS.

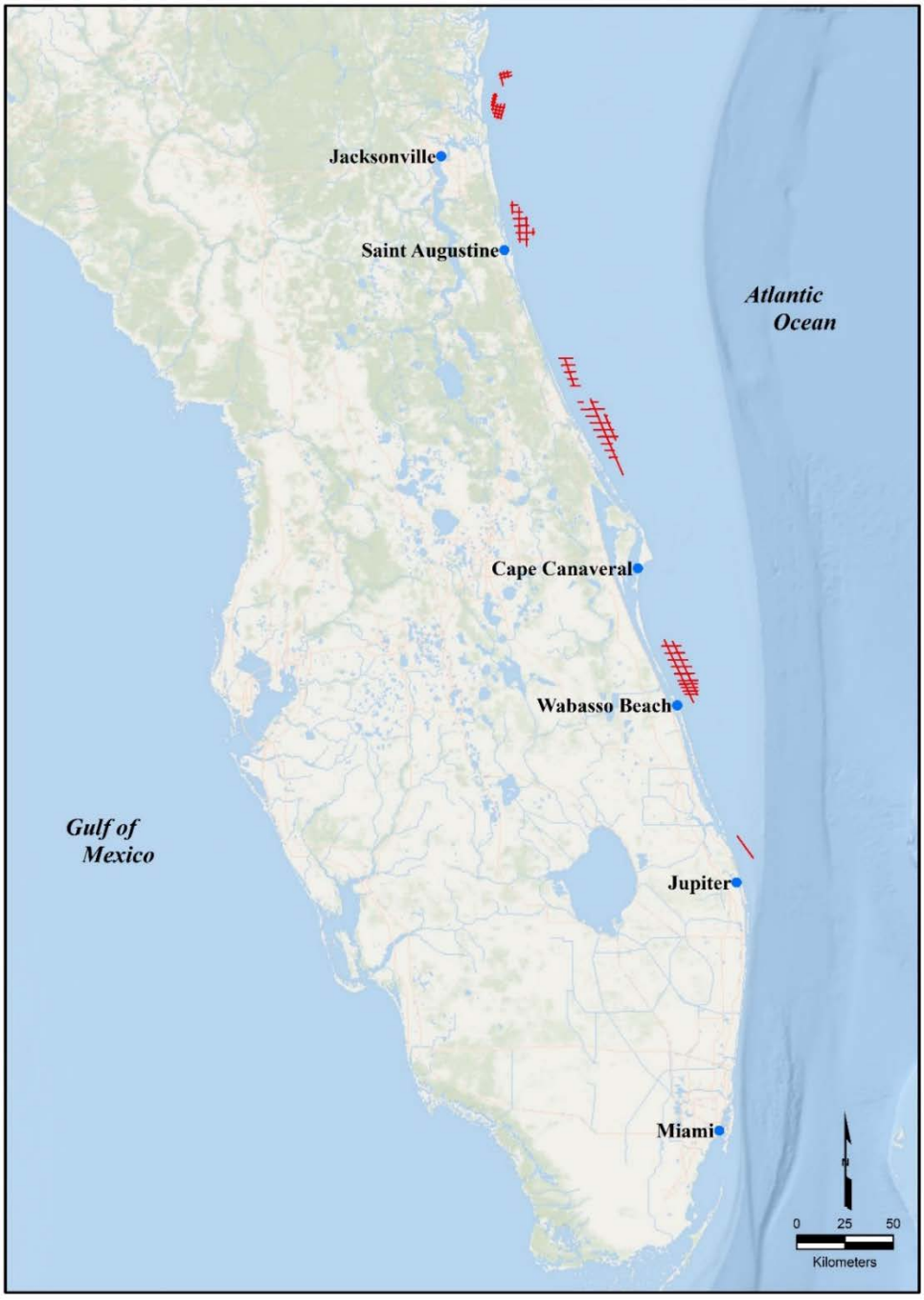

Figure 1: As-run tracklines along the Florida OCS where CB&I conducted the reconnaissance BOEM ASAP investigation in 2015.

The study area is located from 5.6 km (three nautical miles) to 14.8 km (eight nautical miles) offshore U.S. coastlines on the Atlantic OCS within water depths of -30 meters (m). OCS sand sources are limited to 30 m (~90 feet [ft]) of water depth due to practical and economical limitations of the current dredging industry, including restrictions of the current dredging fleet that

is available to U.S. beach nourishment projects. The full reconnaissance effort conducted for BOEM targeted sand resources along the entire Atlantic OCS from Florida to Massachusetts. More specifically along the Florida coastline, CB&I collected both geophysical and geotechnical data in eight study areas from Nassau County to Martin County. Figure 1 below illustrates CB&I's study areas along the Florida east coast.

CB&I began collecting reconnaissance geophysical data on April 19, 2015, offshore Martin County. The survey effort progressed north along the Atlantic OCS and was completed offshore Nassau County on May 1, 2015. Geologic sample locations were evaluated and adjusted in the field on a case by case basis based on real time data collection. Final geologic sample locations were reviewed and approved by a qualified marine archaeologist from Tidewater Atlantic Research (TAR). The geologic sampling cruise commenced on July 29, 2015, and progressed north, completing geological survey operations on August 16, 2015.

Project Overview

CB&I was contracted by BOEM on September 10, 2014, to conduct the ASAP project. The reconnaissance data acquisition phase, conducted in 2015, consisted of collecting widely-spaced geophysical and geotechnical data in order to identify preliminary borrow areas. State allocations were determined by considering length of coastline, and analysis of historic need for sand resources and historic geophysical and geologic data density along with a meeting held with state representatives and stakeholders. In preparation for this coordination meeting, CB&I plotted all previously collected data available together with offshore bathymetry within the study area. Bathymetry data were provided by NOAA National Ocean Service (NOS) as gridded digital elevation models (DEMs) derived from hundreds of coastal surveys selected and tested by NOAA. Together with the bathymetry, the known existing data coverage, and the participation of stakeholder agencies, CB&I developed a priority list of areas for the 2015 reconnaissance-level ASAP data collection.

CB&I held a state coordination meeting with Florida representatives (including the FDEP and the Florida Geological Survey [FGS]) and federal representatives from BOEM, the United States Geological Survey (USGS) and the USACE, in February 2015 to discuss, coordinate and implement, as best as possible, the state's interests for data acquisition into CB&I's ASAP 2015 reconnaissance Data Acquisition Plan. Approximately 12% of the overall widely-spaced reconnaissance-level geophysical effort was allocated along the Florida coastline, consisting of approximately 502 km of the BOEM ASAP project total of 4,138 km of geophysical data. BOEM ASAP reconnaissance-level geotechnical data allocation for Florida consisted of 11% (30 sample sites) of the project total of 260 geologic sample sites. These 30 Florida sample sites consisted of 11 surface grab samples and 19 vibracores and analysis of 125 individual geologic subsamples (11 from the surface grab samples and 114 from the vibracores, Table 2).

The BOEM ASAP geophysical survey began in Martin County on April 19, 2015 and ended in Nassau County on May 1, 2015, with data being collected offshore Martin, Indian River, Brevard, Volusia, St. Johns, and Nassau Counties. Geologic samples were planned based on the in-the-field geophysical data review and approved by a qualified marine archaeologist prior to their collection. Geologic data collection began offshore Martin County on July 29, 2015, progressing north and ending in Nassau County on August 16, 2015. The BOEM ASAP geologic data collection effort

resulted in the collection of 30 geotechnical sample sites, with 11 being surface grab samples and 19 being vibracores. A total of 125 individual geotechnical subsamples (11 from the surface grab samples and 114 from the vibracores) were analyzed for geological properties in CB&I's accredited geotechnical laboratory.

Under the BOEM ASAP contract, CB&I was not tasked with conducting a full analysis and interpretation of the geophysical data, however CB&I did perform a general analysis with minimal processing and interpretation in order to ensure proper geologic sample placement for the reconnaissance geotechnical data collection. CB&I's original contract with BOEM did include the geotechnical sediment analysis of both the 11 surface grab samples and 19 vibracores, consisting of 125 individual geologic subsamples (11 from the surface grab samples and 114 from the vibracores) in Florida. Upon the completion of both the geophysical and geotechnical survey phase, CB&I submitted both the raw digital geophysical as well as the analyzed geotechnical data results to BOEM for distribution to each state. It was left to each state to determine how to integrate both data sets and process the geophysical data and assess any areas that could benefit from additional survey efforts.

While the second and third year of the BOEM ASAP project consisted of collecting additional geophysical and geotechnical data for some states heavily impacted by Hurricane Sandy, they did not include any additional data collection or data processing offshore Florida.

Project Goals

CB&I was contracted by FDEP on December 6, 2016, to conduct an analysis of the data collected by CB&I during the ASAP project carried out for BOEM in 2015. As previously mentioned, the contract between CB&I and BOEM did not include conducting any analysis or interpretation of the geophysical data, nor any delineation of potential resources within the Atlantic OCS. Upon receiving both the geophysical and geotechnical data, and as part of the FDEP's cooperative agreement funding with BOEM, FDEP was interested in developing the acquired data into preliminary borrow areas/sand resource areas that could be used as a basis for a future design-level survey. In support of these goals, CB&I was tasked with performing an in-depth analysis and interpretation of the geophysical and geotechnical data collected during the 2015 reconnaissance campaign offshore Florida.

CB&I processed all geophysical data collected offshore Florida and calculated volumes within preliminary borrow areas for further investigation. The processing of chirp sub-bottom data included plotting vibracore samples on the chirp sub-bottom data, delineating the sand boundary, and calculating a potential sand thicknesses for each area. Sidescan sonar and magnetometer data were processed to identify any avoidance areas containing sensitive benthic habitats, debris fields, environmental hazards, shipwrecks and/or any areas containing cultural resources, resting on or just below the seafloor. This was followed by a preliminary design for potential borrow areas, including a buffer of 2 feet over incompatible material and a remaining minimum thickness of three feet, resulting in an estimate of available beach compatible sands within the preliminary borrow areas.

Project Area

The study area is located from 5.6 km (three nautical miles) to 14.8 km (eight nautical miles) offshore the Florida Atlantic coast from Martin to Nassau County within water depths of up to -30 m. The following section describe the general geologic framework of the overall region.

Florida East Coast Geologic Framework

Florida's east coast is a unique coastal region due to its numerous studies and measured shoreline changes dating as far back as the mid-1800's (Agassiz, 1880). Although the near 150 years of data analysis and scientific studies along Florida's east coast does provide insight into the nearshore geologic framework, it is merely a glimpse into the sediment transport and barrier island formations over a 20,000-year period of sea-level rise (Houston, 2014). The BOEM ASAP data collected offshore Florida occur within two specific geographic areas corresponding to regions as identified in previous FDEP Reconnaissance Offshore Sand Search (ROSS) database funded studies, the Florida central Atlantic region and the Florida northeast Atlantic region. The Florida central Atlantic region contains three BOEM ASAP reconnaissance survey sites offshore Martin, Indian River and Brevard Counties (Figure 2). These reconnaissance sites contain a total survey length of 175.8 km. The Florida northeast region contains a total of five BOEM ASAP reconnaissance survey sites, totaling 346.9 km (Figure 3) offshore Nassau, St. Johns and Volusia Counties.

The BOEM ASAP Florida study areas are located on the Atlantic outer continental shelf. The Atlantic margin continental shelf varies considerably in width, gradient, and morphologic complexity over the 3,000 km it extends along the east coast of the United States. Along Florida's coastline, the shelf narrows and forms a step-like linear flat typical of modern irregular rocky ridges and paleo reef ridges (Ousley, et al., 2014). Almost all of it is covered by a surficial sand sheet, often with some gravel (Hollister, 1985).

In terms of regional structural geologic formation, there are two fundamentally different views concerning the topographic complexity of the early basement structure underlying the Florida-Bahamas region. Mullins and Lynts (1977) postulate that the Bahamas Bank formed during the Jurassic on top of rift-generated horst-and-graben topography. This interpretation forms the basis for the so-called graben hypothesis. During long-term subsidence associated with the regional passive margin-setting, carbonate derived sedimentation on the megabank kept pace, forming thick (up to 14 km) shallow-water limestones. Sheridan et al. (1988) and Leg 101 Scientific Party (1988), on the other hand, envisioned a carbonate megabank that extended from the West Florida Escarpment (in the Gulf of Mexico) to the Blake-Bahamas Escarpment (east side of the Straits of Florida and western margin of the Blake Plateau-Bahama Bank). Because this megabank seemed to have formed by the Late Jurassic on a basement terrain not segmented into large horsts and grabens, it is referred to as the megabank hypothesis. Whether horst-and-graben or megabank, karst (subsurface and exposed sinkholes) developed in Paleocene, Eocene, and Oligocene limestones to produce subsurface local stratigraphic deformation in the form of folds and sags (Meisburger and Field, 1975; Popenoe et al., 1984). These folds have about 80 m of subsurface relief. Karstification (dissolution of limestone rocks) proceeded during the late Oligocene to early Miocene sea-level low stands. Geomorphological interpretation

of the karstified terrain refers to several major physiographic features that resulted from geological structures (e.g. lineaments, folds, and sags), subaerial weathering processes and subterranean dissolution, and sedimentation.

In terms of more recent geologic history, overlying the Paleocene, Eocene, Oligocene, and Miocene limestones is a surficial sand sheet consisting of predominantly Pleistocene and Holocene siliciclastic sands. The surficial sand sheets typically consist of Holocene aged unconsolidated deposits consisting of beach ridges, beach troughs, paleo-ebb deltas, paleo-shorelines and sand waves (Ousley, et al., 2014). The mid- and south-Atlantic OCS is generally characterized by fields of relatively well-oriented, linear, northeast-trending shoals (Duane et al., 1972). These shoals form a small angle with the coast (usually less than 35°), display complex bathymetry, have up to 10 m of local relief, and have side slopes of a few degrees. As well-organized morphologic features, they extend from water depths of only a few meters out to depths of about -60 m (Duane et al., 1972). Even though they show large variations in size, complexity, and distribution along the eastern seaboard, they nevertheless can be grouped into arcuate (inlet and cape-associated) and linear shapes (Duane et al., 1972). The overall unconsolidated sediment thicknesses along the northeast and central Florida Atlantic OCS regions ranges from 0 to 80 feet thick (Phelps et al., In Progress).

The shoals, composed of Holocene sands, rarely attain thicknesses greater than 10 m and generally rest on horizontal strata of marsh, lagoonal, and estuarine deposits. Radiocarbon dating of the underlying material indicates that most of the shoals are younger than the last transgression and are therefore less than 11,000 years old (Walker and Coleman, 1987). The shoal sands, which bear evidence of recent modification by current and wave activity, are generally well-sorted, medium grained sands that are similar in lithology to present shoreline beaches (Finkl and Andrews, 2007). Although there are numerous theories concerning their origin, it is generally accepted that they were formed by nearshore processes (Duane et al., 1972; Hollister, 1985; Walker and Coleman, 1987). Shoals that are now isolated on the shelf are judged to have been formerly shoreface-connected and subsequently detached during the coastal retreat that accompanied the last rise in sea level (Finkl and Andrews, 2007).

In addition to the sandy shoals, carbonate sediments naturally occur throughout the study area, Atlantic OCS, and on most modern continental shelves (Ginsburg and James, 1974). Because the various skeletal and non-skeletal carbonate grains are generally not moved far from their environment of formation, their distribution is a reliable tool on continental shelves for interpreting the history of Holocene deposition. Holocene shelf carbonates, summarized by Ginsburg and James (1974), are grouped into two intergrading categories: open shelves (e.g. eastern Gulf of Mexico) and rimmed shelves (e.g. south Florida). Rimmed shelves are those in which a continuous or semi continuous rim or barrier lagoon on the shelf margin restricts circulation and wave action on the adjacent shelf lagoon. The rim along the southeast Florida coast is a barrier reef which terminates just south of the Martin County/Palm Beach County line.

Finkl and Andrews (2007) describes the open and rimmed shelves as follows. The thin accumulation of surface carbonate sediments on open shelves is largely relict and formed in shallow water earlier in the Holocene. The deposits of rimmed shelves, especially the shallower ones, are often thick, young (<6,000 years old), and continuous, with contemporary deposits. Sand and granular-sized grains are the most frequent and widespread form of carbonate on modern shelves. Coral algal reefs and algal hardgrounds are characteristic of shelf margins in tropical seas. Lime muds and mixtures of lime mud and sands are limited to lagoons rimmed by shelf-margin barriers.

Surficial carbonate sediments of the western North Atlantic shelf are relict and were deposited in shallow water earlier in the Holocene, as described by Emery (1968), Emery and Uchupi (1972), and Milliman et al. (1972). From Cape Hatteras south to Miami the percentage of carbonate increases progressively. Milliman et al. (1972) mapped nine assemblages of carbonate sand grains on the southern shelf, two of which were offshore Florida. North of Jacksonville, molluscan debris predominates over the interior shelf with zones of ooid-peloid and coralline algae near the margin. From Jacksonville to Miami, where the percentage of carbonate is higher, ooid-peloid sands are more extensive, barnacle fragments are a significant component, and the molluscan sand zone is narrower. The age of the ooid sand near the shelf margin off Florida ranges from 9,000 to 14,000 years BP (before present) (Macintyre and Milliman, 1970).

Florida Central Atlantic

The central Florida Atlantic coast region spans from the Volusia County/Brevard County border south to the Martin County/Palm Beach County border and occurs in the Atlantic and Gulf Coast Physiographic Province (Walker and Coleman, 1987). The offshore portion of the study area lies on the continental shelf physiographic unit, including the shoreface, inner shelf plain, outer shelf, and Florida-Hatteras Slope.

A predominant physiographic land feature of the central Atlantic barrier island system is Cape Canaveral. Cape Canaveral is a cuspate foreland (Stauble, 1988), similar to Cape Hatteras (North Carolina) where a sandy cape developed based on underlying geology and by the meeting of offshore currents. The barrier islands of this region were created, in part, by this cuspate foreland. Additionally, to the north, the flood-tidal delta of the migrating (until stabilized) Ponce de Leon Inlet and a now-closed second inlet that was located near Bethune Beach influenced the regional physiography (Stauble, 1988).

Within the Cape Canaveral region, offshore ridges on the shelf margin are interpreted as erosional remnants of Pleistocene limestone, capped by shallow-water calcarenite and coralline algal limestone. Milliman et al. (1972) radiocarbon dated two samples of the algal limestone at about 12,000 and 27,000 years BP. From Cape Canaveral to Palm Beach the ridges are relict dunes or beach ridges capped with prolific growth of living branched corals (Oculina sp.) (Macintyre and Milliman, 1970). From Palm Beach to Miami the single ridge is an ‘inactive’ reef of hermatypic corals, octocorals, and sponges, with a narrow halo of carbonate sand rich in fragments of algae (Ginsburg and James, 1974).

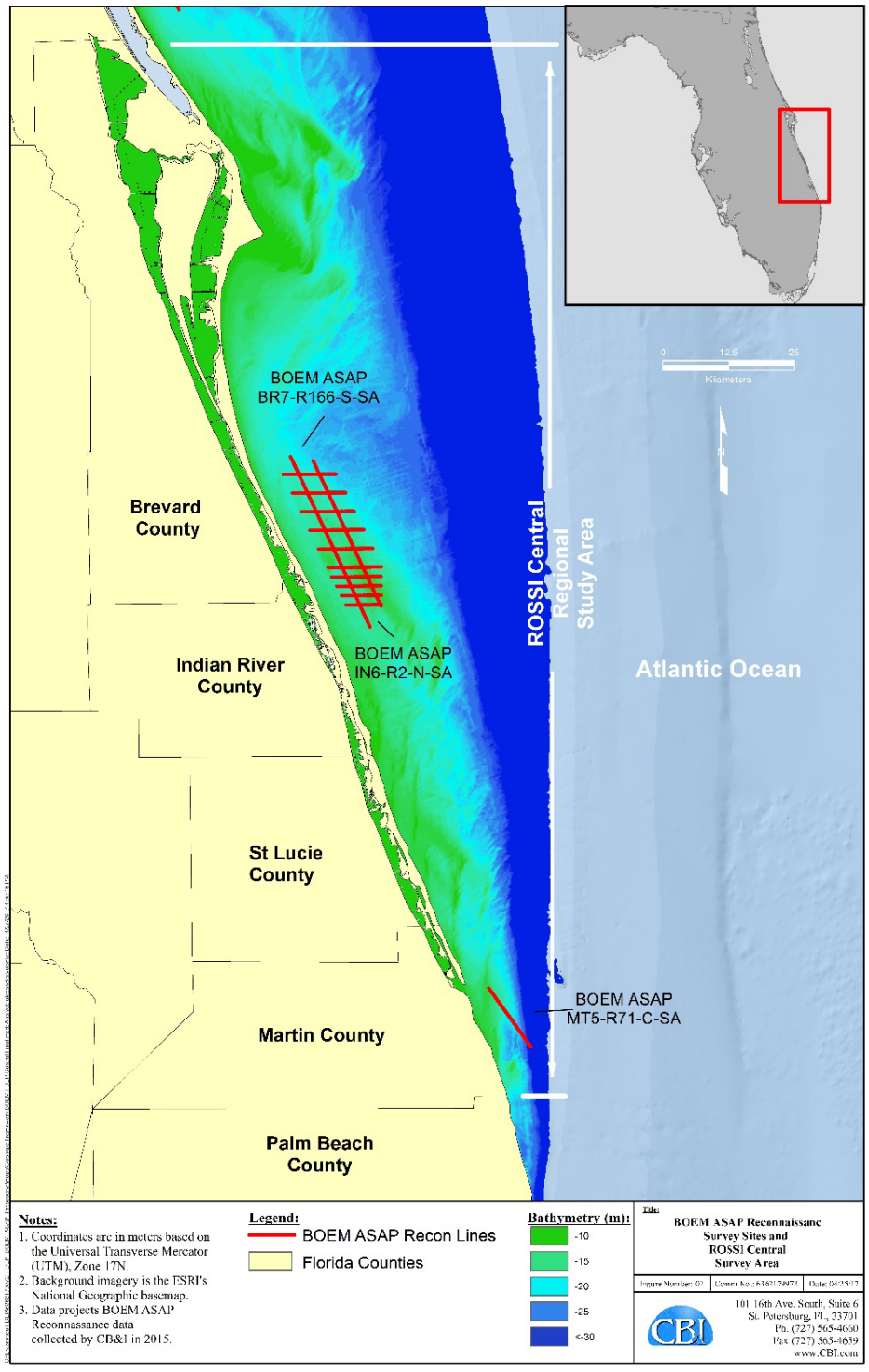

Figure 2: Location of the ROSSI regional study area along the central Florida Atlantic, covering about 720 km^2. The study area is defined by re-formatted NOAA bathymetry in state and federal waters along Brevard, Indian River, St. Lucie, and Martin counties, and contains two of the BOEM ASAP Florida study areas (modified from URS and CPE, 2007)

NOAA bathymetry provides a convenient base for mapping seafloor topography, determining geomorphologic units, and establishing a submarine land topology that could

be related to morphosedimentary bodies within this region (URS and CPE, 2007). As described by URS and CPE (2007), these geospatial relationships combined with collateral data, such as geophysical data, are used to build models of the coastal surficial geological framework. These data indicate that central-Florida OCS sedimentary bodies are strongly influenced by abundant sediment supply around the Cape Canaveral cuspate foreland and accumulation of sediments in positive topographic relief features such as ridges and shoals. From northern Brevard County to Melbourne Beach, there is a directional accumulation of sediments as influenced by the bedrock high upon which the cuspate foreland developed (Finkl and Andrews 2007). There is a buildup of sediments on the updrift (northern) flank of the cuspate foreland with clear offshore bypassing around the apex in the form of well-developed transverse bar systems and ridges. Seafloor units on the downdrift (south) side of the cuspate foreland are characterized by large sand sheets (Cocoa Sand Flat), ridge fields (Malabar Ridge Field), and shoals (Finkl and Andrews 2007). These morphosedimentary features become more constrained southward from Indian River County as the continental shelf narrows and the features themselves become more shore parallel in alignment (Finkl and Andrews 2007).

Shoreface-connected and isolated linear shoals (sand ridges) associated with Cape Canaveral are reported to have formed by coastal-retreat processes (Duane et al. (1972). These sand-rich areas, as reported by Nocita et al., 1990, correspond to what they term as ‘shoal areas’; however, in more recent studies (URS and CPE, 2007) they are translated into morphosedimentary units that include transverse bars, shoals, sand ridges, and parts of sand flats. In the region studied by Nocita et al. (1990) offshore Cape Canaveral, more than 70% of the sample area contained sand. Shoals, transverse bars, and sand ridges contained more than 90% sand. Some areas of shell/gravel- rich surficial sediment occurred nearshore and offshore, but these areas were of minor areal extent.

According to Nocita et al. (1990), large sand bodies making up shoals (referred to as ridge fields) offshore Cape Canaveral appear to be possible relict features containing Pleistocene stratigraphic sections. Buried fluvial paleochannels were also noted to occur in the Florida Central Atlantic and Northeast Atlantic areas, as observed in chirp sub-bottom profiles.

Sand flats within the Florida central Atlantic OCS are extensive and contain large sediment volumes. Throughout the Florida Central Atlantic OCS, the Cape Canaveral cuspate foreland and a narrowing shelf with elongated sediment ridges and shoals are the two overarching types of continental shelf units (Finkl and Andrews, 2007). Therefore, there is potential for several offshore sand sources located in Brevard County. These offshore sand sources include Canaveral Transverse Bars, Mims Ridge Field, Merritt Ridge Field, Farmton Sand Flats, Gifford Shoal and Cocoa Sand Flats (Finkl and Andrews, 2007).

The inner shelf plain is characterized by an extremely gentle seaward slope and narrow depth range (between -12 to -23 m). Relic reefs and lithic sand ridges, as a response to sea level changes, were formed by back-stepping of the reefs (Banks, 2007). According to URS and CPE (2007), the inner-shelf plain consists of a series of platforms or step-like flats (areas of reduced gradient), gentle slopes leading from one level to the next, and shoals. The features are bathymetrically subdued and are not topographically prominent. Shoal

ridges and hills are most extensively developed south of Sebastian Inlet. These shoals are linear and most are aligned in a northeasterly direction. In profile, inner-shelf shoals show a smooth regular surface with both symmetrical and asymmetrical cross-sectional forms. Where asymmetrical, the steeper flanks face east or southeast (seaward). Analyses of chirp sub-bottom profiles indicate that the shoals are superposed on the surface of the flat (URS and CPE, 2007.)

URS and CPE (2007) further states that the outer-shelf zone is dominated by discontinuous broken topography of generally low relief (3 to 7 m). The seafloor is characterized by rocky or coral reef patches, ridges, ledges, cliffs, and depressions. Linear trends of ridges or abruptly steepening slopes are typical of this zone. Although these features are discontinuous and highly irregular, some ridges are fairly persistent at water depths of -21 to -27 m Mean Low Water (MLW) (URS and CPE, 2007).

Florida Northeast Atlantic

The northeast Florida Atlantic coast region spans from the Florida/Georgia border south to the Volusia County/Brevard County border. The extents of the continental shelf stretch about 85 km offshore along the northern boundary (Florida/Georgia state line) to about 40 km seaward along the offshore extension of the Volusia County/Brevard County border. The northeast coast of Florida also occurs in the Atlantic and Gulf Coast Physiographic Province (Walker and Coleman, 1987).

The most prominent geological and geomorphological features along the northeast coast of Florida (Figure 3) include sand flats and ebb-tidal deltas on the inner shelf; sand waves, shoals, and banks on the middle shelf; and large sand ridges on the outer shelf (Finkl and Andrews, 2007). Deepwater ridges occur along the seaward margin of the northeast Atlantic in water depths ranging from -28 to -45 m (Finkl and Andrews, 2007). Sand ridges are a pervasive morphological feature throughout the study area. Shoreface-attached sand sheets occur along the entire length of the study area and are surmounted inshore by ebb-tidal deltas, mostly in the northern part of the study area in Duval and St. Johns counties (Finkl and Andrews, 2007). Other minor sedimentary features include transverse bars alongshore Nassau County and ebb-tidal deltas on the inner shelf offshore Nassau, Duval, and St. Johns counties (Finkl and Andrews, 2007). These northeastern Florida county beaches have the highest rate of silica sands found along the Florida east coast (Houston et al., 2014).

Islands along northeastern Florida have likely formed from two distinct time periods, the late Pleistocene and the Holocene. The late Pleistocene is marked by a series of sea-level changes, ranging from 3 to 450 feet lower than current sea level (Olsen Associates, 2016). As sea level rose, river channels began to infill with finer sediments, over the coarser sediments deposited via the truncated rivers (Olsen Associates, 2016). In terms of geologic evolution, the shelf off northeastern Florida is relatively complicated with different hypotheses posited to account for some of the major features. Although the geological framework retains a complicated evolutionary history, some of the major developments are briefly mentioned here as a background to the description of major structures and processes that affect the geomorphology of the seafloor and surface sediments contained thereon.

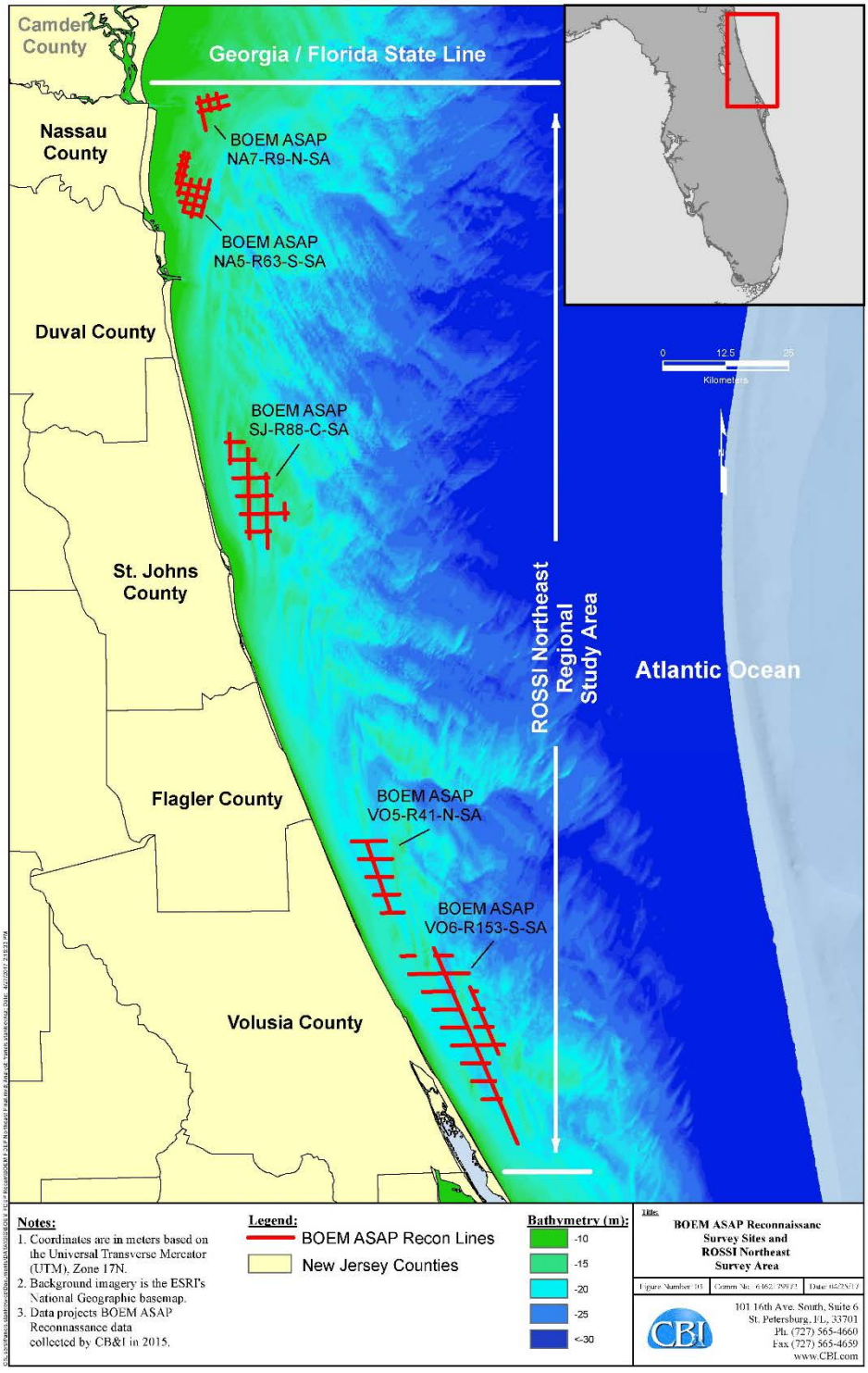

Figure 3: Location of the ROSSI regional study area along the northeast Florida Atlantic. The study area is defined by re-formatted NOAA bathymetry in state and federal waters along Nassau, Duval, St. Johns, Flagler and Volusia counties, and contains five of the BOEM ASAP Florida study areas (modified from URS and CPE, 2007.)

The ROSS northeast Florida study area is located on the southern extension of the East Coast Shelf, which is defined by Uchupi (1968) as a gently seaward-sloping submarine plain bordering the Atlantic coast from Cape Cod to the Florida Keys. The East Coast Shelf is bounded by the 3-mile limit to the west (which marks the boundary between state and federal waters) and the Florida Hatteras Slope to the east. The northeast Florida Atlantic study area is part of the southeastern East Coast Shelf. Following Price's (1954) geomorphological terminology, Meisburger and Field (1975) subdivided the northeast Florida shelf into three main units: shoreface, shelf floor, and shelf edge. Exposed during glacio-eustatic sea-level lowstands during the Pleistocene, relict stream drainage patterns formed on the shelf (i.e. off Fernandina and St. Augustine) along with weathering profiles and Pleistocene soils.

From a sedimentological point of view, sediments occurring on the shelf are highly variable in terms of grain size characteristics, particle shape, and mineralogy (Meisburger and Field, 1975). Trends in sediment distribution appear to be related to both shelf and surface morphology and sub-bottom (geological) structure. URS and CPE (2007) further discusses the fact that anomalous surface sediment patterns are related to the surface exposure of older underlying strata. In general, surficial sediments are detrital quartz sands that overlie older carbonate-rich quartz sand deposits. The overall distribution patterns of surface sediment on the shelf floor are largely the result of the thin and discontinuous nature of Pleistocene and Holocene sediments, but large volumes of quartz sand occur in spatially large but topographically subdued positive features (URS and CPE, 2007). Adjoining patches of the shelf surface often contain sediments deposited at different times and under contrasting environmental conditions. Sediments as old as late Miocene and as young as Holocene are locally exposed in adjacent surface patches. Boundaries between these patches are sharp. They are not gradual as with facies changes in contemporaneous deposits. Thus, lithologic and faunal assemblages of the different patches may be different (URS and CPE, 2007). In addition to the exposure of sediments of different age at the surface, there are lateral gradations within contemporaneous deposits and the disposition of surface sediments in detail is locally complex and irregular. However, there is a relatively uncomplicated dominant sediment distribution pattern – poorly sorted fine quartz sands that mantle the entire shoreface from Georgia to Cape Canaveral (URS and CPE, 2007). The contact or boundary between shoreface facies and inner shelf facies commonly occurs at about the 3-mile limit, which occurs between the -30 and -50 foot isobath (Meisburger and Field, 1975) except just south of Flagler Beach where the shoreface narrows.

The thickness and spatial distribution of lithologic units on the shelf are organized by Meisburger and Field (1975) into three primary patterns: Georgia border to Jacksonville, Jacksonville to St. Augustine, and St. Augustine to Cape Canaveral. Most of the shelf region between Georgia and Jacksonville is covered by fine- to coarse-grained quartz sand deposits 0.3 to 1 m thick but ranging up to 2 m thick in places. Off Fernandina and Jacksonville, quartz sand is thicker (up to 2.5 m) and more uniform in lateral extent, probably due to the presence of the St. Johns and St. Marys Rivers. Late Tertiary dolomite silts and white foraminiferal sands occur several feet below the surface of the seafloor. Weathered materials representing the remains of Quaternary soils or groundwater profiles

also occur below the surficial blanket sediments. Organic-rich muds and peats (radiocarbon-dated at 9,625 years BP) also occur in the area at -18 m MLW.

As stated by URS and CPE (2007), in the Jacksonville to St. Augustine segment, the overall sediment character is similar to distribution patterns to the north. The relative distribution of the different sediment types changes significantly, however, both laterally and vertically. Fine- to medium-grained quartz sands are thicker and more laterally extensive. Pre-Pleistocene dolomite silts and foraminiferal sands are less abundant and more restricted in lateral extent. Reconnaissance vibracores from this area show relatively thick (>2.5 m) sequences of quartz sand. The Georgia region is a likely source for the north Florida shelf sands, based on the presence of (a) an unstable heavy mineral assemblage similar to that of Georgia coastal sediments and reflecting a metamorphic-igneous provenance and (b) a fine-grained low carbonate nature suggesting modern fluvial derivation.

In the St. Augustine to Cape Canaveral segment, sediment character changes as the surface Quaternary sediments thicken and display facies changes that are quite marked. Clayey silt and muddy shell deposits, not present north of St. Augustine, occur near Daytona Beach. Silt and shell deposits may be related to shoreward migration of the Mosquito Lagoon barrier in response to rising sea level.

Sand resources on the shelf of northern Florida beyond the 3-mile limit are not relatively well known. Reconnaissance studies by Meisburger and Field (1975), for example, indicate the presence of quartz sand sheets up to 2 m thick and linear ridge-like shoals off Fort Pierce and Cape Canaveral and south of Daytona Beach. Bank shoals, flat-topped masses of irregular outline and low relief, occur throughout the area and contain several feet of quartz sand atop these topographic highs. Some show promise as sand sources, such as the shoal located 10 km offshore from Jacksonville and St. Augustine where the sand volume is estimated by Meisburger and Field (1997) to be on the order of 178 million cubic yards. Deposits off Ormond Beach and Marineland are estimated to contain about 60 and 40 million cubic yards, respectively. A buried paleochannel of the St. Johns River contains reasonably clean, medium- to coarse-grained quartz sand under a shallow overburden (URS and CPE, 2007). Because some other paleochannels are filled by silty sand and clay, detailed exploration is required to locate sand-filled paleochannels. Linear shoals, such as those lying off Amelia Island, may contain thick sand accumulations. A sand ridge near St. Augustine, for example, is estimated to contain at least 7 million cubic yards of sand in a layer 1.2 to 1.8 m thick (URS and CPE, 2007).

Survey Areas

A total of 522 km, or approximately 12% of the overall BOEM ASAP reconnaissance geophysical data, was collected offshore Florida. In addition, 30 geotechnical sample sites, 11 being surface grab samples and 19 being vibracores, were also collected offshore Florida as part of the 2015 BOEM ASAP reconnaissance survey. A total of 125 individual geotechnical subsamples (11 from the surface grab samples and 114 from the vibracores) were collected and analyzed as part of BOEM ASAP.

Florida has a large amount of historic geophysical data throughout the state and a significant number of vibracores offshore. During the planning stages of the BOEM ASAP project, BOEM and CB&I met with representatives from the State of Florida, including the FDEP and the FGS, as well as representatives of the USACE, USGS, and other federal and local stakeholders to discuss historic data coverage, historic data quality, upcoming survey activities, upcoming beach nourishment needs, and regional geomorphology. A large portion of the Florida continental shelf was previously investigated as identified in ROSSI as either borrow areas of varying status or planned geotechnical investigations. In an effort to avoid duplicate work efforts, CB&I avoided data collection within these areas. The final data collection plan was established based on need for resources and a general lack of data in Volusia County, southern Brevard and northern Indian River Counties. The USACE suggested investigating an area offshore Hobe Sound to assess the existence of a potential "sand wedge" of sediment that appears to have been transported off the inner continental shelf and deposited onto a lower shelf within the project boundaries of the BOEM ASAP project. CB&I did not conduct any geophysical or geologic data collection efforts in the vicinity of Cape Canaveral Shoals since this area currently has a significant amount of historic data throughout the region within the BOEM study area boundaries, including existing permitted and leased federal borrow areas.

The final reconnaissance survey plan for Florida, based on the discussions during the meeting and the data available, led CB&I to collect geophysical and geotechnical data offshore six counties along the Florida coastline which would later be broken down into eight study areas. Study areas were given names based on the *Southeast Florida Sediment Assessment and Needs Determination (SAND) Study* performed by the USACE and FDEP. The naming convention presented in the SAND study took into account the county, distance (in miles) to the centroid of the area and closest R-Monument to the centroid. From this naming convention CB&I established eight study areas, two in Nassau County, one in St. Johns County, two in Volusia County, one in Brevard County, one in Indian River County and one in Martin County. Tables 1 and 2 below include the breakdown of the acquired geophysical and geotechnical data per county and study area.

Table 1: Summary table of FL ASAP geophysical line kilometers by county.

County	Study Area	As-run Geophysical (km)
Martin	MI5-R071	14.2
Indian River	IR6-R002	71.5
Brevard	BE7-R166	90.1
Volusia	VO6-R153	128.4
	VO5-R041	45.3
St. Johns	SJ6-R088	81.4
Nassau	NA5-R063	66.0
	NA7-R009	25.8
Florida Total		**522.7**

Table 2: Summary table of FL ASAP geologic site locations and number of subsamples (coordinates are in North American Datum (NAD) 1983 UTM Zone 17N).

Site Name	X	Y	Type	Analyzed Subsamples	County	Study Area
FL-BOEM-2015-VC01	596390	2995020	Vibracore	6	Martin	MI5-R071
FL-BOEM-2015-VC02	590316	3003454	Vibracore	8	Martin	MI5-R071
FL-BOEM-2015-VC03	566320	3082304	Vibracore	4	Indian River	IR6-R002
FL-BOEM-2015-VC04	560596	3084074	Vibracore	5	Indian River	IR6-R002
FL-BOEM-2015-SS05	556227	3098388	Surface Grab Sample	1	Brevard	BE7-R166
FL-BOEM-2015-SS06	559150	3102009	Surface Grab Sample	1	Brevard	BE7-R166
FL-BOEM-2015-SS07	566011	3076926	Surface Grab Sample	1	Indian River	IR6-R002
FL-BOEM-2015-VC08	524496	3210546	Vibracore	6	Volusia	VO6-R153
FL-BOEM-2015-SS09	529798	3193634	Surface Grab Sample	1	Volusia	VO6-R153
FL-BOEM-2015-VC10	505911	3247612	Vibracore	7	Volusia	VO5-R041
FL-BOEM-2015-SS11	500862	3251122	Surface Grab Sample	1	Volusia	VO5-R041
FL-BOEM-2015-SS12	514414	3229529	Surface Grab Sample	1	Volusia	VO6-R153
FL-BOEM-2015-SS13	518546	3214051	Surface Grab Sample	1	Volusia	VO6-R153
FL-BOEM-2015-SS14	514302	3221176	Surface Grab Sample	1	Volusia	VO6-R153
FL-BOEM-2015-VC15	518706	3224812	Vibracore	11	Volusia	VO6-R153
FL-BOEM-2015-VC16	480634	3323433	Vibracore	8	St. Johns	SJ6-R088
FL-BOEM-2015-VC17	476287	3319774	Vibracore	4	St. Johns	SJ6-R088
FL-BOEM-2015-VC18	482957	3316294	Vibracore	4	St. Johns	SJ6-R088
FL-BOEM-2015-VC19	477850	3312643	Vibracore	4	St. Johns	SJ6-R088
FL-BOEM-2015-SS20	477311	3327981	Surface Grab Sample	1	St. Johns	SJ6-R088
FL-BOEM-2015-VC21	465510	3376131	Vibracore	5	Nassau	NA5-R063
FL-BOEM-2015-VC22	464683	3377415	Vibracore	7	Nassau	NA5-R063
FL-BOEM-2015-VC23	464846	3378105	Vibracore	8	Nassau	NA5-R063
FL-BOEM-2015-VC24	465630	3379768	Vibracore	3	Nassau	NA5-R063
FL-BOEM-2015-VC25	464405	3387421	Vibracore	6	Nassau	NA5-R063
FL-BOEM-2015-VC26	470058	3396823	Vibracore	6	Nassau	NA7-R009
FL-BOEM-2015-VC27	469591	3397978	Vibracore	7	Nassau	NA7-R009
FL-BOEM-2015-VC28	468873	3398381	Vibracore	5	Nassau	NA7-R009
FL-BOEM-2015-SS29	469451	3398700	Surface Grab Sample	1	Nassau	NA7-R009
FL-BOEM-2015-SS30	470604	3398786	Surface Grab Sample	1	Nassau	NA7-R009
Total				**125**		

SURVEY SYSTEMS AND EQUIPMENT

Reconnaissance Geophysical Survey

Reconnaissance-level geophysical data collection consisted of 522 km of geophysical data (chirp sub-bottom, sidescan sonar, magnetometer and swath bathymetry) acquired along the Florida east coast. The geophysical survey vessel and systems CB&I used are described in detail below.

Vessel

Divemasters Inc. provided the *m/v Atlantic Surveyor*, based in Toms River, New Jersey, for the geophysical survey operations. The *m/v Atlantic Surveyor* is a 33.5 meter steel-hulled vessel with a 2.7 m draft (Figure 4). The vessel is equipped with twin Detroit V1671 engines, a fuel capacity of 16,850 gallons, and three generators. The vessel has a clear deck area of 17 by 7.5 m that houses a portable office module for survey equipment setup and operation. The vessel also has a 20,000 pound, telescopic, stern-mounted A-frame and various deck winches that were used for geophysical survey equipment deployment and retrieval.

Figure 4: Divemasters Inc.'s *m/v Atlantic Surveyor*

Navigation

Positioning

A C-Nav 3050 differential global navigation satellite system (DGNSS), owned and operated by CB&I, provided vessel navigation and horizontal positioning for all geophysical data acquisition (Figure 5). The C-Nav 3050 is an augmented DGNSS system using proprietary dual frequency satellite corrections (C-NavC1/C-NavC2). The corrections are based on a global network of tracking stations. Each station has a minimum of two active receivers with quality controlled feedback loops. Each satellite typically tracks seven stations. The corrections are also fed directly to two independent control centers that constantly monitor and maintain data quality for a precise DGNSS solution. The manufacturer advertises that the system has a specified horizontal accuracy of 5 to 10 centimeters (cm) and vertical accuracy of 10 to 15 cm when receiving corrections in "Real Time Gypsy" (RTG) mode. All data were collected using Hypack software and then integrated to individual data acquisition systems. Position data were logged as a *.raw* Hypack file.

Figure 5: Image showing a C-Nav 3050 DGNSS receiver

Motion Control

Figure 6: Applanix POS MV motion and attitude system

An Applanix position orientation system (POS MV 320 E) global navigation satellite system (GNSS) was mounted to the survey vessel and used to collect attitude, heading, heave, position and velocity data of the survey vessel (Figure 6). The Applanix POS MV family is an inertially aided motion unit that provides highly accurate attitude corrections. The POS MV 320 E works by combining GNSS data with inertial measurement unit (IMU) angular rate and acceleration and GNSS Azimuth Measurement System (GAMS). To increase the accuracy of the data collected, CB&I had to perform a GAMS calibration to calculate the misalignment of the inertial navigator to the heading produced from GAMS. Calibration was performed through careful physical measurement of system components and aggressive maneuvering of the survey vessel to reduce the dynamic heading alignment below one (1) degree (approximately) and subsequently calculate the misalignment with the GAMS heading. The combinations of these systems and protocols lead to a very accurate horizontal and vertical position. Motion data were logged (as a *.raw* Hypack file) and integrated into all applicable systems. Raw attitude and GNSS data were also logged into Applanix file formats.

Navigation Computing

Hypack is a state-of-the-art navigation and hydrographic surveying system. Navigation, motion reference unit, magnetometer, and all depth sounder systems were interfaced with an onboard computer, and the data were integrated in real time using Hypack Inc.'s Hypack 2015 software. Locations of the tow points on the vessel for each towed instrument in relation to the primary GNSS antenna and the length of cable between the tow point and each towed instrument was measured and entered into Hypack. The real-time position of each towed instrument was calculated using the aforementioned values and a catenary factor specific to each systems towing attitude, and displayed in real time through Hypack and monitored by CB&I scientists. Online screen graphic displays included the pre-plotted survey lines, the updated boat track across the study area, adjustable left/right indicator, as well as other positioning information such as boat speed, and line bearing. The digital data were merged with positioning data (C-Nav), video displayed and recorded to each of the individual acquisition computers. Data were collected in Universal Transverse Mercator (UTM) meters zone 17N. Each acquisition system parsed the corrected navigation string from Hypack to the incoming data; therefore, all raw data were layback corrected.

Bathymetry

CB&I used an EdgeTech 6205, a fully integrated swath bathymetry and dual frequency sidescan sonar system that uses chirp pulse modulation, for our swath hydrographic and seafloor backscatter data collection (Figure 7). This system's standard configuration includes an over-the side vessel pole mount, sound velocity sensor at the sonar head, and is easily integrated with standard motion reference units, sound velocity profilers, and altimeters. Sound velocity profiles were taken at the beginning and end of each day and throughout the survey day via an underway sound velocity (SV) system as needed to adjust

for changes in sound velocity in the water column. The 6205 uses ten receiver elements and one discrete transmit element in a pair of transducer heads. The high number of channels enables enhanced rejection of multi-path effects as well as reverberation and acoustic noise. The swath of the bathymetry data can be either 350 m or 150 m and has a range resolution of 1 cm at 550 kilohertz (kHz). The maximum useable swath of the bathymetry is based on water depth and was monitored by CB&I scientists. In an effort to collect the maximum amount of data, the range were set to 150 m at 550 kHz. The quality of the bathymetric data decreases as the range increases, therefore the range was limited to approximately 8 to 10 times the water depth to produce accurate and repeatable depth measurements. The bathymetric processor within the EdgeTech Discover software "binned" the data based on a user defined cell size related to a range. Two bin methods were available: equal angular and equal spacing. The latter was utilized for this survey considering the relatively low relief of the targeted study areas. The binned data were recorded into Hysweep as *.hsx* (Hysweep file) format.

Figure 7: EdgeTech 6205 fully integrated swath bathymetry and dual frequency sidescan sonar system

Backscatter swath coverage can be set to be 250 m or 70 m with a range resolution of 1 cm and 0.6 cm at 550 kHz and 1600 kHz respectively. Sonar settings were monitored and adjusted in real-time to use the optimal settings for environmental, oceanographic and geologic conditions in order to maximize data quality and coverage. Backscatter data were recorded to *.jsf* files. It should be noted that the sonar data from the combined swath bathymetry and sonar system were used as secondary data, CB&I was running a standalone towed sidescan sonar system as a primary source of sidescan sonar data.

Navigation and horizontal positioning for the 6205 combined sonar system were provided by the C-Nav DGNSS system, with the motion data provided by the Applanix POS MV 320 E system, both via Hypack. Bathymetry data were recorded in *.hsx* files and *.raw* (Hysweep/Hypack file) format.

Prior to the start of bathymetric data collection, a patch test was required for the EdgeTech 6205 to precisely measure system misalignments in relation to the vessel's reference frame. Offsets were calculated for latency, roll, pitch and yaw. In brief, the patch test was performed by collecting three parallel survey lines perpendicular to a slope (or object) on the seafloor in a specific reciprocal pattern. Survey lines were spaced three to four times the water depth to allow for sufficient overlap of swaths. The collected patch test data were loaded into Hysweep editor and processed using the Patch Test utility. It should be noted that the system latency should be zero due to the incorporation of a one pulse per second (1 PPS) timing device. Patch tests were conducted at the onset of the survey and whenever the side-mount pole, IMU, or antennas were moved.

Chirp Sub-bottom Sonar

An EdgeTech 3200 sub-bottom profiler with a 512i towfish was used to collect the high-resolution seismic reflection profile data (Figure 8). This system is a versatile wideband frequency modulated (FM) sub-bottom profiler that collects digital normal incidence reflection data over many frequency ranges within the 0.5 kHz – 12 kHz range, also called a "chirp pulse." This instrumentation generates cross-sectional images of the seabed capable of resolving bed separation resolutions of 0.06 m to 0.10 m (depending on selected pulse/ping rate). The tapered waveform spectrum results in images that have virtually constant resolution with depth. The data were collected and recorded in the systems native, EdgeTech *.jsf* format. The chirp sub-bottom system was monitored and adjusted, if needed, in real-time to use the optimal settings for environmental, oceanographic and geologic conditions in order to ensure the highest quality data are being collected. Navigation and horizontal positioning for the sub-bottom system were provided by the C-Nav DGNSS system via Hypack utilizing the Hypack towfish layback correction.

Figure 8: Image of the sub-bottom profiler 512i towfish.

Sidescan Sonar

As the aforementioned EdgeTech 6205 was pole mounted resulting in potential vessel motion impacts to the backscatter data, CB&I collected additional sidescan sonar data from an independently towed system ensuring the collection of a quality dataset.

CB&I employed an EdgeTech 4200-HFL sidescan sonar system which uses full spectrum chirp technology to deliver wide-band, high energy pulses coupled with high resolution and superb signal to noise ratio echo data (Figure 9). The portable sidescan sonar package includes a laptop computer running the Discover® acquisition software and 300/600 kHz dual frequency towfish running in high definition mode. At 300 kHz the maximum range scale is 150 m and at 600 kHz the maximum range scale is 100 m. The sensor was towed from a marine grade hydraulic winch in order to adjust for changes in the seafloor and maintain an altitude that is 10 to 20% of the range of the instrument per BOEM guidelines. The frequencies of this system are sufficiently capable of identifying seafloor objects and features of at least one (1) m in diameter. The sidescan sonar system was monitored and adjusted, if needed, in real-time to use the optimal settings for environmental, oceanographic and geologic conditions in order to maximize data quality and coverage to ensure the highest quality data are being collected. Navigation and horizontal positioning for the sidescan sonar system were provided by the C-Nav DGNSS system via Hypack utilizing the Hypack

Figure 9: Image of the EdgeTech 4200 Sidescan Sonar towfish.

towfish layback correction. Sidescan sonar data were collected and recorded in the systems native, EdgeTech *.jsf* format.

Magnetometer

A Geometrics G-882 Digital Cesium Marine Magnetometer was used to perform a cursory investigation of the magnetic anomalies within the study area (Figure 10). The magnetometer is run on 110/220 volts alternating current (VAC) power and capable of detecting and aiding the identification of any ferrous, ferric or other objects that may have a distinct magnetic signature. The G-882 has a typical counter sensitivity of 0.02 nT (nanotesla, or gamma) P-P (peak-to-peak) at a 0.1 second sample rate or 0.002 nT at 1 second sample rate and can collect up to 40 samples per second. Sample frequency was factory-set at up to 10 samples per second. The magnetometer was towed in tandem with the EdgeTech 4200-HFL sidescan sonar system at an altitude of no greater than 6 m above the seafloor, per BOEM regulations, and far enough from the vessel to minimize boat interference since the instrument has a sensitivity of 1 gamma. The tandem system was attached to a marine grade hydraulic winch in order to adjust for changes in the seafloor and maintain an altitude of no greater than 6 m above the seafloor. Navigation and horizontal positioning for the magnetometer was provided by the C-Nav DGNSS system via Hypack utilizing the Hypack towfish layback correction. Magnetometer data were recorded in .raw Hypack file format.

The purpose of the magnetometer survey was to establish the preliminary presence and location of any potential underwater wrecks, cultural resources, submerged hazards, or any other features that would affect vibracore activities. Specifically, the data were used by a qualified marine archaeologist to clear vibracore sites; in addition it can provide baseline data for future development of potential marine sand resources.

Figure 10: Geometrics G882 magnetometer

Reconnaissance Geologic Sample Survey

The reconnaissance geologic sample collection effort consisted of 30 geologic samples (19 vibracores and 11 surface grab samples) from Martin County to Nassau County. The reconnaissance geologic sampling cruise mobilized out of Palm Beach, Florida and sampling commenced on July 29, 2015. The collection effort progressed north and completed sample collection offshore Nassau County on August 16, 2015.

Vessel

AVS' *m/v Thunderforce*, based in Fort Pierce, Florida, served as the vibracore and surface grab sample collection platform (Figure 11). Built in 1980, the *m/v Thunderforce* is a 33.5 m steel-hulled vessel with a draft of 2.1 m. The vessel has a gross tonnage of 98 tons and is equipped with twin Detroit 780 horsepower diesel engines, a fuel capacity of 9,000 gallons and two, 30 kW Delco generators.

Figure 11: The M/V Thunderforce. AVS' vessel for the geophysical and geotechnical survey operations.

Navigation

The following two subsections describe the positioning and navigational computing equipment utilized in the 2015 BOEM ASAP reconnaissance geotechnical survey.

Positioning

For the geotechnical survey, CB&I employed a Trimble Differential Global Positioning System (DGPS) The Trimble DGPS system uses a Pro Beacon receiver to provide the necessary corrections from the nearest U.S. Coast Guard Navigational Beacon. The DGPS initially receives the civilian signal from the global positioning system (GPS) NAVSTAR satellites. The locator automatically acquires and simultaneously tracks the NAVSTAR satellites, while receiving precisely measured code phase and Doppler phase shifts, which enables the receiver to compute the position and velocity of the vessel. The receiver then determines the time, latitude, longitude, height, and velocity once per second. The GPS accuracy with differential correction provides for a position accuracy of one 1 to 4 ft.

Navigation Computing

Navigational and depth sounder system were interfaced with an onboard computer, and the data were integrated in real time using Hypack, Inc.'s Hypack 2015® software. Hypack 2015® is a state-of-the-art navigation and hydrographic surveying system. The location of the vessels A-Frame (vibracore tow point) and capstan winch (surface grab sampler tow

point) in relation to the DGPS were measured, recorded and entered into the Hypack 2015® survey program. Online screen graphic displays include the pre-plotted sample locations and the vessel centered at the chosen tow point based on the sample type. Before collecting a sample, the surveyor logged all receiving data to a *.raw* file and took a target at each sampling attempt. The final target dialog box was reviewed to ensure that a depth, x and y position as well as time were populated. If any information was missing, the *.raw* file was reviewed and necessary items were edited. Once the sampling attempt was completed the target was given a name based on the sample number and attempt number.

Vibracore System

CB&I and AVS utilized a 271B Alpine Pneumatic vibracore, owned and operated by AVS, configured to collect undisturbed sediment cores up to 6.09 m (20 ft) in length (Figure 12). The self-contained, free-standing pneumatic vibracore unit contains an air-driven vibratory hammer assembly, an aluminum H-beam, which acts as the vertical beam upright on the seafloor, 6.09 m long steel tubes measuring 10.16 cm (4 inches) in diameter, with a plastic core liner and a drilling bit with a cutting edge. An air hose array provides compressed air from the compressor on deck to drive the vibracore. The vibracore unit is winch and A-Frame deployed and retrieved from the *m/v Thunderforce*. The vessel was "live boated" at all geologic sample locations and no anchoring was conducted during geologic sample collection to prevent potential damage to seafloor environmental or cultural resources.

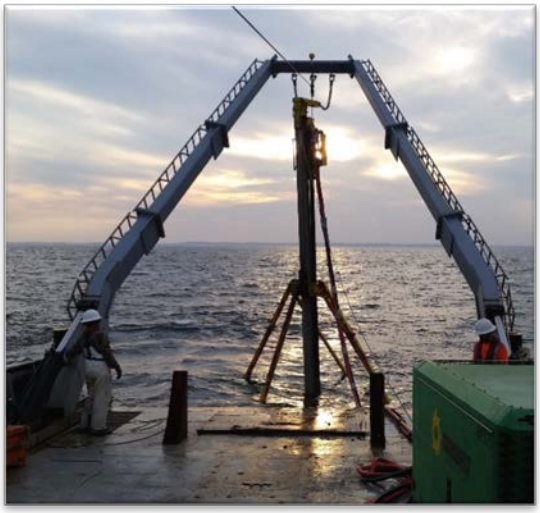

Figure 12: Alpine vibracore rig.

The minimum recovery at each vibracore sample location was determined to be 80 percent of the expected penetration though the unconsolidated strata through which it has penetrated. The total length recovery was measured and compared to the measured depth of penetration to calculate percent recovery. Penetration was determined with the use of a penetrometer and chart recorder. Depth of penetration beneath the surface of the bottom must be known to within plus or minus 0.5 ft of actual penetration. The desired depth of penetration was 20 ft, or shallower where specific, resistant geologic layers (consolidated clays or rock) were evident in the reconnaissance chirp sub-bottom data. It is recognized, however, that maximum penetration may not be achieved at all sample locations.

Penetration refusal occurred when less than 1 ft of advance was accomplished after 5 minutes of vibration. When refusal was met at less than 80 percent of the desired depth of penetration, the sample portion was removed and a new core pipe was prepared. A jet pump hose was attached to the top of the core pipe just below the vibrator. The rig was lowered to the bottom and jetted down to a depth 2 ft above where the first attempt met refusal. The jet was then turned off and the vibrator turned on, taking the additional part of the core and an approximate 2 ft overlap. Retries were attempted until penetration reached refusal or until three total attempts were achieved, whichever occurred first. In some cases, as an alternative to jetting the second attempt, CB&I and AVS elected to try and collect a full 20 ft vibracore (without jetting).

Surface Grab Sampler

CB&I utilized a Ponar petite grab sampler for collection of unconsolidated surface grab samples. The Ponar was lowered by hand over the side to the seafloor at pre-determined and pre-approved sample locations while "live boating." Once near the seafloor, the Ponar was allowed to free fall, triggering the sampling device to penetrate and close into the seafloor, collecting a surface sediment sample. The Ponar was then retrieved to the deck of the vessel, and the sample was transferred into secure sample bags. In some cases, multiple attempts were conducted at one sample site in order to collect an adequate sample size. Once a full sample was obtained the bag was labeled and stored for transport back to CB&I's geotechnical laboratory for visual description, photographing and sediment analysis (described later in this document).

SURVEY OPERATIONS

Reconnaissance Geophysical Survey Operations

CB&I conducted a preliminary vessel mobilization in Point Pleasant, New Jersey from April 6, 2015 to April 8, 2015. This initial mobilization consisted of loading all the survey equipment, connecting cables and tow-systems to their respective survey computers, installing all positioning systems and antennae, attaching the EdgeTech 6205 to the pole mount, measuring raw offsets and configuring the navigation software. Once all systems were properly connected and integrated, CB&I survey crew conducted a bench test of each individual geophysical survey equipment to ensure that everything was properly configured. Following the completion of the preliminary mobilization, the *m/v Atlantic Surveyor* began its transit from New Jersey to West Palm Beach, Florida.

Upon arriving in West Palm Beach, the vessel was met by CB&I's geophysical and hydrographic survey team on April 16, 2015 at the Rybovich Marina. On April 16, 2015, the CB&I crew conducted additional measurements of the systems' offsets using a laser range finder for a more accurate vessel and towed system positioning. On April 17, 2015, the vessel left the dock to conduct a wet test of the survey systems and returned to the marina at the end of the day. On April 18, 2015, the vessel departed to conduct calibrations for the bathymetric system (EdgeTech 6205 and Applanix POS MV). On April 19, 2015 the crew finalized all necessary calibrations and calculations and began collecting geophysical data in Martin County in the early afternoon. The first survey team continued to head north and arrived offshore Indian River and Brevard County by April 20, 2015. Geophysical data continued to be collected offshore Indian River and Brevard

County until April 23, 2015. Between April 24 and 26, 2015 the survey vessel was located offshore Volusia County and then transited to St. Johns County where geophysical data were collected between April 27 and 28, 2015. After a crew change, the vessel returned offshore Nassau County on April 30, 2015, completing survey operations offshore Nassau County Florida on May 1, 2015.

During the geophysical survey offshore Florida, five patch tests were conducted, four of which took place after raising the pole mount due to a long transit and one taking place after the boat returned to port for a crew change. On April 26, 2015 survey operations were shut down for an hour due to the Protected Species Observer (PSO) sighting a Leatherback turtle within the exclusion zone. The crew change took place on April 28, 2015 and the new survey team remained at port on April 29, 2015 due to unfavorable weather conditions in the Nassau County area. The *m/v Atlantic Surveyor* left the port overnight and arrived offshore Nassau County before sun-rise on April 30, 2015.

Throughout the duration of the project, survey operations took place during daylight hours only (dawn to dusk). Geophysical operations began with a PSO clearance of 30 minutes once the observer was able to see the exclusion zone of 100 m around the chirp sub-bottom source. Once the exclusion zone was clear, geophysical systems (i.e. chirp sub-bottom) began a power ramp-up, starting from the lowest power output and reaching full power in at least 20 minutes.

Geologic Sample Site Selection

CB&I conducted a certain level of post-processing of the geophysical data for quality assurance/quality control and geologic sample site selection. Geologic sample locations were evaluated, and adjusted in the field on a case by case basis based on real time data collection.

During the geophysical data collection, the crew leader of each shift was tasked with selecting appropriate sites for geologic samples (both surface grab samples and vibracores). During data acquisition, when a sand hill or shoal was identified, targets were placed in the Hypack navigation software. In addition to the digital target log in Hypack, the chirp sub-bottom data were being printed to provide a large scale overview of each chirp sub-bottom line. Upon completing a specific sub-area or full area, CB&I scientist were tasked with reviewing both the printed chirp sub-bottom logs as well as targets set in the navigation software to determine locations that have a chirp sub-bottom signature indicative of sand that should be sampled. Areas that appeared generally thicker such as sand hills and/or shoal complexes were generally sampled with vibracores. Regions with generally thinner deposits sometimes in-between areas of higher relief were sampled with a surface grab sample. Whenever possible, geotechnical samples were placed on or close to line intersections in order to provide a more comprehensive correlation of the strata and collected chirp sub-bottom data. A final xy location for each sample was logged on a master sheet which would be reviewed by the marine archaeologist for any cultural resource artifacts or anomalies.

Final geologic sample locations were approved by a qualified marine archaeologist of TAR. All survey data (sidescan sonar, chirp sub-bottom and magnetometer) were submitted to the archaeologist for review. The proposed geotechnical sampling sites for both surface grab samples and vibracores were reviewed to identify and avoid any cultural resources or other magnetic/electromagnetic anomalies, such as munitions of explosive concern within a 50 m (164 ft) radius. TAR reviewed the geophysical data and cleared or rejected potential geologic sample

locations prior to sampling. If TAR rejected a location, the nearest clear location where a vibracore or surface grab sample activity was permissible was recorded and the proposed geologic sample site was changed.

Reconnaissance Geologic Sample Survey Operations

The BOEM ASAP reconnaissance geologic sampling cruise began mobilization on July 27, 2015 and completed mobilization on July 29, 2015 in Fort Pierce, Florida. Sampling commenced on July 29, 2015 and progressed north. Between July 29 and 30, 2015 geotechnical samples were being collected offshore Martin County, followed by Indian River and Brevard County, which were completed on July 31, 2015. Operations offshore Volusia County began on August 1, 2015 and were completed on August 14, 2015 after the vessel required maintenance. On August 15, 2015, geotechnical samples were collected offshore St. Johns and Nassau County and sampling operations were completed on August 16, 2015.

Marine mammal mitigation measures for the geotechnical operations were the same as with the geophysical survey and were similarly implemented. Prior to any sample being collected, the PSO conducted a 30 minute clearance of the 100 m exclusion zone. The area around the vessel was constantly monitored by the PSO and operations were terminated once clearance could no longer be maintained. During survey operations in Florida, there were no shut downs due to any protected species entering the exclusion zone.

DATA PROCESSING

Reconnaissance Geophysical Data Processing

CB&I collected geophysical and geotechnical data in Federal waters offshore six Florida Counties during the BOEM ASAP project in 2015. As part of the original ASAP project, geophysical data (chirp sub-bottom, sidescan sonar and magnetometer) were not processed or interpreted. Under the current contract with FDEP, CB&I was tasked with conducting a comprehensive processing and interpretation of the collected geophysical data and correlating it to the already analyzed geotechnical data.

Bathymetry

Bathymetry data, collected with the EdgeTech 6205 system, was processed under the original contract between CB&I and BOEM for the ASAP project and submitted as *.xyz* files to each of the states.

The recorded raw swath bathymetry data were corrected in real time for motion artifacts (heave, pitch and roll) and heading from the data acquired by the Applanix POS M/V system. Moreover, collected sound velocity profiles collected throughout the survey were applied in real time and recorded to the raw bathymetry file. Post-processing of the swath bathymetry data were performed using Hysweep 2015 MBMAX64 Editor, which involved applying a tidal correction which were derived from a combination of C-NAV SBAS GNSS vertical positions and NOAA observed tides. Each line was then inspected for any data outliers or issues and a final *.xyz* was exported for each state.

Chirp Sub-bottom Sonar

Post collection processing of the chirp sub-bottom data were completed using Chesapeake Technology, Inc.'s SonarWiz 6 software. This software allows the user to apply specific gains and settings in order to produce enhanced sub-bottom imagery that can then be interpreted and digitized for specific stratigraphic facies relevant to the project goals.

Raw *.jsf* files were imported into SonarWiz6 and the data were then bottom tracked, gained and swell filtered. The process of bottom tracking uses the high-amplitude signal associated with the seafloor to map it as the starting point for gains and swells. Swell filtering is a ping averaging function, which allows for the elimination of vertical changes caused from towfish movement produced from changes in sea state. The swell filter was increased or decreased depending on the period and frequency of the sea surface wave conditions and special care was taken not to over-smooth and eliminate features on the seafloor. Time-varying gain (TVG) was applied and manipulated to produce a better image (contrasts between low and high return signals) below the seafloor to increase the contrast within the stratigraphy, and increase the amplitude of the stratigraphy with depth, accounting for some of the signal attenuation normally associated with sound penetration over time. A blank-water column function was also applied to eliminate any features such as schools of fish under the chirp system which produce noise within the water column.

Sidescan Sonar

Post collection processing of the sidescan sonar data were completed using Chesapeake Technology, Inc.'s SonarWiz 6 software. This software allows the user to apply specific gains and settings in order to produce enhanced sidescan sonar imagery that can be interpreted and digitized for specific benthic habitat features and debris throughout the study area. The first step in processing was to import the data into the software and bottom track the data. This is achieved using an automated bottom tracking routine and in some cases done manually. This step provides the data with an accurate baseline representation of the seafloor and eliminates the water column from the data.

After bottom tracking, the data were processed to reduce noise effects (commonly due to the vessel, sea state, or other anthropogenic phenomenon) and enhance the seafloor definition. In most cases automatic TVG is sufficient to provide the best imagery. TVG divides the data into parallel swaths and increases or decreases backscatter as the timing of the record increases in order to strengthen more distant regions that are normally degraded due to signal attenuation. This creates a better sidescan sonar image and allows the processer to identify areas with similar acoustic properties. In areas with high levels of noise in the data it was necessary to apply automatic gain control (AGC), which normalizes the data by strengthening quiet regions/soft returns while simultaneously reducing/eliminating overly strong returns by obtaining a local average at a given point. During processing, each survey line was viewed and interpreted for any potential hazard contacts, geologic features, benthic habitat/hardbottom and sediment boundaries. When potential contacts were identified, a point was digitized to provide geographic coordinate information at the contact location for integration into ArcGIS and an image of the contact was produced. All geologic features and sediment boundaries were digitized in SonarWiz 6 by encapsulating the feature into a geographically referenced polygon/polyline shapefile for integration into ArcGIS.

Magnetometer

Magnetometer data were post processed within Hypack's MagEditor software and plotted in the form of profiles. In order to normalize the magnetic field and select anomalies with the finest data resolution possible, the background magnetic field and background noise was adjusted to negate for diurnal variations. Within MagEditor, the diurnal magnetic readings were duplicated and cropped. The cropped data were then deducted from the original gamma readings to normalize the magnetometer data from any diurnal variations. Anomalies were then selected with the Whole Magnetic Analysis tool, accounting for the distance over ground, time elapsed, the minimum and maximum gamma readings and the total peak to peak gamma readings.

Ferrous items, detected via the magnetometer, are typically observed with an increased gamma intensity reading and seen as monopoles, dipoles and multi-component signals (Figure 13). These varying signals distinguish the anomalies from their natural environment. Anomalies identified throughout the processing and identification phase were then classified based on their magnetic signatures and intensity.

Once all magnetic anomalies were identified they were compared to distinguishable features observed in the chirp sub-bottom and identified sidescan sonar contacts. These anomalies and targets are compared and analyzed based on their proximity, signature and intensity. Anomalies and targets identified within a 150 m buffer to one another were exhibited in the provided target report. Out of the 67 magnetic anomalies, four anomalies were determined to correlate to contacts identified in the sidescan sonar data.

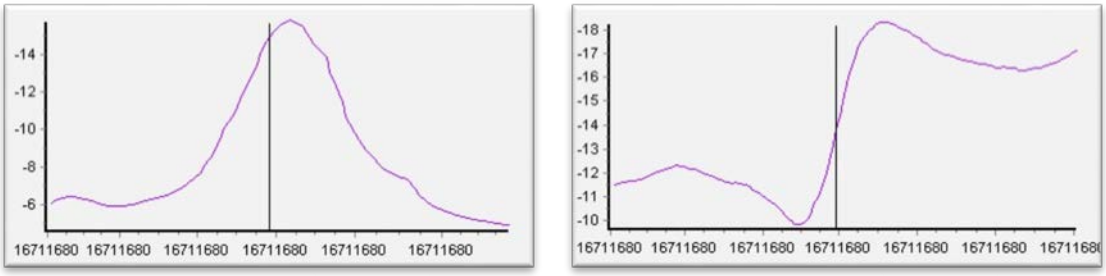

Figure 13: Magnetometer data examples showing monopolar anomaly (left) and dipolar anomaly (right)

Reconnaissance Geologic Sample Data Processing

Reconnaissance geotechnical data collected offshore Florida consisted of 11 surface grab samples and 19 vibracores and analysis of 125 individual geologic subsamples (11 from the surface grab samples and 114 from the vibracores, Table 2). CB&I processed all geotechnical data collected offshore Florida as part of the BOEM ASAP project and submitted to BOEM vibracore logs, photographs, granularmetric reports and grain size distribution curves.

Vibracore Logging

Upon collection of the vibracores and removal of the vibracore tube, cores were measured, marked, and cut into 1.52 m (5 ft) sections and transported to CB&I's accredited geotechnical laboratory in Boca Raton, FL. Vibracores were split lengthwise and logged in detail by describing sedimentary properties by layer in terms of layer thickness, color,

texture (grain size), composition and presence of clay, silt, gravel, or any other identifying features in accordance with American Society for Testing and Materials (ASTM) standard procedure D 2488-09a. The vibracores were photographed in 2.0 ft intervals using a 3.9 megapixel digital camera that was mounted on a frame directly above the vibracores. The photographs were taken using full spectrum overhead lighting and an 18% gray background, which provides a known reference color and is the standard reference value against which all camera light meters are calibrated. Sediment samples were extracted from the vibracores at irregular intervals based on distinct stratigraphic layers and sediment quality (strata with apparent high fines content were typically avoided) in the sediment sequence. For stratigraphic layers within each vibracore that occurred at different depths, but were significantly similar, a sample was not collected or analyzed for the deeper unit(s). Instead, CB&I reported the results of the first similar sample for the first similar unit as the virtual results of the all similar deeper unit(s). Per the original ASAP project contract with BOEM, the archive halves of the vibracores were then wrapped and boxed for transfer to Columbia University's Lamont Dougherty Earth Observatory (LDEO) core archive facility in New York. As of the date of this report, Florida's remaining sampled vibracore halves are being temporarily stored at CB&I's Boca Raton, Florida facility. Sedimentary properties of the surface grab samples were also described. Each surface grab sample was split into two representative sub-samples, one sub-sample was used to conduct the laboratory analysis and the other sub-sample was provided to LDEO core archive facility with the vibracore samples.

The sediment samples extracted from the vibracores and the surface grab samples were prepared for processing in CB&I's geotechnical laboratory. This laboratory is accredited by the Construction Materials Engineering Council, Inc. (CMEC) for ASTM D422/T88 Sieve Analysis, D1140, D4648, and CPE-HAT-09 and is validated by USACE Materials Testing Center for ASTM D422/T88, D1140, D3740, D4648, CPE-HAT-09, and E329. Geologic samples were analyzed to determine texture (grain size and sorting); percent carbonate, and color. The testing methods are summarized below:

Sieve analysis

The sediment samples were analyzed to determine color and grain size distribution. During sieve analysis, the wet, dry and washed Munsell colors were noted. Grain size was determined through sieve analysis in accordance with ASTM Standard Materials Designation D422-63 for particle size analysis of soils. This method covers the quantitative determination of the distribution of sand particles. Sediment finer than the No. 230 sieve (4.0 phi) was analyzed following ASTM Standard Test Method, Designation D1140-00. Mechanical sieving was accomplished using calibrated sieves with a gradation of half phi intervals. Additional sieves representing key ASTM sediment classification boundaries were included to meet appropriate beach-compatible mineral characterization. Weights retained on each sieve were recorded cumulatively. The sieve stack used for mechanical analysis is provided in Table 3. Grain size results were entered into the gINT® software program, which computes the mean and median grain size, sorting, silt/clay percentages for each sample using the moment method.

Table 3: Granularmetric Analysis Mesh Sizes.

Sieve Number	Size (phi)	Size (mm)
3/4	-4.25	19.00
5/8	-4	16.00
7/16	-3.5	11.20
5/16	-3	8.00
3 ½	-2.5	5.60
4	-2.25	4.75
5	-2	4.00
7	-1.5	2.80
10	-1	2.00
14	-0.5	1.40
18	0	1.00
25	0.5	0.71
35	1	0.50
45	1.5	0.36
60	2	0.25
80	2.5	0.18
120	3	0.13
170	3.5	0.09
200	3.75	0.08
230	4	0.06

Carbonate analysis

Carbonate content was determined by percent weight using the acid leaching methodology described in Twenhofel, W.H. and Tyler, S.A., 1941. Methods of Study of Sediments. New York: McGraw-Hill, 183p. Results were entered into the gINT® software and displayed on the granularmetric reports.

DATA INTERPRETATION

Reconnaissance Geophysical Data Interpretation

The following subsections describe in detail the steps required to interpret the BOEM ASAP geophysical data, as well as the initial results for each data type.

Bathymetry

Bathymetry data, collected with the EdgeTech 6205 system, was processed under the original contract between CB&I and BOEM for the ASAP project and submitted as *.xyz* files to each of the states. For the purposes of the current contract with the FDEP, CB&I has not conducted any additional processing or interpretation on the bathymetric data. CB&I attempted to perform the necessary calculations for the preliminary borrow area design using the bathymetric data collected during the reconnaissance survey, however, due to the large line spacing, the resulting surfaces were inaccurate due to the large amount of interpolation occurring between the distant lines. In order to reduce the error being propagated in the preliminary borrow area delineation phase, CB&I opted to use United States Coastal Relief Model (CRM).

The CRM model has an original horizontal projection of NAD 83 geographic and a vertical datum of “sea level.” To make the two data-sets comparable within the specified standards in the BOEM ASAP contract, the US CRM data-set depths were converted to North Atlantic Vertical Datum 1988 (NAVD88) and the data were re-projected to the appropriate

UTM coordinate system. Due to the distances between the study areas, the bathymetric data were clipped and analyzed within the individual study areas.

Chirp Sub-bottom Sonar

After data processing, subsurface data interpretation was performed using SonarWiz 6 software. Bottom tracked chirp sub-bottom profile lines were opened to digitally display the recorded subsurface stratigraphy. Using the software's Sonar File Manager, color-coded vibracore descriptions were added directly to the chirp sub-bottom profiles. A project-specific color scheme, based on a stoplight (red, yellow, green) color scale, was developed for the BOEM ASAP Florida vibracores based on the compatibility of the prospective nourishment material with that of the native sediment characteristics of regional beaches. Details on the overall classification method can be found in the Reconnaissance Geologic Sample Data Interpretation section.

Using the color-coded vibracore descriptions as a guide (furthered described under the Reconnaissance Geologic Sample Data Interpretation section of this report), the chirp sub-bottom stratigraphy was interpreted and the depth of the top of marginal to poor quality material was determined. The stratigraphic reflector that best correlated with this layer was digitized by digitally clicking on the reflector within SonarWiz to create a color-coded boundary. This boundary appears on the subsequent chirp sub-bottom imagery to allow for an easy, visual reference for the boundary between potentially beach-compatible material and the marginal to poor quality material (Figure 14). This boundary was used within SonarWiz to compute the thickness of the potentially beach-compatible deposit by calculating the thickness between the digitized seafloor and the digitized bottom of potentially beach-compatible material boundary. Additionally, features such as buried paleochannels were also digitized for their overall location in each area and plotted along with the thickness surfaces for a better understanding of the subsurface geology in each area (Figure 15). A shapefile with the location of the digitized paleochannels can be found in the digital Appendix D.

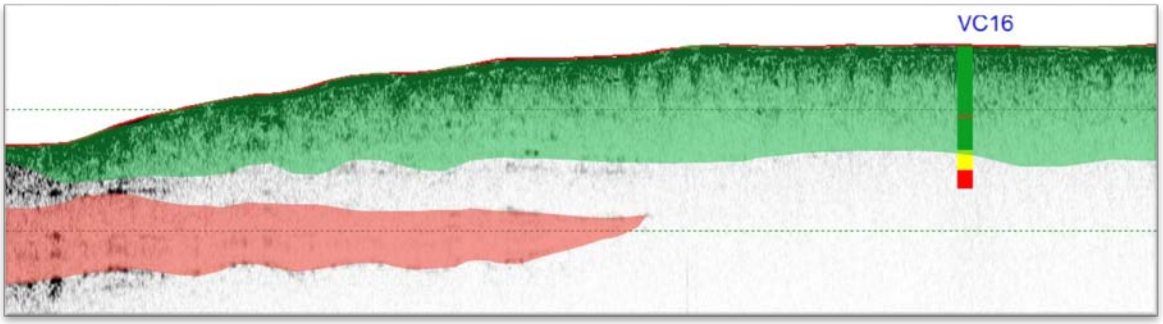

Figure 14: Chirp sub-bottom Line 042 offshore St. Johns County. The brown line at the top of the sub-bottom record represents the seafloor. Layers color coded as green are likely beach compatible, yellow indicates potentially incompatible material, and red indicates likely incompatible material. The color-code criteria are further explained in the Reconnaissance Geologic Sample Data Interpretation section of this report.

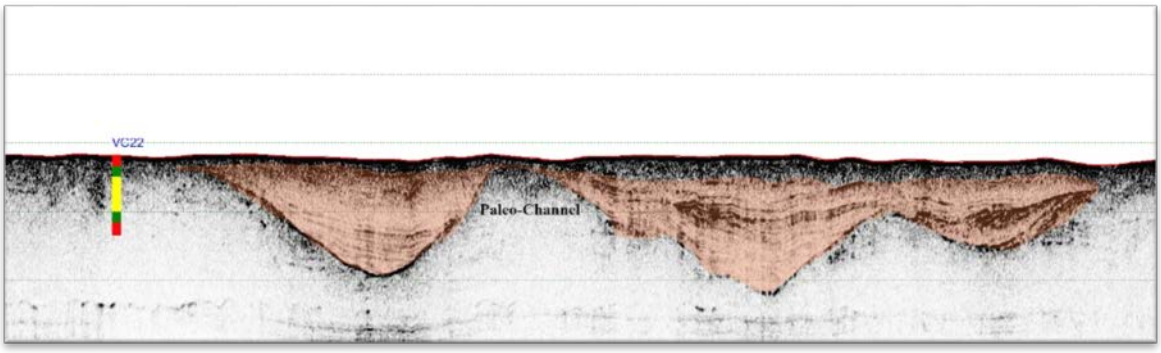

Figure 15: BOEM chirp sub-bottom Line 047, with plotted color coded vibracore FL-BOEM-2015-VC22 with highlighted digitized paleochannels.

Upon analysis of the data, it became evident that, due to the widely spaced as-run lines, a conservative sand resource delineation approach would be the best method to provide a comprehensive and accurate coverage of the area. In order to accurately digitize subsurface reflectors, the geologist relies heavily on computed intersections between perpendicular chirp sub-bottom lines to confirm the vertical location of actual geologic reflectors. With the large spaces between collected survey lines from the reconnaissance phase, there are fewer survey line intersections, reducing the amount of data available to "tie" geologic features together. This, in turn, reduces the overall accuracy of, and confidence in the chirp sub-bottom data. While the data are sufficient to make quality geologic interpretations supporting the identification and mapping of potential beach-compatible sand resources, it is not at a sufficient spatial resolution (between lines) to allow for a detailed accounting and mapping of geologic data between survey lines.

Also, given the few number of vibracores sampling the subsurface material, the interpretation of the overall sediment type and quality is highly dependent upon the chirp sub-bottom acoustic response. Therefore, most of the digitization excluded areas where the subsurface stratigraphy had a signal that was not indicative of clean sands. It is likely however, that some of the areas interpreted as not being beach-compatible, based on the chirp sub-bottom signal, could potentially be included in a borrow area design once a more detailed investigation is conducted. Additionally, with a more comprehensive geophysical data coverage, the reflectors digitized as the sand boundary could change and, therefore, the volume estimates could change.

Using the seafloor and the reflector representing non beach-compatible material (i.e. high silt, clay or rock content) boundary, the thickness of the sediment wedge was calculated and exported in order to develop an isopach (sediment thickness) of each of the eight study areas. X/Y/Thickness files were imported into Golden Software lnc.'s Surfer software program and adjustments were made to the digitization whenever discrepancies occurred. A final thicknesses file was exported for each area and interpolated into an isopach surface within ArcGIS. These data are included in digital Appendix E. The original BOEM ASAP dataset were collected in meters as per that projects specifications, however industry standards and state conventions dictate that Florida borrow area designs be completed in feet. Therefore, the isopach surface was then converted from meters into feet utilizing the ArcGIS Raster Calculator, by multiplying the pixel value by 3.2808339. Maps depicting

the sediment thickness in feet can be found in Appendix B. It is worth mentioning again that the isopach surface created in ArcGIS is only a reconnaissance level model since it is interpolating between the widely spaced reconnaissance lines and therefore is not expected to be completely accurate.

An example of this can be seen in Figure 04 in Appendix B, where there appears to be a slight discontinuity in the thickness at the boundary between study areas BE7-R166 and IR6-R002. During the interpolation process, there was an approximate 2 ft thickness difference at the boundary, which was likely due to the fact that the east/west data points at the study area boundary are not part of the IR6-R002 study area, making the Topo to Raster function have to "estimate" the thickness between the two north/south lines in study area IR6-R002. In order to reduce some of the interpolation error, the surface presented (and used for the delineation of the preliminary borrow areas), was generated by including some of the data points on the east/west line from study area BE7-R166 in the study area IR6-R002 surface. Therefore it is important to remember that, although CB&I has taken all possible steps in minimizing the amount of error in the data processing and interpretation phase, it is unavoidable that some of these inaccuracies may be compounded in subsequent steps due to the wide reconnaissance-level coverage between the available data points.

All of the interpreted chirp sub-bottom data and features were exported to a web project, viewable in any standard web browser software program and are included in digital Appendix C. The web project graphically shows each of the collected chirp sub-bottom lines, interpreted reflectors, and have active navigation time stamps tied to cursor navigation. The Web project was formatted for inclusion in the FDEP Regional Offshore Sand Source Inventory (ROSSI) database. A shapefile with the digitized paleochannels are included in digital Appendix D and X/Y/Thickness files for each area are included in digital Appendix E.

Sidescan Sonar

Following data processing, each line was inspected for any surface artifacts, debris and bottom type. Each individual identified feature was highlighted by creating a contact. Within the Contact Manager in SonarWiz 6, the processor is able to measure the general size of the identified feature/object and any associated scour or shadow, provide a general description and a potential identification of the object (if possible). The majority of the identified contacts are small unidentified objects. All identified contacts in the sidescan sonar data collected along the Florida east coast were exported and compiled into one contact report which provides a picture of the target and any measurements and/or descriptions available (Appendix H). The location of each identified target is depicted in the map series in Appendix G. A shapefile which includes the location and general classification of each contact is included in digital Appendix K.

The sediment bottom type was classified and digitized in SonarWiz 6 by encapsulating the feature into a geographically referenced polyline shapefile. Based on the return signal CB&I personnel are able to interpret the sediment type on the seafloor. Areas with a high amplitude (i.e. lighter color) are normally associated with coarse sediments and areas with

a low amplitude (i.e. darker color) are indicative of finer grained sediments. Table 4 describes the classification scheme used for the delineation of the seafloor.

Table 4: Sidescan sonar classification scheme

Bottom Feature	Description
Hardbottom	High confidence areas of rock outcrops on the seafloor that appear to be continuous or cover a majority of the digitized area with definitive boundaries. High confidence is based on these features having definitive boundaries, having a signature indicative of very coarse material and exhibiting a rugged surface.
Scattered Hardbottom	Rock outcrops that do not appear to be continuous or appear to be sparsely distributed throughout the digitized area.
Outcrop	Rock outcrops on the seafloor with definitive boundaries exhibiting a signature indicative of coarse material, rough surface features or ledges are visible.
Potential Outcrop	Features on the seafloor that appear to be rock outcrops exhibiting a signature indicative of coarse material with definitive boundaries, however rough surface features may not be visible.
Secondary Feature – Potential Mud	Bottom type is unclear and an accurate interpretation cannot be made. These areas exhibit signatures indicative of finer grained sediment, typically mud.
Sand Waves	Features or sparse areas exhibiting a signature indicative of moderately coarse material with visible ripples within the features or areas.
Potential Debris	Features interpreted to be existing seafloor infrastructure (pipeline, cable, foundation, etc.) ort other man-made debris.

Larger debris fields were digitized and are included as shapefiles for inclusion on the maps. Figure 16 depicts a potential debris field identified within study area VO6-R153. Due to the widely-spaced reconnaissance lines and large data swath, most targets require further investigation with a reduced swath and higher frequency to ascertain the nature of the contact. As such, detailed site-specific sidescan sonar investigations will be required to fully understand hazard potential of each contact.

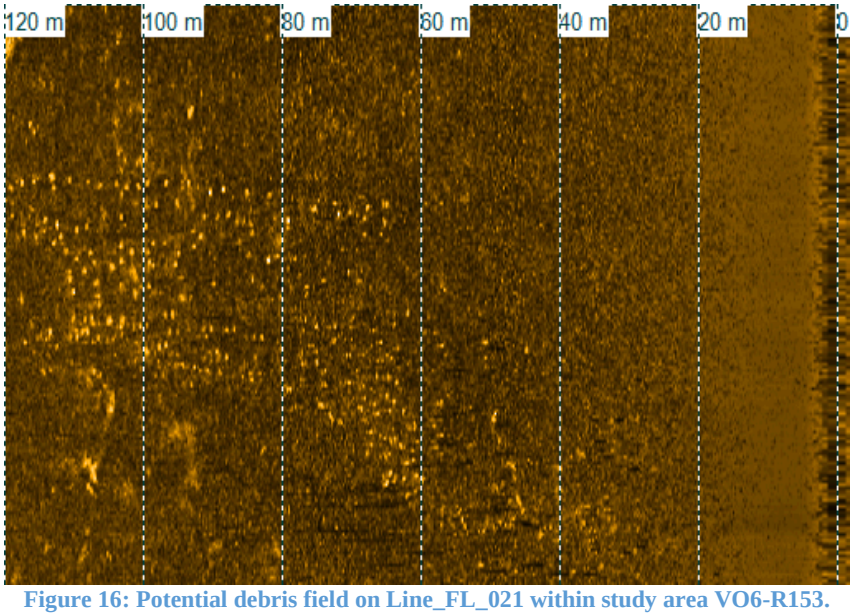

Figure 16: Potential debris field on Line_FL_021 within study area VO6-R153.

Various bottom types are found across the survey lines within each area. The widely-spaced reconnaissance lines limit the ability to interpolate bottom types across lines limiting the overall results. A design-level survey is required to accurately assess the presence and extent of each bottom type. Preliminary results from the widely-spaced reconnaissance lines indicate the following.

Study area NA7-R009, located offshore northern Nassau County is generally characterized as having mostly sandy features in the center of the study area with some areas of scattered hardbottom present.

Study area NA5-R063, located offshore southern Nassau County is generally characterized as having sandy features within the northwestern portion of the study area. A potential debris field was identified within the south central area and scattered hardbottom was identified within the southeastern portion of the study area.

Study area SJ6-R088, located offshore St. Johns County contains a significant amount of sand features throughout the central and eastern portion of the study area. Small areas of definitive hardbottom and scattered hardbottom are present throughout the area but appear to be less common than sand features.

Study area VO5-R041, located offshore northern Volusia County is characterized as having more scattered hardbottom surface features present than sand features. Sand features occur along the far eastern portion of the study area while scattered hardbottom is more common and identified throughout the eastern and central portions.

Study area VO6-R153, located offshore central and southern Volusia County contains both sandy and scattered hardbottom surface features. In general, sandy features appear to be most common throughout the central and eastern portion of the study area. Scattered hardbottom is common throughout the central and western portion of the study area.

Study area BE7-R166, located offshore southern Brevard County, appears to be characterized as containing mostly scattered hardbottom and outcrops throughout the study area. Sand features are sparse and generally occur at the northern and central west portion of the study area. Other surface features include potential mud at the northern portion of the study area.

Study area IR6-R002, located offshore northern Indian River County, contains potential mud, sand, potential outcrops and scattered hardbottom. Although the study area, in general, appears to be void of surface features, potential mud is located in the western and southwestern portion of the study area, sand features are generally observed in the southern portion and potential outcrops and scattered hardbottom are observed throughout.

Study area MI5-R071-C-SA, one survey line located offshore Martin County, contains a patch of sand features located adjacent to hardbottom within the approximate southern third of the survey line.

Once the data were thoroughly reviewed a mosaic was produced in the form of a GeoTIFF for each study area. The exported GeoTIFF contains the full swath of each line. An HTML web project was produced and formatted for each individual study area to allow for a line-by-line view of each waterfall sidescan sonar image. Since the data consists of widely-spaced reconnaissance lines, there is no data overlap. Maps with the exported mosaics overlaid with the bottom type classification can be found in Appendix F. Digital Appendix

I contains the low frequency web project viewable in any standard web-browser, Appendix J contains the processed mosaics for the low frequency data. Shapefiles for the location of each of the identified contacts and digitized seafloor characterization for each area can be found in Appendix K.

Magnetometer

CB&I conducted a thorough review of the magnetometer data collected along the east coast of Florida. Each identified target was recorded on a master spreadsheet with its associated target name, consisting of abbreviated line names, number of anomalies on line, signature characteristics, gammas and duration in meters. The master spreadsheet also includes a comprehensive description of the anomalies location (easting and northing), the line number, signature type (monopole, dipole or multicomponent), intensity (gammas), duration (meters), assessment of size of identified ferrous objects and their correlation (if any) to any identified sidescan sonar or chirp sub-bottom features. The master magnetic anomaly spreadsheet is included as Appendix L.

When completing a geophysical survey with the use of a magnetometer, the survey is conducted on a horizontal plane, which slices through the detectable magnetic field (Hrvoic and Pozza 2004). Depending on the field and intensity at which the anomaly is approached, this allows for the detection of varying magnetic signature characteristics in the form of monopoles, dipoles and multicomponent (Bright et. al., 2014). These signature characteristics are then compared with gamma intensities and durations. Gamma intensities and duration are analyzed pre- and post-processing for any variations in signal strengths. By analyzing gamma intensities and durations, in correlation with signature characteristics, the processor is able to identify probable man-made objects. Line by line review of the magnetometer data carried out by CB&I personnel identified a total of 67 magnetic anomalies in the study areas.

The 67 magnetic anomalies are spread among the eight study areas. Study area MI5-R071 was identified to contain one magnetic anomaly at the northern most section with an intensity of 78.6 g and duration of 69.5 m. Study area IR6-R002 contains seven anomalies concentrated in the northern portion of the study area with scattered anomalies ranging in intensity from 11.23 g to 64.49 g and a duration of 30.7 m to 82.8 m. Study area BE7-R166 contains nine anomalies concentrated in the central portion of the study area with scattered anomalies ranging in intensity from 3.95 g to 49.67 g and a duration of 11.2 m to 90.5 m. Study area VO6-R153 contains 12 anomalies, the majority of anomalies are scattered about the site. Study area VO5-R041 contains one anomaly in the northern portion of the survey site with an intensity of 17.02 g and a durations of 45.14 m. SJ-R88-C-SA contains eight anomalies, the anomalies range in intensity from 4.5 g to 5,922 g, the duration extend from 2.94 m to 45.14 m. Study area NA5-R063 contains 17 anomalies scattered about the study area, ranging in intensity from 3.11 g to 29.34 g and a duration of 8.10 m to 32.67 m. Study area NA7-R009 contains 12 anomalies scattered about the study area, ranging in intensity from 6.98 g to 60.77 g and a duration of 13.14 m to 48.26 m. A map series with all identified magnetometer targets can be found in Appendix G.

After the initial magnetometer processing phase, the anomalies are then correlated with the sidescan sonar targets to identify any potential hazards such as debris, pipelines, shipwrecks and any other ferrous material on the seafloor. Individual magnetometer lines were inspected for signature characteristic, signature duration and total gamma intensity within a close proximity to sidescan sonar contacts. Moreover, identified anomalies were compared to the acoustic signature characteristics associated with historically significant submerged cultural resources and Munitions of Explosive Concern (MEC).

Table 5: Magnetic anomalies with associated sonar contacts

Mag Anomaly	Sonar Contact	Study Area	Mag Signature Characteristics	Gamma Intensity	Sonar Length (m)	Assessment
012-1-dp-3.95g-17.15m	Contact 012	BE7-R166	dipolar	3.95g	3.33	Potential Debris
054-3-mc-3.26g-16.95m	Contact 094	NA5-R063	multicomponent	3.26g	4.6	Object Cluster or Rock Cluster
054-3-mc-3.26g-16.95m	Contact 095	NA5-R063	multicomponent	3.26g	12.49	Object Cluster or Rock Cluster
057-2-nm-9.23g-42.00m	Contact 100	NA7-R009	negative monopolar	9.23g	12.54	Object Cluster or Rock Cluster

Out of the 67 magnetic anomalies, four anomalies were associated with sidescan sonar contacts (Table 5). The four anomalies and associated contacts were identified in three study areas, including BE7-R166, NA5-R063 and NA7-R009. The associated anomalies and contacts were identified within a 150 m buffered zone of one another. Based on the sidescan sonar descriptions and the buffered distances, one anomaly and associated contact, 012-1-dp-3.95g-17.15m and Contact 012, was identified as significant and potentially associated with the remains of marine debris. The remaining three anomalies were associated with object clusters - rock clusters identified in the sidescan sonar. The remaining 63 magnetic anomalies have been identified as non-significant and appear to be associated with potential small debris.

Locations of the targets were exported as a shapefile for visualization and integration into ArcGIS and compared to the identified preliminary borrow area, which ensures that the design data collection would target the most probable resource while avoiding potential hazards on or below the seafloor. The final spreadsheet with all identified anomalies can be found in Appendix L and a shapefile of all magnetic anomalies as well as a detailed attribute table for inclusion in the ROSSI database are in the digital Appendix M.

Reconnaissance Geologic Sample Data Interpretation

The BOEM ASAP data collection effort offshore of the Florida east coast consisted of the collection of 30 geotechnical sample sites, with 11 being surface grab samples and 19 being vibracores, within the eight BOEM ASAP Florida study areas. A total of 125 individual geotechnical subsamples (11 from the surface grab samples and 114 from the vibracores) were analyzed for geological properties in CB&I's accredited geotechnical laboratory. Sieve analysis data as well as carbonate information were entered into gINT along with core descriptions. A final granularmetric report and log was exported and submitted to each state along with vibracore photographs as part of the BOEM ASAP project.

For proper integration into the chirp sub-bottom project in SonarWiz, individual layers in each vibracore were color-coded based on the amount (percent) of fine material (percent passing the

#230 sieve). Samples with a fine grain content less than or equal to 5% were color coded as green/good while samples that were between 5% and 10% were classified as yellow/moderate. Layers with a greater than 10% fine content or described as being clay were classified as red/bad. Based on the color of individual layers, the full core was also classified as good, moderate or bad. Vibracores with more than 3 to 5 ft of good sand at the surface were classified as good/green. Vibracores with less than 3 to 5 ft of beach-compatible surface sand with subsequent yellow layers received an overall classification of moderate/yellow. The few vibracores that received the overall classification of bad/red had no beach-compatible sands below or near the seafloor. Maps in Appendix A include the location of each vibracore along the collected survey line and its overall classification and the location of surface grab samples.

Granularmetric curves and reports, descriptive logs and photographs of vibracore data were used to compile sediment characteristics and vibracore composite statistics in seven of the eight preliminary study areas (study area BE7-R166 is not included as it did not contain any BOEM ASAP vibracores, Table 6). It should be noted that the identified final composite values are only an estimate based on few, widely spaced geologic samples, and that additional vibracores should be taken during a secondary offshore design-level investigation in order to more confidently determine the beach-compatibility of the preliminary borrow areas.

Table 6: Vibracore cut elevations and general study area composite (Study Area BE7-R166 is not included as it did not contain any BOEM ASAP vibracores).

Vibracore ID	Study Area	Elevation (NAVD88)		Depth Bottom Clean Sand (ft)	Mean Grain size Composite (mm)	% Silt Content Composite	Sorting (mm)	% Carbonate Composite
		Top of Core (ft)	Bottom of Clean Sand (ft)					
FL-BOEM-2015-VC01	MI5-R071	-76.6	-86.4	9.8	0.14	5.01%	0.50	41.5
FL-BOEM-2015-VC02	MI5-R071	-46.3	-54.4	8.1	0.22	4.48%	0.43	44.01
FL-BOEM-2015-VC03	IR6-R002	-41.1	-59	17.9	0.62	2.6%	0.36	76.46
FL-BOEM-2015-VC04	IR6-R002	-46.7	-61.3	14.6	0.50	2.56%	0.45	55.89
FL-BOEM-2015-VC08	VO6-R153	-61	-71.7	10.7	0.22	3.98%	0.62	8.52
FL-BOEM-2015-VC10	VO5-R041	-60.9	-69.5	8.6	0.24	2.39%	0.49	17.45
FL-BOEM-2015-VC15	VO6-R153	-60.7	-72.3	11.6	0.30	2.98%	0.44	32.72
FL-BOEM-2015-VC16	SJ6-R088	-54	-71.3	17.3	0.21	3.75%	0.52	11.57
FL-BOEM-2015-VC17	SJ6-R088	-54.2	-56.7	2.5	0.22	2.04%	0.52	9.00
FL-BOEM-2015-VC18	SJ6-R088	-57.3	-70.7	13.4	0.19	2.99%	0.56	9.91
FL-BOEM-2015-VC19	SJ6-R088	-49.6	-62.4	12.8	0.22	1.58%	0.55	7.2
FL-BOEM-2015-VC21	NA5-R063	-50.8	-50.8	0	N/A	N/A	N/A	N/A
FL-BOEM-2015-VC22	NA5-R063	-56.1	-56.1	0	N/A	N/A	N/A	N/A
FL-BOEM-2015-VC23	NA5-R063	-46	-53.7	7.7	0.21	1.99%	0.60	6.62
FL-BOEM-2015-VC24	NA5-R063	-48.1	-48.1	0	N/A	N/A	N/A	N/A
FL-BOEM-2015-VC25	NA5-R063	-45.9	-49.9	4	0.21	4.03%	0.62	6.21
FL-BOEM-2015-VC26	NA7-R009	-42.1	-59.1	17	0.18	2.91%	0.50	9.21
FL-BOEM-2015-VC27	NA7-R009	-44.4	-55.7	11.3	0.22	2.21%	0.49	10.17
FL-BOEM-2015-VC28	NA7-R009	-44	-54.4	10.4	0.24	2.51%	0.44	13.10

Composite mean grain size and percent silt content were computed for each vibracore within the study areas by calculating the weighted average (sample weighted by effective lengths of the sampled layer above the cut elevation). The final product of this calculation was a composite vibracore sample with weights for each phi interval. This composite vibracore sample was then input into gINT with any other composite vibracores (if available) where a final mean grain size and fine grained content was calculated based on the weighted average. Generally, the maximum cut value was determined to be the last layer classified as beach-compatible (green), however, sometimes yellow units or a thin red layer were also included in the composite statistics as long as the final composite did not exceed 5% silt content. All samples within the cut were then evaluated together to compile a composite for each preliminary borrow area.

Preliminary Borrow Area Delineation

Once all of the individual datasets were processed and interpreted, CB&I reviewed all of the data collectively to delineate preliminary borrow areas. The criteria to develop preliminary borrow areas included:

1) Identifying the boundary between beach-compatible sands overlying incompatible material, referred to in subsequent sections as the bottom of clean sand (BCS).
2) Buffering that boundary with a 2.0 ft vertical buffer to avoid incompatible material.
3) Limiting the preliminary borrow area areal extent to areas with at least three (3) ft of beach-compatible sand remaining after buffering to ensure enough volume to make dredging operations viable.
4) Buffering sidescan sonar and magnetic anomalies indicative of potential protected environmental and/or benthic resources and cultural resources.
5) And, finally, exclusion of widely-spaced, isolated, small, or irregularly-shaped areas remaining that would not produce a viable preliminary borrow area after all of the above considerations were accounted for.

As the resulting preliminary borrow areas are based on widely-spaced reconnaissance-level geophysical and geotechnical data, final borrow areas with detail and data sufficient for regulatory permitting and/or leasing were unable to be identified. All of the preliminary borrow areas presented in this Report of Findings were delineated to be in substantial compliance with the "Potential" designation as identified in the Southeast Florida Assessment and Needs Determination (SAND) study conducted by the USACE and FDEP (Ousley et al., 2014.) Specifically, the preliminary borrow areas from this investigation satisfy a 70% confidence level that beach-compatible sands in project quantities are present at these locations and that they contain geotechnical data with laboratory analysis. Further, vibracores and analyses indicate the presence of a minimum of 4 ft (5 ft in the case of this investigation) of beach-compatible material greater than 0.13 mm mean grain size with less than 5% silt content passing the #230 sieve, less than 5% retained on the #4 sieve, and all Munsell values at 4 or greater. In addition, all preliminary borrow areas have some combination of data sets: vibracores, bathymetry, chirp sub-bottom, and/or geomorphology combined with professional judgment used to define the sediment source.

In order to refine, design, permit, and/or lease these actual sand resources, additional phased (reconnaissance-level and design-level) geophysical and geotechnical data would need to be collected over all of the study areas under consideration for final design and usage.

Once the overall sand resource isopach maps were developed during the chirp sub-bottom interpretation phase, CB&I delineated "dredgeable" deposits with volumes within each of the eight reconnaissance-level study areas. The first step in determining “dredgeable” deposits is to determine the sediment volume and dredge cut elevation. In order to determine dredge cut elevations, chirp sub-bottom thickness values must be correlated to a processed bathymetric surface/elevation. This particular step, although simple in principle, proved to be more complicated than expected due to the widely-spaced data coverage. The correlation of two highly-extrapolated surfaces (the isopach thickness and the interferometric sonar bathymetric surface) was providing a bottom of clean sand (BCS) elevation that was overly interpolated, and likely not indicative of the actual geology. To improve this process, CB&I discussed the issue with FDEP staff and elected to utilize historic bathymetric elevation data from NOAA, as opposed to the collected BOEM ASAP bathymetry data.

The isopach was converted to a cut elevation by combining it with the historical CRM bathymetric data from NOAA converted to NAVD88. By combining the isopach with the bathymetric elevation, a new elevation surface was created which represents the bottom of clean sand (BCS) elevation. The BCS surface was generated by utilizing the Spatial Analyst Raster Calculator in ArcGIS which subtracts the isopach thickness surface from the historic bathymetric elevation surface, therefore lowering the bathymetry elevation to the BCS elevation. Once complete, CB&I geologists performed several different data comparisons in order confirm that the gridding process was accurate. The first was to compare the BCS elevation to the original isopach map values, generated using two separate software programs: Surfer and ArcGIS. In addition, the elevations were compared to a subset of chirp sub-bottom data to confirm that the elevations correlated with the chirp sub-bottom digitized interpretations as well as with the identified cut elevations of the vibracores, when available.

The second step in delineating the preliminary borrow area was to isolate only the areas meeting the necessary cut thickness required for a viable borrow area. As per FDEP borrow area design guidelines, a 2 ft buffer of compatible material over incompatible material (i.e. rock, consolidated sediment, overly silty or clayey material, etc.) must be included in all borrow area designs. Further, as part of this contract, FDEP wanted to complete preliminary designs and volume calculations for resources that have a minimum 3 ft thickness (after buffering) to ensure enough thickness and volume to allow for viable dredge operations. To limit the preliminary borrow area extents to meet these guidelines, CB&I removed/clipped all areas less than 5 ft thick (2 ft buffer plus 3 ft minimum thickness) from the isopach surface using ArcGIS. Once complete, CB&I added 2 ft to the remaining BCS elevation surface, accounting for the FDEP required 2 ft buffer in the preliminary design. The resulting buffered BCS elevation surface then represented the maximum cut depth for each preliminary borrow area, finalizing the vertical extents of the preliminary borrow areas.

Next, all sidescan sonar contacts, benthic classification digitization, magnetometer targets and historical data were overlain onto the buffered BCS cut elevation surface to determine if any remaining areas needed to be further buffered to exclude any potential hazards. Details on which areas were buffered and their justifications as well as a general description of the area can be found in the Results section. Once this step was complete, the final preliminary borrow area horizontal extents were complete.

During the process of delineating preliminary borrow sites in each area, it became evident that some regions meeting the 5 ft sediment thickness were not large enough, or oriented in a way to make them viable borrow areas. The final preliminary borrow areas in each study area were chosen based on the overall likelihood of it being developed into a viable borrow area. Small, piecemeal areas that made the 5 ft thickness cut, but were isolated, small, or otherwise unviable for dredging were removed from consideration as preliminary borrow areas. Additionally, areas that were thicker than 5 ft, however isolated to a single chirp sub-bottom line with no correlation to perpendicular or adjacent line(s) were also excluded. This was done due to the fact that isolated, single chirp sub-bottom lines do not present enough data to accurately allow for gridding potential volumes of sands, often resulting in gridding artifacts that reduce the overall value and quality of the interpretation. In the end, with a few exceptions, all preliminary borrow areas are based off data interpretation across multiple lines, highlighting a particular geologic feature.

After all of the above was completed, each remaining individual preliminary borrow area received a name composed of the county abbreviation, distance to centroid (in miles) of the preliminary borrow area as well as closest R monument.

Once these areas had been identified, a volume analysis was completed by utilizing the Cut/Fill tool in ArcGIS's Spatial Analysis extension. This tool compares two raster surfaces and determines the change in volume between them. In this instance, the NOAA CRM bathymetry elevation was referenced as the "before" surface and the buffered BCS cut elevation the "after" surface. The resulting number is the buffered, available net volume within each individual preliminary borrow area and is listed in Table 7. These preliminary borrow areas can be found on the maps in Appendix N. All volumes were calculated in cubic feet and converted to the industry standard cubic yards. CB&I also calculated the overall, unbuffered and unclipped gross volume of each area by calculating the volume between the NOAA CRM bathymetry elevation surface and the unbuffered and unclipped BCS cut elevation surface. The gross volume has not been corrected to account for minor variations in beach compatibility, design/dredgeability considerations, or required design safety buffers to prevent accidental over dredging and placement of incompatible material. This gross volume is also included on Table 7.

Table 7: Area and volume breakdown for each study area.

Study Area	Total Area (ft^2)	Total Gross Volume (cy)	Potential Usable Area (ft^2)	Potential Usable Net Volume (cy)	Usable Area	Usable Volume
NA7-R009	245,310,485.44	5,340,756	150,568,684	3,382,109	61%	63%
NA5-R063	526,514,700.33	3,903,129	74,964,853	1,546,402	14%	40%
SJ6-R088	1,504,763,706.17	31,931,137	562,574,174	20,836,060	37%	65%
VO5-R041	918,492,978.73	2,349,846	27,711,274	367,378	3%	16%
VO6-R153	3,050,891,629.06	19,068,257	264,305,974	4,643,195	9%	24%
BE7-R166	1,790,881,641.81	28,384,048	500,128,947	6,286,051	28%	24%
IR6-R002	1,086,982,722.04	27,302,260	713,485,638	17,416,202	66%	64%
Total	**9,123,837,864**	**118,279,432**	**2,293,739,544**	**54,477,396**	**25%**	**46%**

Estimates on the composite sediment characteristics for each preliminary borrow area delineation were determined based on the closest vibracore sample. In some instances, such as in Brevard

County, there were no vibracore samples in the vicinity of the preliminary borrow area, therefore no assumptions were made on the potential composite. When possible, CB&I chose to use historic vibracores in order to better determine the geotechnical composite. The method used for calculating the composite percentage can be found in the Reconnaissance Geologic Sample Data Interpretation section.

Finally, each preliminary borrow area was reviewed and classified as a "Potential" or "Unverified" sand resource in accordance with the Southeast Florida Assessment and Needs Determination (SAND) study conducted by the USACE and FDEP (Ousley et al., 2014, Table 8).

Generally, areas with more than one vibracore (either collected during the BOEM reconnaissance geotechnical investigation, historic or through seismic correlation) were classified as Potential. Borrow areas with geophysical data along with a single vibracore (either through seismic correlation along a geophysical line, or collected during the BOEM reconnaissance) and/or areas with geotechnical data indicating a non-beach compatible composite were classified as "3A Unverified." Areas with no vibracores, (either collected during the BOEM reconnaissance phase or historic), or that could be seismically correlated to a collected vibracore and/or with little geophysical data, were normally classified as "3B Unverified." Current reconnaissance geophysical and geotechnical data collected during the 2015 BOEM investigations do not allow for any areas to be classified as Proven.

Table 8: SAND study sand resource classification criteria (Ousley et al., 2014).

Category	Confidence	Description
1 Proven	90%	Meets all the criteria of Potential sources. Contains permitted borrow areas that have not been dredged. Some areas have design level geotechnical and seismic coverage; any areas that are less than design level have high data density combined with professional judgment of the interpretation of bathymetry, seismic and geotechnical data.
2 Potential	70%	Meets all the criteria of Unverified sources. Also has geotechnical data with laboratory analysis. Cores indicate a minimum of 4' of compatible material, greater than 0.13 mm mean grain size, less than 5% silt content passing the #230 sieve, less than 5% retained on the #4 sieve, all Munsell values are 4 or greater. Areas all have some combination of data sets: vibracores, bathymetry, seismic, geomorphology combined with professional judgment used to define the sediment source.
3A Unverified	30%	Volume contributing. Some evidence to suggest a beach-quality sand source such as geomorphic, bathymetric, seismic, or other form of remotely sensed feature and at least one geotechnical core that meets the sediment criteria herein. Does not include depleted or unusable areas.
3B Unverified	0%	Non-volume contributing. Some evidence to suggest a beach-quality sand source such as geomorphic, bathymetric, seismic, or other form of remotely sensed feature. Does not contain geotechnical data yielding information on the character of the material. Does not include depleted or unusable areas.
0 Depleted or Unusable	0%	Depleted: beach compatible material has been removed from the area for beach nourishment prior to the SAND Study. Unusable: Area is within 400' of hardbottom, near a cultural or historical resource, or is within submerged utility buffer. Fish havens and Offshore Dredge Material Disposal Sites (ODMDS) are also included in this category.

RESULTS

During the summer of 2015, CB&I conducted a two-part reconnaissance sand search investigation offshore the east coast of Florida as part of the BOEM ASAP project. During the first survey, CB&I collected approximately 522 line km of bathymetric, chirp sub-bottom, sidescan sonar and magnetometer data from 5.6 km (three nautical miles) to 14.8 km (eight nautical miles) offshore Nassau, St. Johns, Volusia, Brevard, Indian River and Martin Counties in eight study areas. The second survey phase involved the collection of 11 surface grab samples and 19 vibracores and

analysis of 125 individual geologic subsamples (11 from the surface grab samples and 114 from the vibracores). The purpose of the survey was to delineate potential sand resources for future beach nourishment projects along the coastline. From the geophysical and geotechnical data processing and interpretation of the eight study areas conducted for the FDEP, CB&I has identified 16 areas that could be further investigated and developed into preliminary borrow areas. An estimated gross 118,279,432 cubic yards (cy) of sand was identified within all eight study areas, of which 54,477,396 cy fall within the necessary borrow delineation requirements specified by FDEP (3 ft minimum sediment thickness after application of a 2 ft buffer). A breakdown of the volume for each study area can be found in Table 7 above. Maps with the final depth corrected, clipped and buffered cut elevations that will be used in the description of each individual preliminary borrow area below can be found in Appendix N. Maps with the final clipped and buffered preliminary borrow area dredge cut thicknesses can be found in Appendix O. All of the descriptive logs, photographs, granularmetric reports, granularmetric curves, and associated gINT data for the 2015 BOEM ASAP reconnaissance geologic data for Florida are included in Appendix P of this report. A detailed, composite summary table for beach-compatible sands in all of the BOEM ASAP Florida vibracores, and for the few preliminary borrow areas that had more than one vibracore in them, can be found in Appendix Q.

Study Area NA7-R009

Study area NA7-R009 is located offshore Fernandina Beach and the St. Marys River Entrance Channel in northern Nassau County. The study area was surveyed with 25.8 line km of geophysical data and five geotechnical samples (two surface grab samples and three vibracores). The entire area has a generally thick layer of sand overlying some scattered paleochannels. To the west, the beach-compatible sediment appears to be from a series of sand waves spread throughout the area.

Upon closer review of the bathymetry and chirp sub-bottom data, CB&I has identified what is likely the offshore component of the St. Marys River Entrance Channel. This feature is approximately 450 ft wide and roughly 10 to 15 ft deeper than the surrounding area. Due to the wide spacing of the survey lines, the sediment thickness surfaces did not have enough data points to properly interpolate the presence of the channel, therefore the area in between was interpolated as thicker than 5 ft. The original chirp sub-bottom and NOAA bathymetry data were once again reviewed and it was determined that the calculated thickness in that particular area was likely un-realistic, therefore the navigation channel should be excluded from the preliminary borrow area delineation. As can be seen in the preliminary borrow area design maps in Appendix N, the navigation channel was not included in the final preliminary borrow area delineation and volume calculations.

Sidescan sonar indicates that the surface is mostly sand waves along the central portion with some scattered hard bottom in the northeast corner. The area also has some potential debris on the seafloor, however the majority of the sidescan sonar contacts in study area NA7-R009 are potential outcrop features, with a tight cluster close to the intersection between the central north/south and southern east/west line. Magnetic anomalies are all small (less than 150 gammas) with one, 057-2-nm-9.23g-42.00m, appearing to correlate to sidescan sonar contacts. Other than the navigation channel, the preliminary borrow area in study area NA7-R009 did not receive any additional modifications to account for additional avoidance areas.

The final preliminary borrow area identification process in study area NA7-R009 yielded four potential borrow areas meeting the specified requirements (Table 9). The area with the largest volume is in preliminary borrow area NA6-R010, which is located south of the St. Marys River Entrance Channel. Although this area was calculated as having the largest volume, it is likely that it is highly dependent on the estimated thickness interpolation between the two nearshore north/south lines going around the Offshore Dredge Material Disposal Site. The second largest volume, NA10-R011 is located towards the east of the study area and does not have any geotechnical samples taken in or near its extents. This potential sand resource was delineated solely by the chirp sub-bottom data, digitizing the stratigraphic units interpreted to be cleaner sand deposits based on the acoustic response of the geology as seen on the chip sub-bottom data. This area, located in deeper water, is the only one not to have any identified sidescan sonar contacts or magnetic anomalies. The last two areas, NA9-R010 and NA8-R010 are both located to the north of the St. Marys River Entrance Channel and were originally part of the NA6-R010 area and delineate the remainder of the sand waves spread across the area. There are some sand waves present on the surface that are not included in the borrow area design. This is due to the fact that, in those specific areas, the beach-compatible sand layer was less than 5 feet thick, making it too thin to be included in the preliminary borrow area designs.

Table 9: Study area NA7-R009 preliminary borrow area breakdown and composite statistics.

Preliminary Borrow Area	Area (ft^2)	Volume (cy)	Sample	Grain Size (mm)	% Silt	Sorting (mm)	% Carbonate	Classification
NA10-R011	20,522,330.10	499,899	N/A	N/A	N/A	N/A	N/A	3B Unverified
NA6-R010	101,059,815.21	2,428,049	VC26	0.18	2.91	0.50	9.21	2 Potential
NA9-R010	19,743,626.14	312,591	N/A	N/A	N/A	N/A	N/A	2 Potential
NA8-R010	9,242,912.21	141,570	VC28 VC27	0.23	2.35	0.46	11.57	2 Potential
Total	**150,568,684**	**3,382,109**						

The geotechnical samples were all collected close to the central portion of the study area. Two surface grab samples and one vibracore were collected on the northern line, one vibracore close to the area centroid and one to the south of the central area. All vibracores received a final color classification of being good/green. FL-BOEM-2015-VC28 is the northern-most vibracore in study area NA7-R009 and, along with FL-BOEM-2015-VC27, was used to calculate composite statistics for preliminary borrow area NA8-R010. The last core in the area is FL-BOEM-2015-VC26, and was used to estimate the preliminary dredge cut and composite statistics in NA6-R010. The two surface grab samples collected on the north line describe the seafloor as being fine grain sands with less than 2% fines. A breakdown of the different preliminary borrow areas and their potential composites can be found in Table 9.

Borrow area NA10-R011 was classified as “3B Unverified” since it has some geophysical evidence of beach compatible sands but does not have any geotechnical samples. Preliminary borrow areas NA8-R010 and NA6-R010 were classified as “2 Potential” as there is both geotechnical and geophysical evidence of beach compatible sands. Preliminary borrow area NA9-R010 was also classified as “2 Potential” even though it lacks a vibracore within its boundaries. This was done based on the data interpretation conducted in study area NA7-R009. All three western preliminary borrow areas (NA8-R010, NA6-R010, and NA9-R010) were originally part of a single borrow area which were then split by the St. Marys River Entrance Channel.

Additionally, all three vibracores within this area have similar geologic descriptions and composite statistics, further emphasizing that all three areas have similar beach-compatible sands. Moreover, the geophysical data collected on chirp sub-bottom line FL_061, indicates that acoustically, FL-BOEM-2015-VC28 is sampling the same stratigraphic unit (i.e. sand hill) in NA8-R010 and NA9-R010 which is only separated by the navigation channel. As such, while NA9-R010 lacks a vibracore, adjacent vibracores collected in the NA8-R010 and NA6-R010 preliminary borrow areas can also be applied to NA9-R010, providing the geotechnical data required to classify it as a "2 Potential" sand resource.

The southern preliminary borrow area (NA6-R010) has a majority of the potential sand available in study area NA7-R009. Although it appears that there could be more sand available towards the south, expanding that area would extend into the USACE/EPA Offshore Dredge Material Disposal Site (ODMDS) located at the south edge of the study area. If the area were extended into the ODMDS site, additional geologic sample collection should be undertaken to confirm that geologic material in the ODMDS is beach compatible. Additionally, the navigation channel separating the north and south preliminary borrow areas could also require additional attention or design considerations depending on the final preliminary borrow area delineation chosen for further investigation.

Study Area NA5-R063

Study area NA5-R063, located offshore southern Nassau County near American Beach, has approximately 66 line km of geophysical data and five vibracore samples. Study area NA5-R063 has a very thin layer of sand throughout most of its area. There is one larger sand deposit towards the east side, which could potentially be the base of a sand hill occurring further east outside of the scope of the BOEM ASAP survey area, and a second, smaller, more isolated sand hill in the southern portion. Like the other northern areas surveyed, there are several buried paleochannels throughout the study area varying in fill orientation. This particular paleochannel system appears to cover the entire area and be fairly shallow in nature, with some areas having a thicker overlying sand deposit than others.

Sidescan sonar surface classifications in this area are mostly sand waves with some hardbottom and areas of scattered potential debris. There are only a few contacts in this area which are either potential debris or outcrops. There is a cluster of small magnetic anomalies and several contacts on the eastern side of the study area, however the subsurface is mostly paleochannels with a thin sand layer. Two sidescan sonar contacts appear to correlate with magnetic anomaly 054-3-mc-3.26g-16.95m; although, the anomaly consists of a minimal duration and intensity of less than 5 gammas. There were no additional clipping/buffering for the preliminary borrow area delineation within study area NA5-R063.

There are only two subareas (NA5-R076 and NA7-R070) that meet the specified requirements for preliminary borrow area delineation within study area NA5-R063. Preliminary borrow area NA5-R076, a small sand hill to the east of FL-BOEM-2015-VC23, did not have any identified sidescan sonar contacts or targets. At the base of this small sand hill, in the vicinity of the vibracore, the seafloor appears to have an area of potential debris and scattered hardbottom as well as sand waves. The second preliminary borrow area, NA7-R070, is on the eastern side of the survey site. Sidescan sonar digitization in this area classify the seafloor as scattered hardbottom and some sand waves,

with scattered hardbottom being the most prevalent feature. There are no sidescan sonar contacts and only two small (less than 30 gamma) magnetic anomalies.

Preliminary borrow area NA7-R070 is the largest potential sand source within this study area (Table 10). Based on the geophysical data alone, it appears to be a sand hill overlying some buried paleochannels, however there are no geotechnical samples indicating that the digitized sand layer is potentially beach-compatible. That said, the acoustic response of the chirp sub-bottom data indicates that the sediment is similar to other beach-compatible sand resources in the area, and appears clean of significant fine material, shell hash, or other non-compatible acoustic layers. Preliminary borrow area NA5-R076, as previously mentioned, is indicative of an isolated small sand hill occurring amongst paleochannels to the east and west.

Of the five vibracores collected, three were classified as red (bad), one as yellow (moderate) and one as green (good), which was located on the base of the smaller sand hill in NA5-R076. FL-BOEM-2015-VC23 was the only beach-compatible core collected in this study area and was used to estimate the composite statistics of NA5-R076 (Table 10). FL-BOEM-2015-VC25 was classified as moderate and has a maximum cut elevation of -49.9 ft (4.0 ft below the seafloor), therefore indicating that the northern area of study area NA5-R063 does not meet the specified borrow area delineation requirements. FL-BOEM-2015-VC21, FL-BOEM-2015-VC22 and FL-BOEM-2015-VC24 were classified as red and characterize the surficial and subsurface sediment as fine grain sands or clay.

Table 10: Study area NA5-R063 preliminary borrow area breakdown and composite statistics.

Preliminary Borrow Area	Area (ft^2)	Volume (cy)	Sample	Grain Size (mm)	% Silt	Sorting (mm)	% Carbonate	Classification
NA5-R076	10,551,560.98	182,534	VC23	0.21	1.99	0.60	6.62	3A Unverified
NA7-R070	64,413,291.97	1,363,868	N/A	N/A	N/A	N/A	N/A	3B Unverified
Total	**74,964,853**	**1,546,402**						

NA5-R076 received a SAND classification of “3A Unverified” as it has one geotechnical sample and geophysical evidence to suggest beach-compatible sands. NA7-R070 was classified as “3B Unverified” since it has some geophysical evidence of beach compatible sands but does not have any geotechnical samples.

The larger preliminary borrow area on the eastern side (NA7-R070) could be part of a larger sand hill that would be the most promising source of sand in study area NA5-R063, however it is limited by a USACE/EPA ODMDS located at the eastern edge of the study area. Any final borrow area delineation would require addressing the disposal site.

Study Area SJ6-R088

Study area SJ6-R088 is located offshore St. Johns County and was surveyed with 81 line km of geophysical data, four vibracores and one surface grab sample. Based on the sediment thickness calculated from the chirp sub-bottom digitization, this area appears to have a thin sediment layer on the west side with a larger sand deposit to the east. The subsurface geology also indicates the presence of buried paleochannels which occur below the sand deposit. The widely-spaced survey lines, however, do not provide enough resolution to allow for detailed mapping of the paleochannels within this area. The majority of eastern study area SJ6-R088 is thicker than 5 ft

however, around vibracore FL-BOEM-2015-VC16 there is a significant decrease in the sediment thickness which is creating a "hole" in the BCS cut elevation surface since it is not thicker than 5 ft. Review of the chirp sub-bottom data along the two perpendicular lines indicates the possible presence of a shallow paleochannel. Although not as well defined as other paleochannels located throughout the surveyed areas, it does present some acoustic signatures indicative of fine-grain sediments that have been deposited in an "infill-like" pattern.

Sidescan sonar surface classification of the area show that the seafloor is predominantly sand waves with some scattered hardbottom/hardbottom and potential outcrop (located close to the hole created by the surface paleochannel-like feature). There are two clusters of potential outcrop contacts, one to the south of the surface paleochannel and a second close to vibracore FL-BOEM-2015-VC17. Additionally, there are a few scattered potential debris, rocks and buried debris contacts. Study area SJ6-R088 has three larger magnetic anomalies, the largest of which is almost 6,000 gammas with a duration of less than 3 m with the other two being 188 (with a short duration) and 297 gammas (with a longer duration). These three targets are located on the edges of the preliminary borrow area (two on the south and one in the central portion) and were not buffered due to the fact that they do not correlate with any sidescan sonar contacts or digitization indicative of a large object. It should be noted however, that during a more comprehensive survey it may become necessary to exclude those targets from the final design upon being reviewed by a qualified marine archaeologist.

The final preliminary borrow area delineated within study area SJ6-R088 was reduced to SJ7-R093, which is approximately 40% of the entire site and 65% of the total sand volume. Although hard to accurately discern, it is possible that this large sand hill could extend further east, beyond the scope of the planned BOEM ASAP survey lines, on its northern side providing additional beach-compatible sediment.

Of the four vibracores collected in the area, FL-BOEM-2015-VC16, FL-BOEM-2015-VC18 and FL-BOEM-2015-VC19 were classified as "green" (good) and FL-BOEM-2015-VC17 was classified as yellow (moderate). The surface grab sample FL-BOEM-2015-SS20, located in the northern part of the larger sand hill, characterizes the surficial sediment as fine to medium grained sands with a 1.21% fine grain content. All four vibracores were used to determine composite statistics of the SJ7-R093 preliminary borrow area (Table 11). Preliminary borrow area SJ7-R093 received the SAND classification of "2 Potential" as it contains multiple geotechnical samples and geophysical data with evidence that suggest beach-compatible sands.

Table 11: Study area SJ6-R088 preliminary borrow area breakdown and composite statistics.

Preliminary Borrow Area	Area (ft^2)	Volume (cy)	Sample	Grain Size (mm)	% Silt	Sorting (mm)	% Carbonate	Classification
SJ7-R093	924,419,058.55	20,836,060	VC16 VC17 VC18 VC19	0.21	2.82	0.54	9.73	2 Potential

Study area SJ6-R088 has one of the largest volumes of potential sand amongst the eight study areas and, as such, is a viable option for further investigation. Unlike the areas in Nassau County,

it is not bound by any avoidance areas, and is in fact adjacent to two Authorized Borrow Areas/Potential Borrow Areas to the east.

Study Area VO5-R041

Study area VO5-R041, located offshore of northern Volusia County and about 5 miles north of the VO6-R153 study area, was surveyed by 45.3 line km of geophysical data and two geotechnical samples (one surface grab sample and one vibracore). The area contains very little beach compatible sediment and its subsurface geology consists of mostly paleochannels. On the far-east side of the mapped area there is what appears to be the base of a sand hill. Due to the design requirements for preliminary borrow area delineation and the almost negligible volumes calculated in additional piecemeal areas, only a small portion of study area VO5-R041 was developed into preliminary borrow area VO7-R065.

Although not close to the proposed preliminary borrow area, there is a cluster of potential outcrop sidescan sonar contacts at the intersection of Line_033 and Line_029. The majority of the area was classified as being hard bottom with some sand waves towards the eastern side at the base of the potential sand hill. There are only a few small magnetic anomalies throughout, of which none coincide with a sidescan sonar contact.

As previously mentioned, only a small portion (3%) of the total area within study area VO5-R041 was developed into a preliminary borrow area, however, chirp sub-bottom interpretation and digitization indicate that VO7-R065 is likely the base of a larger sand hill that extends to the east of the surveyed site beyond the planned BOEM ASAP survey lines (Table 12). The single vibracore taken in the preliminary borrow area, FL-BOEM-2015-VC10, indicates beach-compatible material almost 8 ft below the seafloor overlying a clayey/shelly layer with 11% fines.

The single vibracore (FL-BOEM-2015-VC10) taken in study area VO5-R041 was intended to sample the base of the potential sand hill and, upon geotechnical analysis, indicated a thick layer of sand below the seafloor and was therefore classified as “green” (good). Surface grab sample FL-BOEM-2015-SS11, collected in the northern area, characterizes the surficial sediment as fine-grained sands with 1.76% fine content. As can be seen in Figure 04 in Appendix N, the area around FL-BOEM-2015-VC10 is not included in a preliminary borrow area. This was due to the fact that the calculated 5 ft thickness in that particular portion yielded a volume that was almost negligible. That said, the vibracore was used to determine composite data for the potential borrow area since the sand layer sampled by the vibracore was traceable on the BOEM ASAP chirp sub-bottom data and the geomorphology indicates VO7-R065 is part of the same hill. Therefore, preliminary borrow area VO7-R065 received a SAND classification of “3A Unverified” due evidence of beach-compatible material in the geophysical data and the geotechnical data available in the adjacent vibracore FL-BOEM-2015-VC10.

Table 12: Study area VO5-R041 preliminary borrow area breakdown and composite statistics.

Preliminary Borrow Area	Area (ft^2)	Volume (cy)	Sample	Grain Size (mm)	% Silt	Sorting (mm)	% Carbonate	Classification
VO7-R065	27,711,273.86	367,378	VC10	0.24	2.39	0.49	17.45	3A Unverified

As previously mentioned, the VO7-R065 preliminary borrow area could potentially be the base of a larger sand hill. Since there are no avoidance areas to the east, it is possible that extending the

final design area towards the 8-nautical mile line (or further) would prove beneficial in increasing the amount of sand available.

Study Area VO6-R153

The VO6-R153 study area, located in the southern portion of Volusia County, is one of the larger study areas surveyed during the 2015 reconnaissance geophysical investigations, having a total of 128.4 line km, with two vibracores and four surface grab samples. Based on the chirp sub-bottom interpretation, the study area appears to be mostly a thin sediment layer with small sand hills scattered around the site, with one larger sand hill in the central area closer to the east side. Below the thin layer of sand are several buried paleochannels, however with the wide line spacing, it is impossible to determine the complexity of the paleochannel network.

Even though study area VO6-R153 is one of the largest areas, it only resulted in the delineation of two preliminary borrow areas: VO5-V317 and VO6-R179. For Volusia County, the R-Monuments do not extend all the way to the south end of the county. As a result, virtual monuments have been established. As preliminary borrow area VO5-V317 is near the south end of the county, there was no close R-monument to its centroid, as such CB&I used virtual monument V-317 as the closest monument to the centroid of the preliminary borrow area, resulting in a preliminary borrow area name of VO5-V317.

The first preliminary borrow area, VO6-R179, is located in the center of the study area has a couple of small magnetic anomalies, however none are associated with any additional digitized sidescan sonar features or contacts. Towards the southern portion of VO6-R179 there are a couple of contacts highlighting a potential outcrop. On its eastern side the seafloor is characterized as being mostly sand waves, and at the base of the sand hill towards the west, scattered hardbottom. The southern preliminary borrow area (VO5-V317) does not have any identified contacts or targets.

Of the entire surveyed area, only about 10% met the necessary requirements for preliminary borrow area delineation. VO6-R179 is likely a large sand hill which is overlying a paleochannel feature. It is notable that there is a small Authorized Borrow Area/Potential Borrow Area within VO6-R179, so it is possible that the current delineated area is an expansion on the previously identified preliminary borrow area. The southernmost preliminary borrow area (VO5-V317), was calculated based on a single survey line, and delineated as a preliminary borrow area due the overall length and acoustic quality along the line. There are no identified targets, contacts, seafloor features or avoidance areas that would prevent further investigation in that area. Therefore, the area could be larger than expected and provide additional beach-compatible sands.

Geotechnical data collected within study area VO6-R153 consists of two vibracores (both classified as “green”) and four surface grab samples. FL-BOEM-2015-VC08, although not in the preliminary borrow area site, was used to estimate the overall sediment composite of VO6-R179. The reason FL-BOEM-2015-VC08 was included in the composite for the preliminary borrow area is that when plotted on the chirp sub-bottom line, there were no clear reflectors matching the estimated BCS boundary, and no stratigraphic or acoustic changes that indicated that the geology at the core location was different than within the preliminary borrow area. Therefore, a shallower (closer to the seafloor), conservative reflector was digitized as the BCS, resulting in a thinner deposit (not meeting design criteria) at the vibracore location. It is likely that once additional data

are collected and there are more intersections available, the vibracore cut boundary would be more easily identifiable and VO6-R179 could be larger and thicker than determined during this preliminary delineation. FL-BOEM-2015-VC15 is located on a small sand hill on the northern area of study area VO6-R153. This particular hill was not further developed into a preliminary borrow area since its overall thickness and shape are based off a short portion of a single line, therefore any calculations on the potential volume would be based only on speculation. Presumably, this area could be further investigated and developed into a preliminary borrow area. The three surface grab samples (from north to south FL-BOEM-2015-SS12, FL-BOEM-2015-SS14, and FL-BOEM-2015-SS13) taken in the areas with a thin sediment layer characterize the surficial sands as fine-grained sands with some to little shell hash with a fine grain content of 1.80%, 2.35%, and 2.49%, respectively. FL-BOEM-2015-SS09 is located within the VO5-V317 preliminary borrow area (Table 13).

During the reconnaissance geotechnical survey, no samples were taken in VO6-R179, therefore historic cores from the ROSSI database were used to estimate preliminary borrow area composite statistics. B13-3 and B13-4 were taken during a sand investigation in 2004 by Costal Technology during their reconnaissance level Volusia County Sand Search investigation (Parkinson, 2005). By incorporating the historic geotechnical data, VO6-R179 was SAND classified as "2 Potential" as multiple vibracores and geophysical data contained evidence of beach-compatible sands. Preliminary borrow area VO5-V317 was SAND classified as "3B Unverified" since it contains no geotechnical data, but has geophysical evidence of beach-compatible sands.

Table 13: Study area VO6-R153 preliminary borrow area breakdown and composite statistics.

Preliminary Borrow Area	Area (ft^2)	Volume (cy)	Sample	Grain Size (mm)	% Silt	Sorting (mm)	% Carbonate	Classification
VO5-V317	43,210,268.78	901,038	N/A	N/A	N/A	N/A	N/A	3B Unverified
VO6-R179	221,095,705.17	3,742,156	B13-3 (historic) B13-4 (historic)	0.27	0.53	0.52	14.63	2 Potential
Total	**264,305,973.95**	**4,643,195**						

The two preliminary borrow areas identified within study area VO6-R153 only account for approximately 25% of its overall available volume, which means that with further investigations the preliminary borrow areas could likely be expanded and more beach-compatible sands identified. As previously mentioned, from this study, no potential hazards were identified which would impede expanding the areas.

Study Area BE7-R166

Study area BE7-R166, located in Brevard County, consists of 90.10 line km of geophysical data and two surface grab samples. The area can be best characterized as having a consistently thin (4.69 ft) sand layer throughout, with some areas getting as thin as 1.11 ft and a couple of points as thick as 11.54 ft, with no distinguishable geomorphologic sand feature. The two surface grab samples, FL-BOEM-2005-SS05 collected in the central portion of the study area and FL-BOEM-2015-SS06 collected in the northeast corner, characterize the surficial sands as being mostly shells with some trace rocks and sand.

Study area BE7-R166 resulted in the delineation of five preliminary borrow areas scattered throughout the study area. The two main preliminary borrow areas are located along the eastern side and the northwest side. The area as a whole has several potential debris contacts, several of which are within preliminary borrow area BE8-R181 on the east side, one of which is associated with magnetometer target 012-1-dp-3.95g-17.15m. The BE8-R181 preliminary borrow area has a few scattered hardbottom features, however most of it is not included in the preliminary borrow area. The other larger preliminary borrow area, BE5-R165, has a small area digitized as being sand waves and a few small magnetic anomalies. The additional three areas are based on a thickness that is only present on one or two lines, therefore highly affected by the gridding interpolation. It is possible that preliminary borrow areas BE4-R202, BE4-R178 and BE5-R165 are in fact the same sand source which extends along the eastern side of the study area and were separated due to the gridding method. Additional design-level investigations would be required to confirm this theory. Since no vibracores were taken within the BE7-R166 study area, and no historic vibracores were identified in ROSSI, all five potential borrow areas received a SAND classification of "3B Unverified" indicating evidence of beach-compatible sands within geophysical data only (Table 14).

Study area BE7-R166, as previously mentioned, does not appear to have any distinguishable features that would warrant an additional investigation, however it is likely to have some beach-compatible sands spread throughout.

Table 14: Study area BE7-R166 preliminary borrow area breakdown and composite statistics.

Preliminary Borrow Area	Area (ft^2)	Volume (cy)	Sample	Grain Size (mm)	% Silt	Sorting (mm)	% Carbonate	Classification
BE4-R202	71,833,189.23	1,009,660	N/A	N/A	N/A	N/A	N/A	3B Unverified
BE4-R178	25,914,319.24	343,834	N/A	N/A	N/A	N/A	N/A	3B Unverified
BE5-R165	112,449,533.11	1,378,075	N/A	N/A	N/A	N/A	N/A	3B Unverified
BE8-R181	222,757,575.73	2,706,416	N/A	N/A	N/A	N/A	N/A	3B Unverified
BE8-R210	67,174,329.25	848,066	N/A	N/A	N/A	N/A	N/A	3B Unverified
Total	**500,128,947**	**6,286,051**						

Study Area IR6-R002

The IR6-R002 study area, located in northern Indian River County, consists of seven lines totaling 71.46 line km, with two vibracores and one surface grab sample. The entire area has a generally thick sand deposit (around 7 to 8 ft), however the central-east side has a thicker sand deposit. The sand hill on the east side has an average thickness of approximately 15 ft. Unlike the northern study areas, there were no subsurface paleochannels identified within this study area and the sand appears to be overlying a shelly-clay layer.

Study area IR6-R002 has a significantly large volume of sand even though the study area is relatively small. The preliminary borrow area highlighted as IR7-R214 has a few contacts identified as potential debris, one potential outcrop and a feature identified as a potential cable and/or anchor line towards the east. There are very few distinguishable seafloor features within preliminary borrow area IR7-R214. Seafloor delineations such as potential outcrop, mud, and outcrop (described further under the Sidescan Sonar subsection of the Reconnaissance Geophysical Data Interpretation section of this report) are located off the sand hill towards the

west. Within preliminary borrow area IR7-R214, there are only a few magnetic anomalies smaller than 60 gammas, therefore the area did not require any additional alterations.

The two vibracores in the area, FL-BOEM-2015-VC03 located on the sand hill, and FL-BOEM-2015-VC04 located on the northwest corner, provide a maximum cut thickness of 17.9 ft and 14.6 ft respectively. Both cores received an overall classification of "green." Composite statistics for the entire preliminary borrow area were based off both vibracores (Table 15). Sedimentary analysis on the surface grab sample, FL-BOEM-2015-SS07 collected in the southern portion of the study area, characterizes the thinner sand area as a shell hash with 1.7% fines.

Vibracore descriptions, carbonate analysis results and composite statistics on the individual vibracores indicate that this particular borrow area appears to be a shelly sand/sandy shell hash. Even though this preliminary borrow area has multiple geotechnical samples, due to the large mean grain size and carbonate content, the sediment source was only classified as "3A Unverified" since additional geotechnical data is required to accurately determine the beach-compatibility of this potential borrow area.

IR7-R214 is bound on the east by a submarine telecommunications cable, which would require additional design considerations if the area were to be formally designed as a preliminary borrow area. The majority of the beach-compatible sand within study area IR6-R002 is, however, within the BOEM ASAP study area, making this a promising resource for potentially large quantities of beach-compatible sand.

Table 15: Study area IR6-R002 preliminary borrow area breakdown and composite statistics.

Preliminary Borrow Area	Area (ft^2)	Volume (cy)	Sample	Grain Size (mm)	% Silt	Sorting (mm)	% Carbonate	Classification
IR7-R214	713,485,638.20	17,416,202	VC03 VC04	0.56	2.58	0.41	67.22	3A Unverified

Study Area MI5-R071

The MI5-R071 study area in Martin County consists of one 14.02 km long survey line and two vibracores. This area was requested to be included in the BOEM ASAP project by the USACE Jacksonville District. Based on the single line, the area appears to have a large sand hill in the northern end with a thinner sand layer towards the south, separated by an area of potentially exposed hardbottom. The area has one small magnetic anomaly and no identified sidescan sonar contacts. The northwestern portion has an average thickness of approximately 13 ft, while the southeastern end has a thickness of 9 ft, with a small central portion having a thickness less than 3 ft. The two vibracores in the area, FL-BOEM-2015-VC01 located on the southeast end of the line and FL-BOEM-2015-VC02 located on the northwest end, indicate a sand thickness of 9.8 ft and 13.5 ft respectively.

Since there is only one geophysical line within the area, preliminary volumes and preliminary borrow area extents cannot be developed as they would be highly speculative and would require significant additional reconnaissance-level and design-level geotechnical and geophysical surveys to confirm and refine.

SUMMARY

CB&I was contracted by FDEP to conduct detailed data processing and interpretation of the Florida geophysical and geotechnical reconnaissance-level data collected by CB&I under contract with BOEM for the Inventory of Potential Beach Nourishment and Coastal Restoration Sand Sources on the Atlantic Outer Continent Shelf of the United States (ASAP). This particular project involved compiling and reviewing all available BOEM ASAP data sets along the Atlantic OCS to identify potential sand sources. Along the Florida east coast, geophysical survey operations took place between April 19, 2015 and May 1, 2015. Once the geophysical data were collected, the geotechnical survey took place between July 29, 2015 and August 16, 2015. The Florida component of the BOEM ASAP project resulted in the collection of 502 km of geophysical (chirp sub-bottom, sidescan sonar, magnetometer, and swath bathymetry), 11 surface grab samples, and 19 vibracores with analysis of 125 individual geologic subsamples (11 from the surface grab samples and 114 from the vibracores).

Upon completion of the reconnaissance survey in 2015, FDEP contracted CB&I to analyze the acquired data in the eight Florida study areas, determine the potential for beach-compatible sand sources, and delineate preliminary borrow areas along the Florida shelf offshore Nassau, St. Johns, Volusia, Brevard, Indian River and Martin County. The preliminary borrow areas delineations in all six counties (eight study areas) had preliminary design criteria that included a minimum cut thickness of 3 feet after applying a 2 ft buffer over incompatible material. CB&I conducted a thorough processing and interpretation of the 522 line km of chirp sub-bottom, sidescan sonar and magnetometer data along with the 30 geotechnical samples and delineated 16 preliminary borrow areas.

Preliminary borrow areas consisted of beach compatible sand resources with a total net volume of 54,477,396 cy of beach compatible sands. Offshore Nassau County, CB&I identified six preliminary borrow areas with a total volume of 4,928,511 cy. One preliminary borrow area was delineated offshore St. Johns County with a total volume of 20,836,060 cy. Preliminary borrow area delineation in Volusia County yielded three areas, with a total of 5,010,573 cy of sand. Data interpretation in Brevard County resulted in five preliminary borrow areas with a total volume of 6,286,051 cy. The single preliminary borrow area identified in Indian River county has a potential volume of 17,416,202 cy.

Finally, each preliminary borrow area was reviewed and classified as a “Potential” or “Unverified” sand resource in accordance with the Southeast Florida Assessment and Needs Determination (SAND) study conducted by the USACE and FDEP. Of all 16 delineated preliminary borrow areas, five preliminary borrow areas offshore Volusia, St. Johns and Nassau Counties received a final SAND classification of “2 Potential” yielding 27,460,426 cy of likely beach compatible sand. Five other preliminary borrow areas offshore Martin, Indian River, Volusia and Nassau County were classified as “3A Unverified” totaling 17,966,114 cy of likely beach-compatible sand. Eight preliminary borrow areas offshore Brevard, Volusia and Nassau Counties were classified as “3B Unverified” with 9,050,856 cy of potentially beach-compatible sand.

Based off CB&I’s interpretation of the geophysical and geotechnical data collected for the BOEM ASAP project, it is evident that there are several viable sand sources along the Florida Atlantic

OCS which would benefit from additional data coverage to further delineate and design preliminary borrow areas. In order to refine, design, permit, and/or lease any of these actual sand resources, additional phased (reconnaissance-level and design-level) geophysical and geotechnical data would need to be collected over all of the study areas under consideration for final design and usage.

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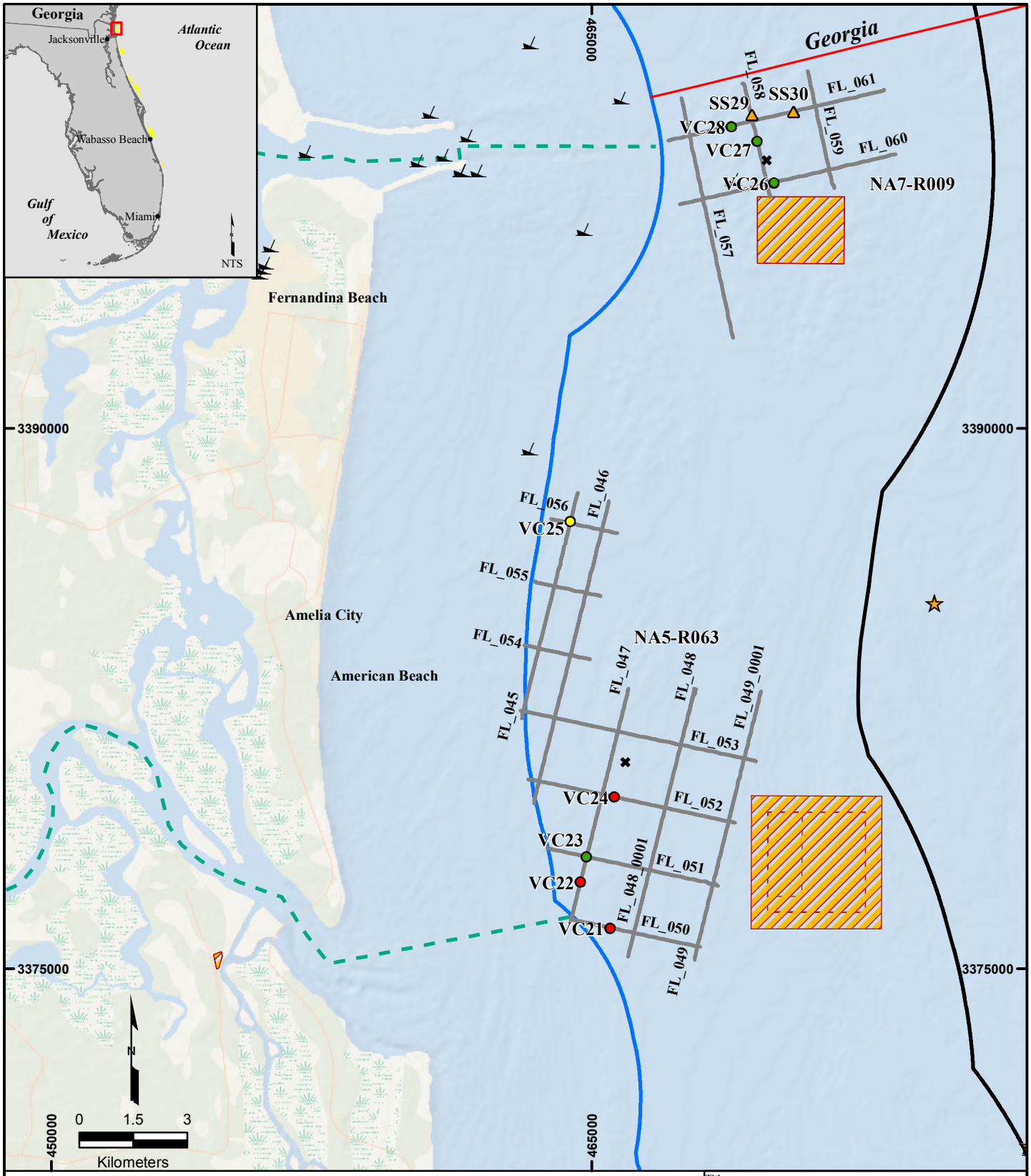
APPENDIX A

Study Area Maps



Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Geotechnical Samples

- Surface Sample
- Vibracore - Good
- Vibracore - Bad
- Vibracore - Moderate
- Reconnaissance As-Run Tracklines
- Area Centroid
- NOAA AWOIS
- Artificial Reefs
- State Offshore Admin Boundary
- County Boundary
- 8 Nautical Miles
- Federal/State Boundary
- USACE/EPA ODMDS

Title: **BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection**

Nassau County

App A: Survey Area

Figure No.: 01	Comm No.: 6362179972	Date: 02/27/17

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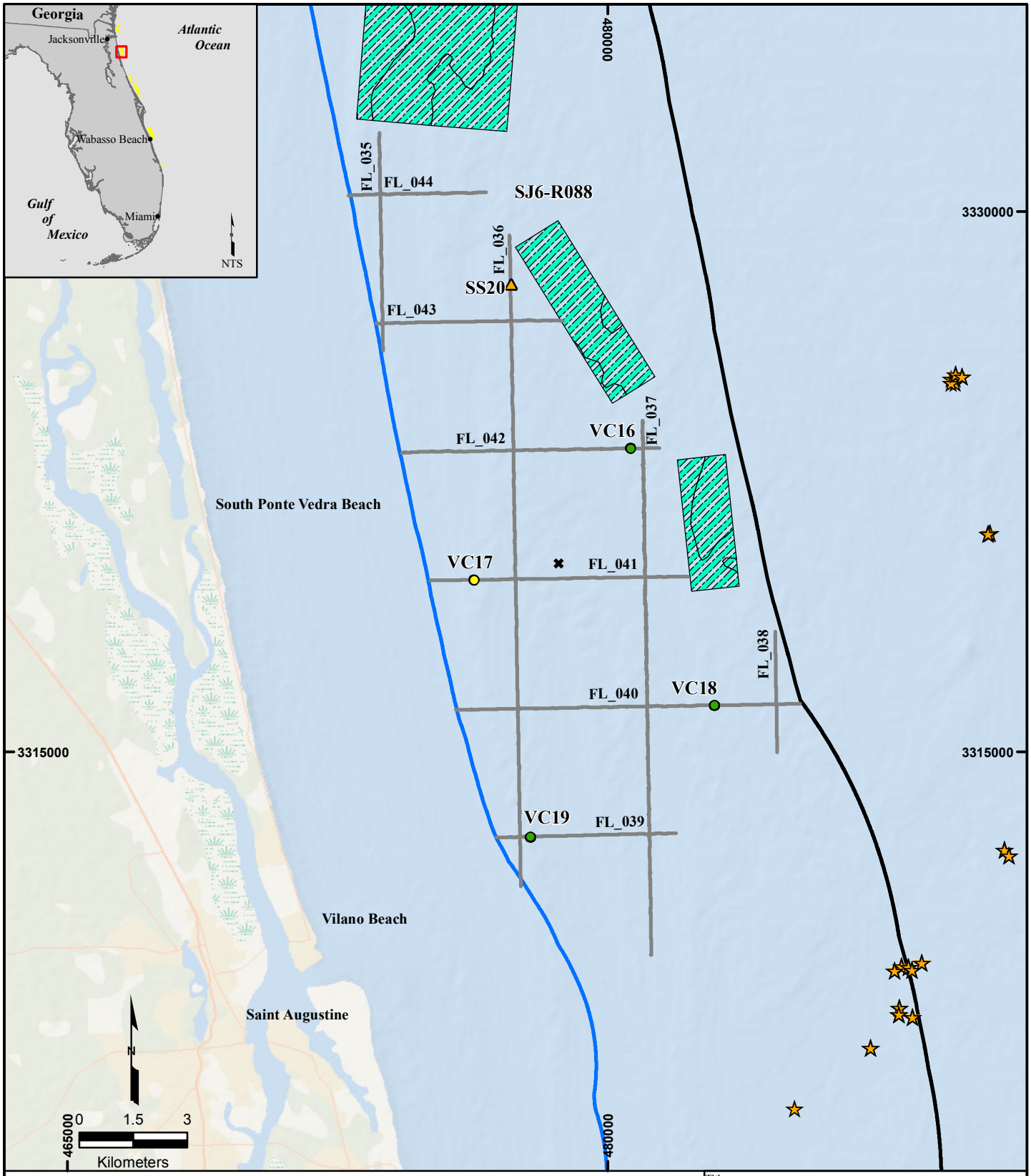

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Geotechnical Samples

- Surface Sample
- Vibracore - Good
- Vibracore - Moderate
- Reconnaissance As-Run Tracklines
- Area Centroid
- Artificial Reefs
- 8 Nautical Miles
- Federal/State Boundary
- ABAs and PBAs

Title: **BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection**

St. Johns County

App A: Survey Area

Figure No.: 02	Comm No.: 6362179972	Date: 02/27/17

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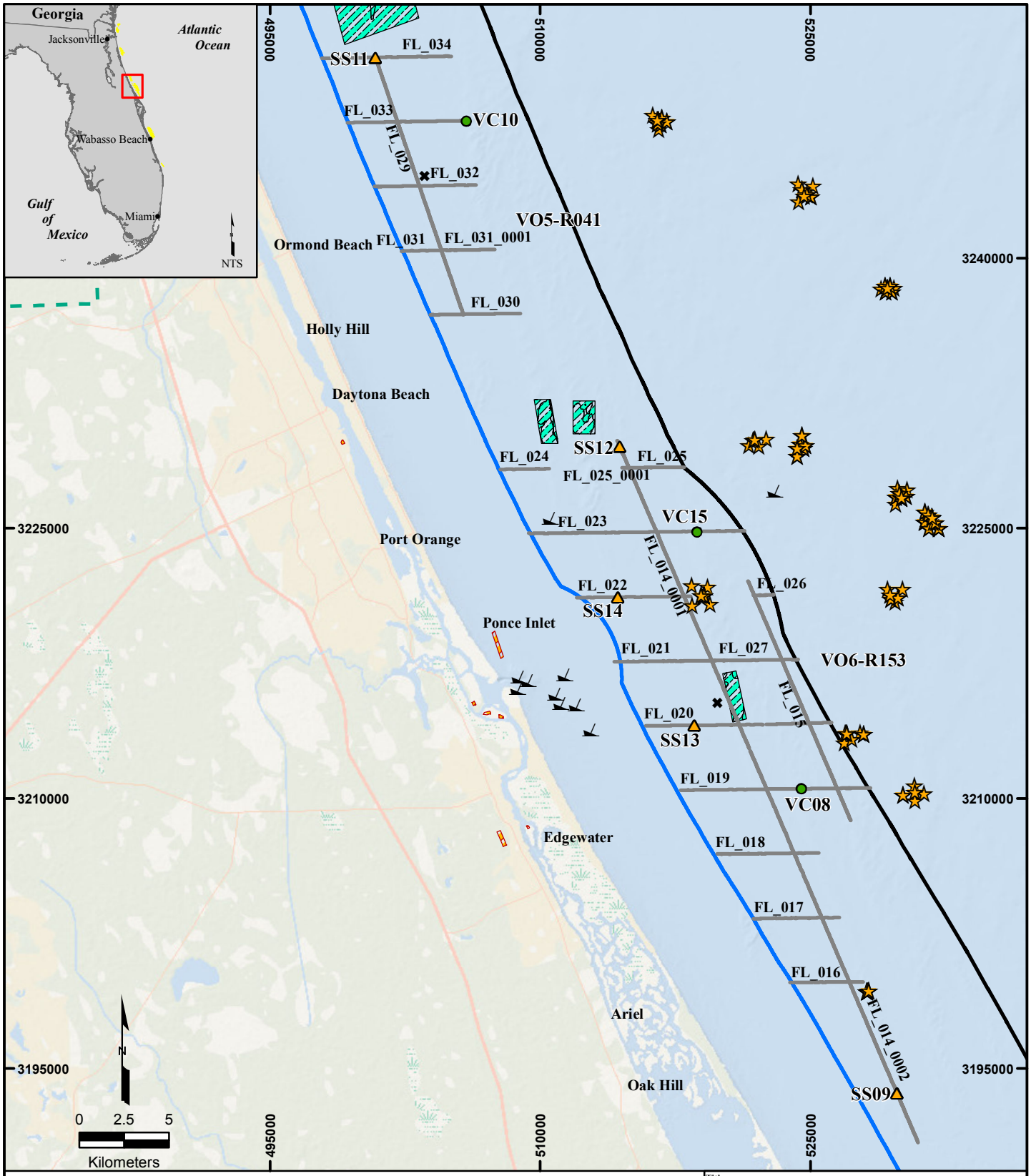

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Geotechnical Samples

- Surface Sample
- Vibracore - Good
- Reconnaissance As-Run Tracklines
- Area Centroid
- NOAA AWOIS
- Artificial Reefs
- County Boundary
- 8 Nautical Miles
- Federal/State Boundary
- ABAs and PBAs
- USACE/EPA ODMDS

Title: BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Volusia County

App A: Survey Area

Figure No.: 03 | Comm No.: 6362179972 | Date: 02/27/17

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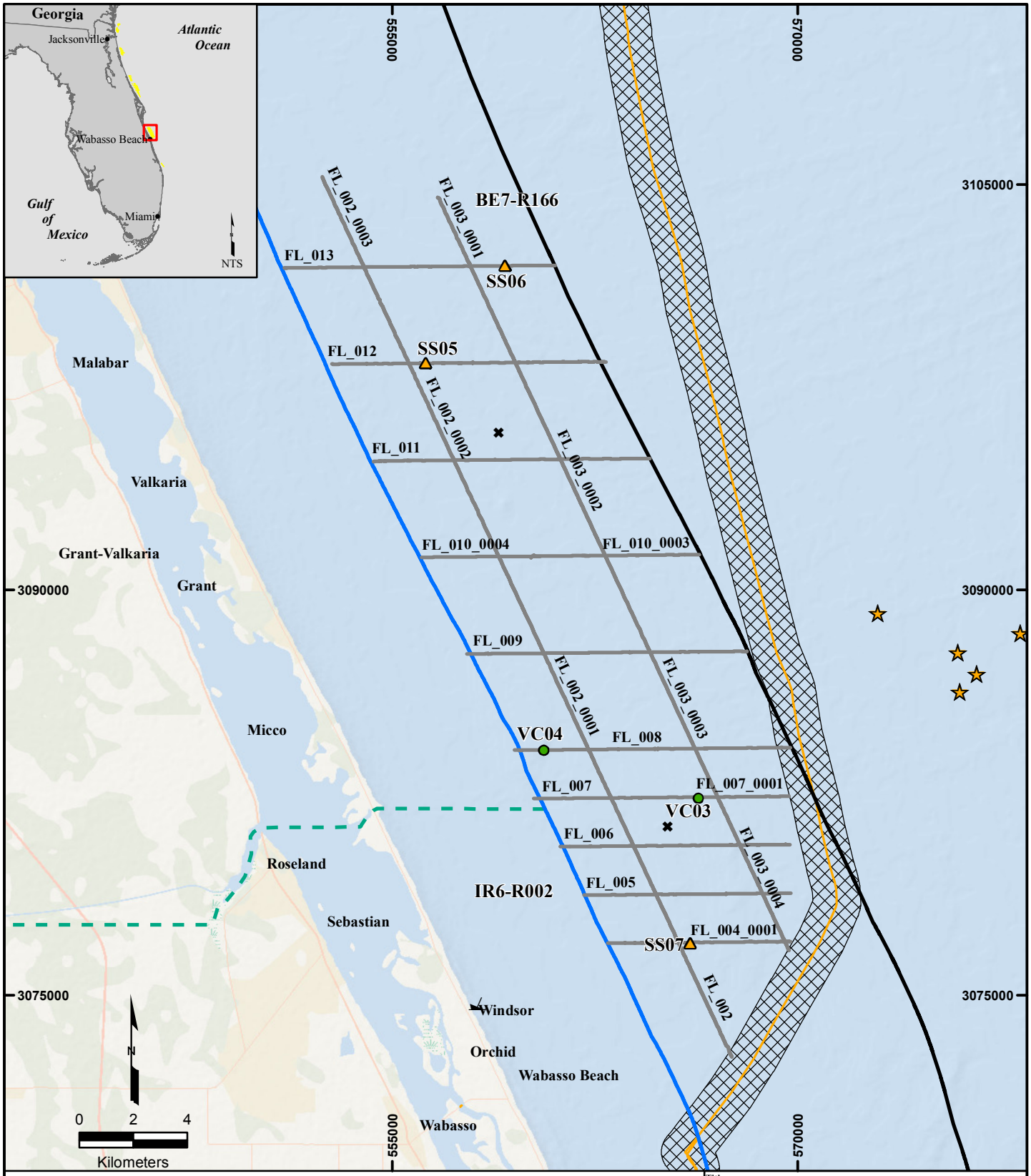

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Geotechnical Samples

- Surface Sample
- Vibracore - Good
- Reconnaissance As-Run Tracklines
- Area Centroid
- NOAA AWOIS
- Artificial Reefs
- County Boundary
- 8 Nautical Miles
- Federal/State Boundary
- Cables
- 1km Cable Buffer

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Brevard and Indian River County

App A: Survey Area

Figure No.: 04	Comm No.: 6362179972	Date: 02/27/17

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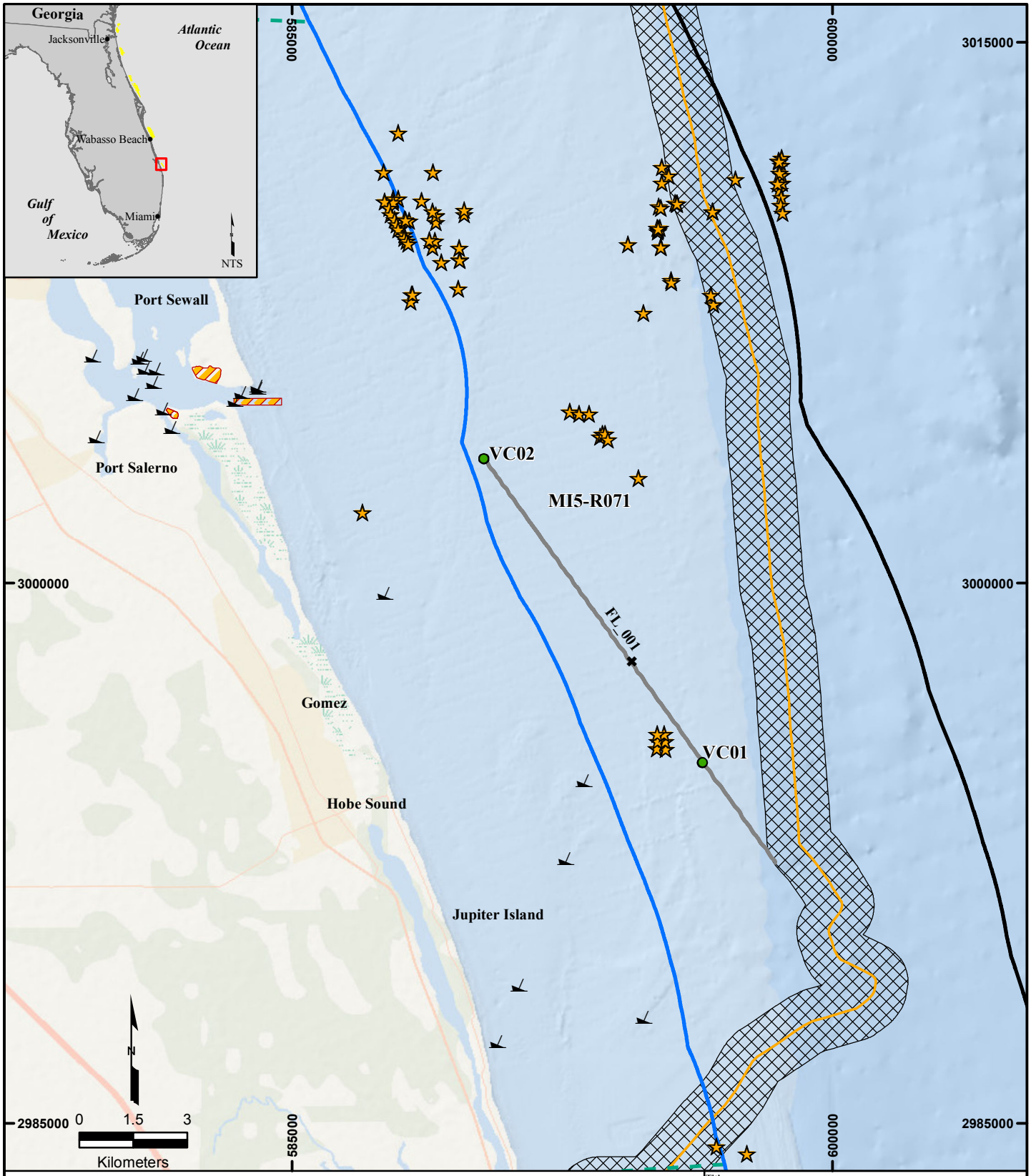

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Geotechnical Samples

- Vibracore - Good
- Reconnaissance As-Run Tracklines
- Area Centroid
- NOAA AWOIS
- Artificial Reefs
- County Boundary
- 8 Nautical Miles
- Federal/State Boundary
- Cables
- 1km Cable Buffer
- USACE/EPA ODMDS

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Martin County

App A: Survey Area

Figure No.: 05	Comm No.: 6362179972	Date: 02/27/17

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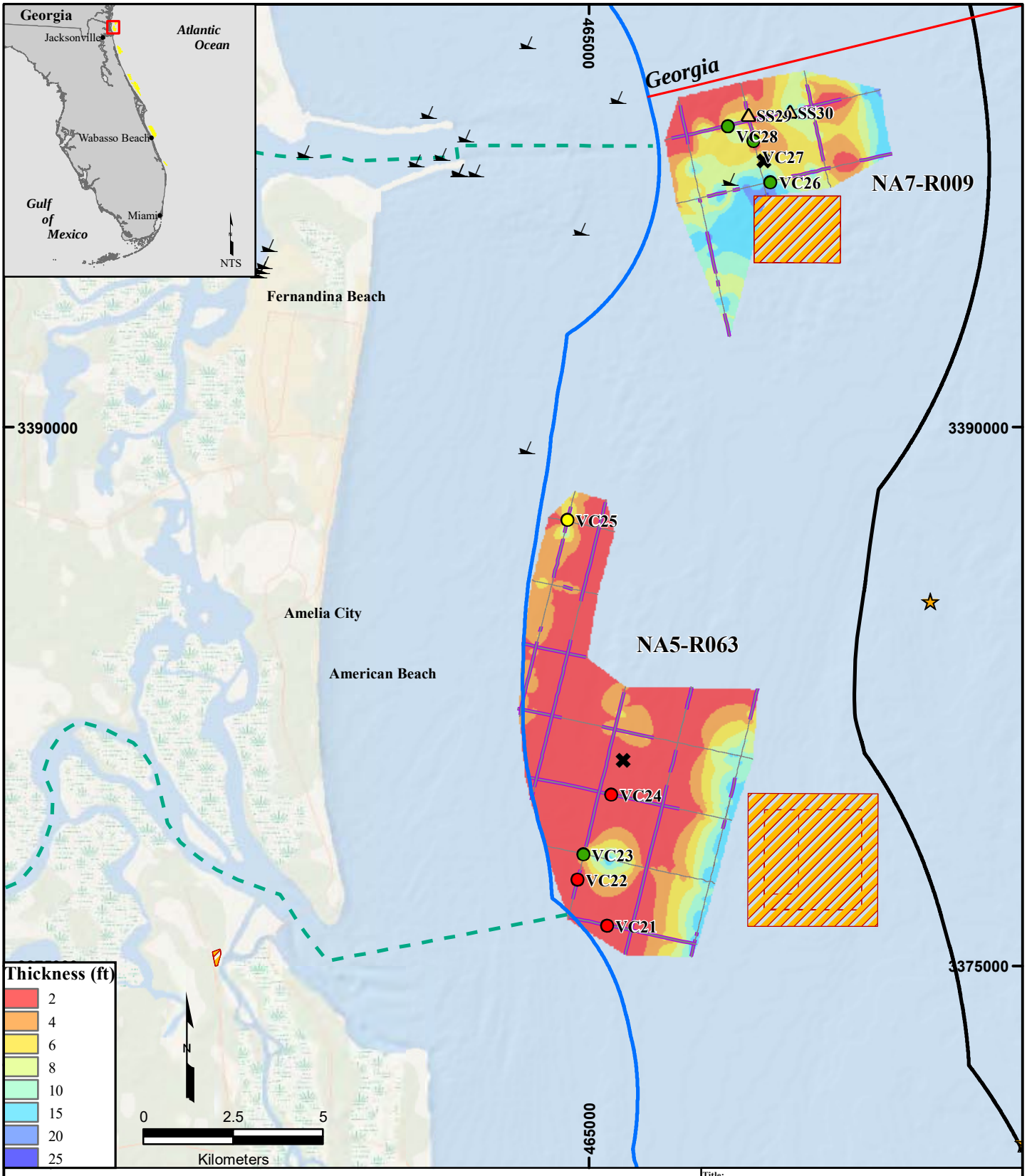
APPENDIX B

Chirp Sub-Bottom Thickness Isopach Maps



Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Geotechnical Samples

- Surface Sample
- Vibracore - Good
- Vibracore - Bad
- Vibracore - Moderate
- Reconnaissance As-Run Tracklines
- Digitized Channels
- NOAA AWOIS
- Area Centroid
- Artificial Reefs
- State Offshore Admin Boundary
- County Boundary
- 8 Nautical Miles
- Federal/State Boundary
- USACE/EPA ODMDS

Title: **BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection**

Nassau County

App B: Seismic Thickness

Figure No.: 01	Comm No.: 6362179972	Date: 02/27/17

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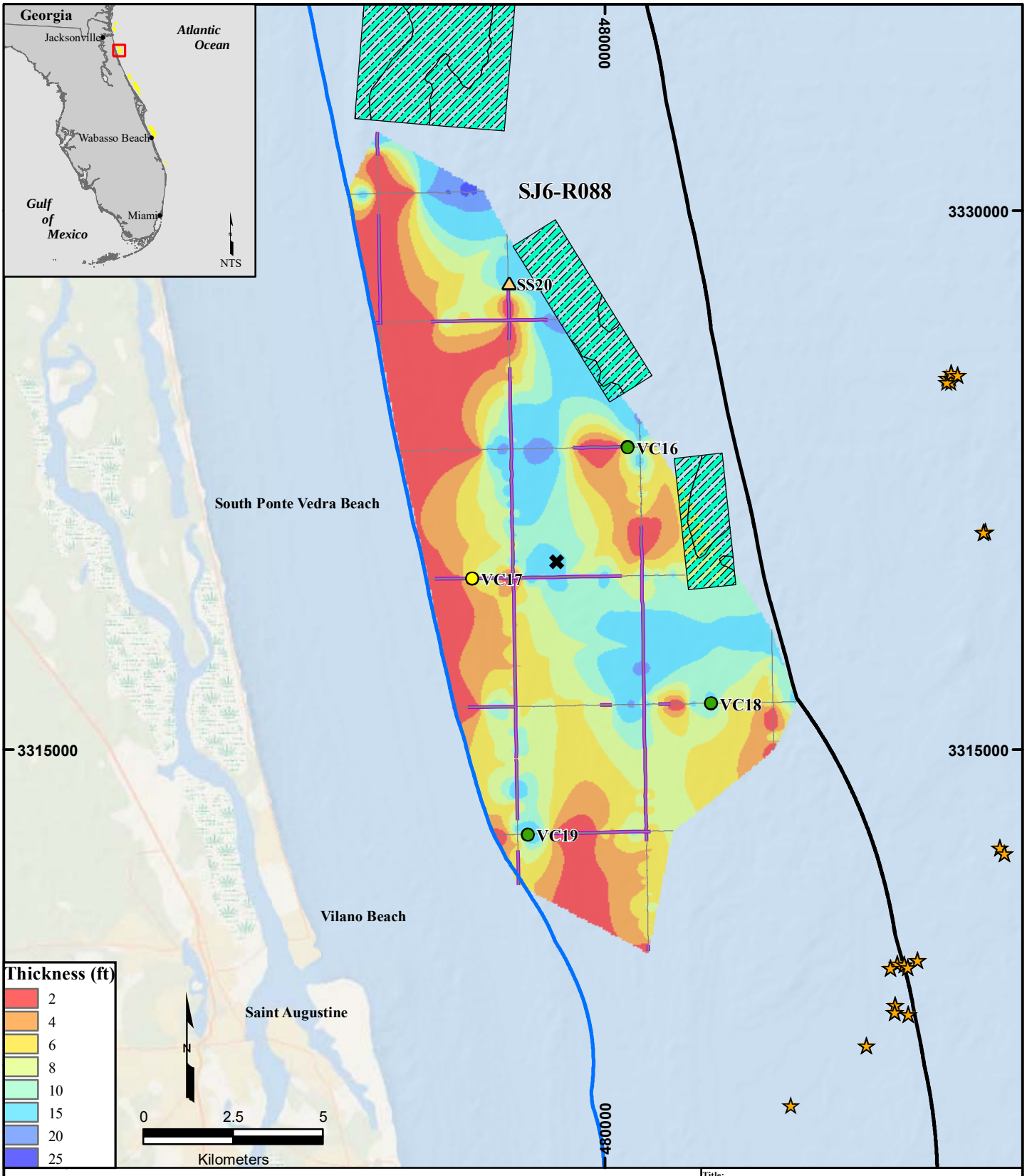

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Geotechnical Samples

- Surface Sample
- Vibracore - Good
- Vibracore - Moderate
- Reconnaissance As-Run Tracklines
- Digitized Channels
- Area Centroid
- Artificial Reefs
- 8 Nautical Miles
- Federal/State Boundary
- ABAs and PBAs

Title: **BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection**

St. Johns County

App B: Seismic Thickness

Figure No.: 02	Comm No.: 6362179972	Date: 02/27/17

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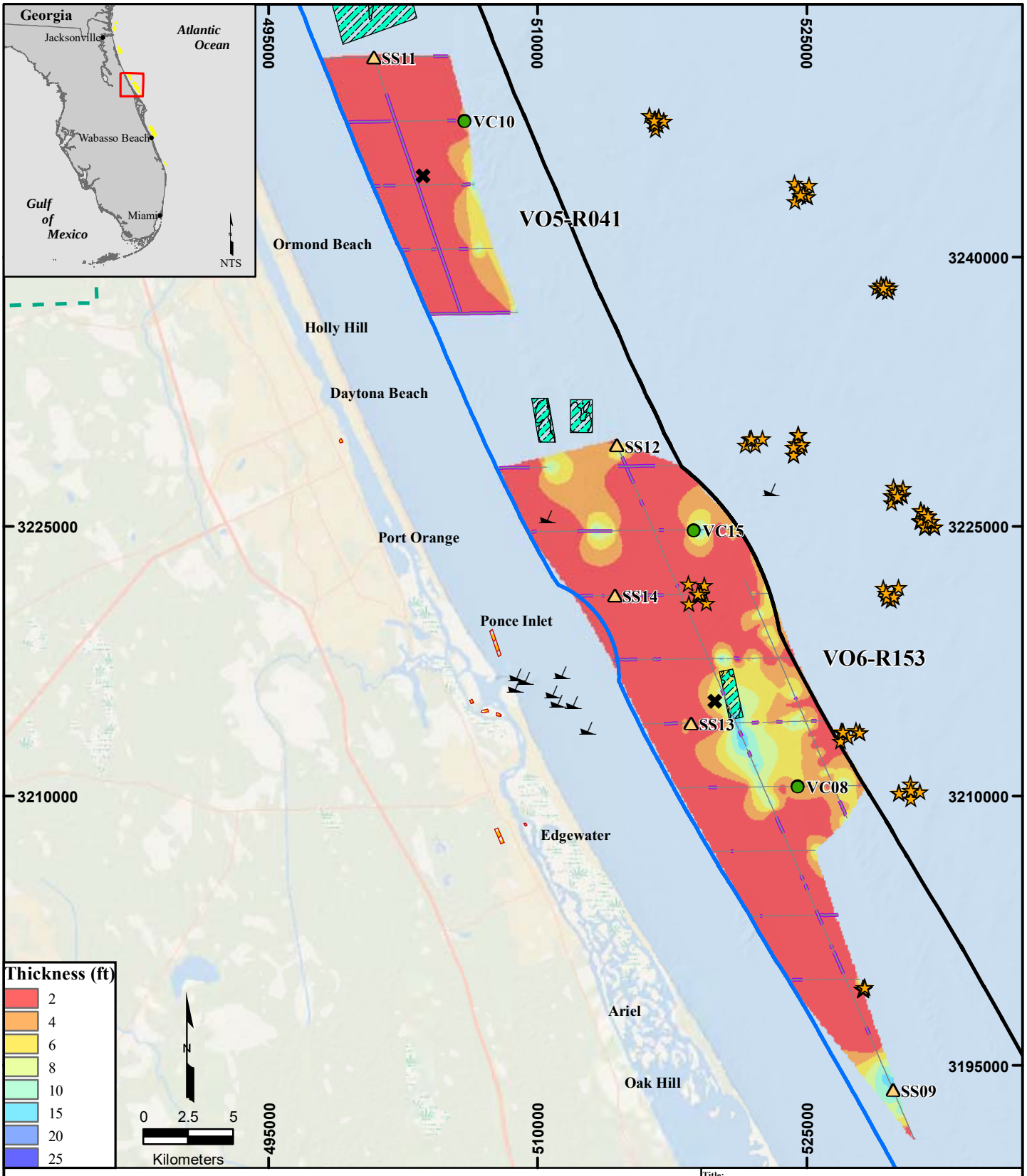

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Geotechnical Samples

- Surface Sample
- Vibracore - Good
- Reconnaissance As-Run Tracklines
- Digitized Channels
- NOAA AWOIS
- Area Centroid
- Artificial Reefs
- County Boundary
- 8 Nautical Miles
- Federal/State Boundary
- ABAs and PBAs
- USACE/EPA ODMDS

Title: **BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection**

Volusia County

App B: Seismic Thickness

Figure No.: 03	Comm No.: 6362179972	Date: 02/27/17

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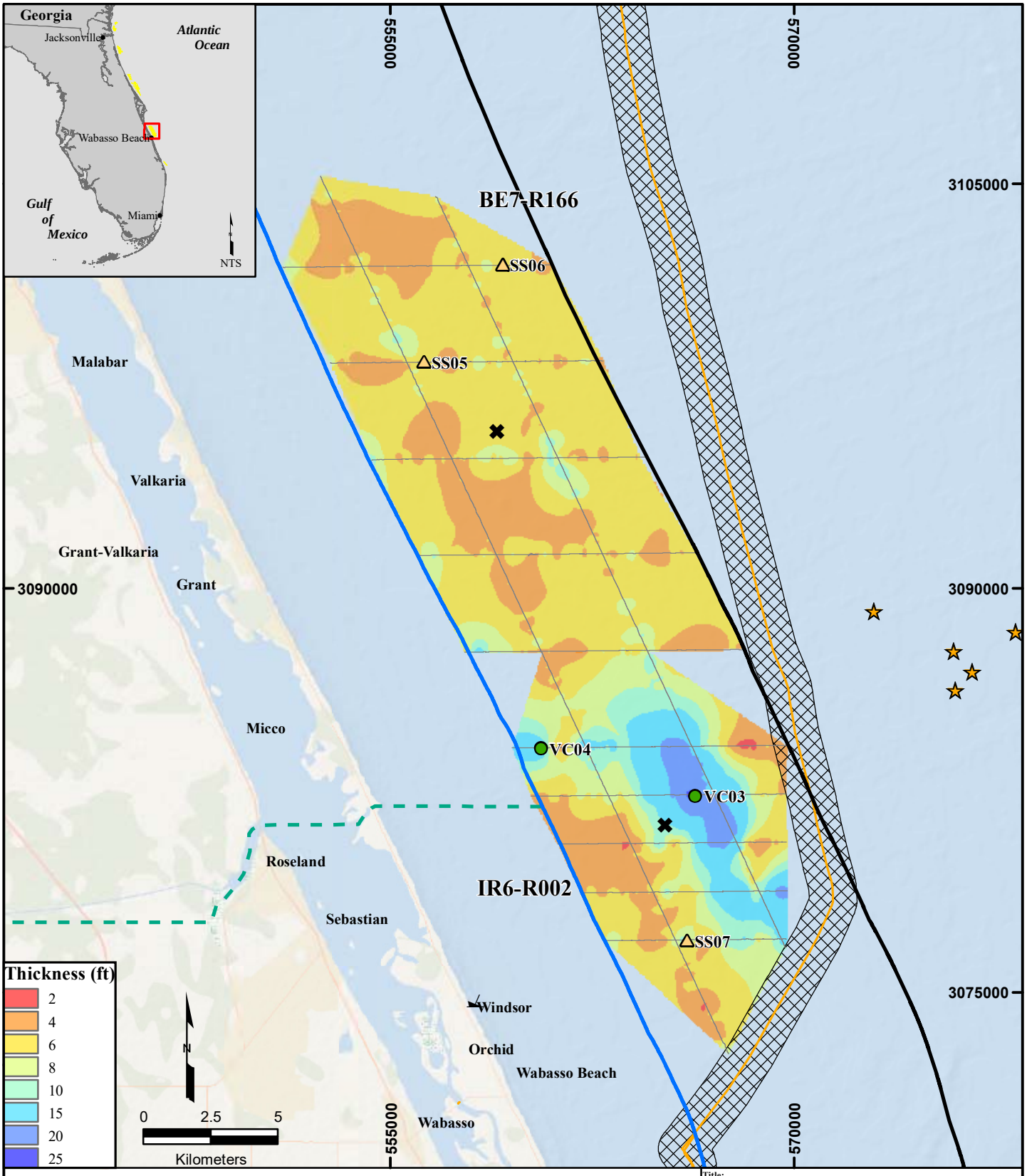

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Geotechnical Samples

- Surface Sample
- Vibracore - Good
- Reconnaissance As-Run Tracklines
- NOAA AWOIS
- Area Centroid
- Artificial Reefs
- County Boundary
- 8 Nautical Miles
- Federal/State Boundary
- Cables
- 1km Cable Buffer

Title: **BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection**

Brevard and Indian River County

App B: Seismic Thickness

Figure No.: 04	Comm No.: 6362179972	Date: 02/27/17

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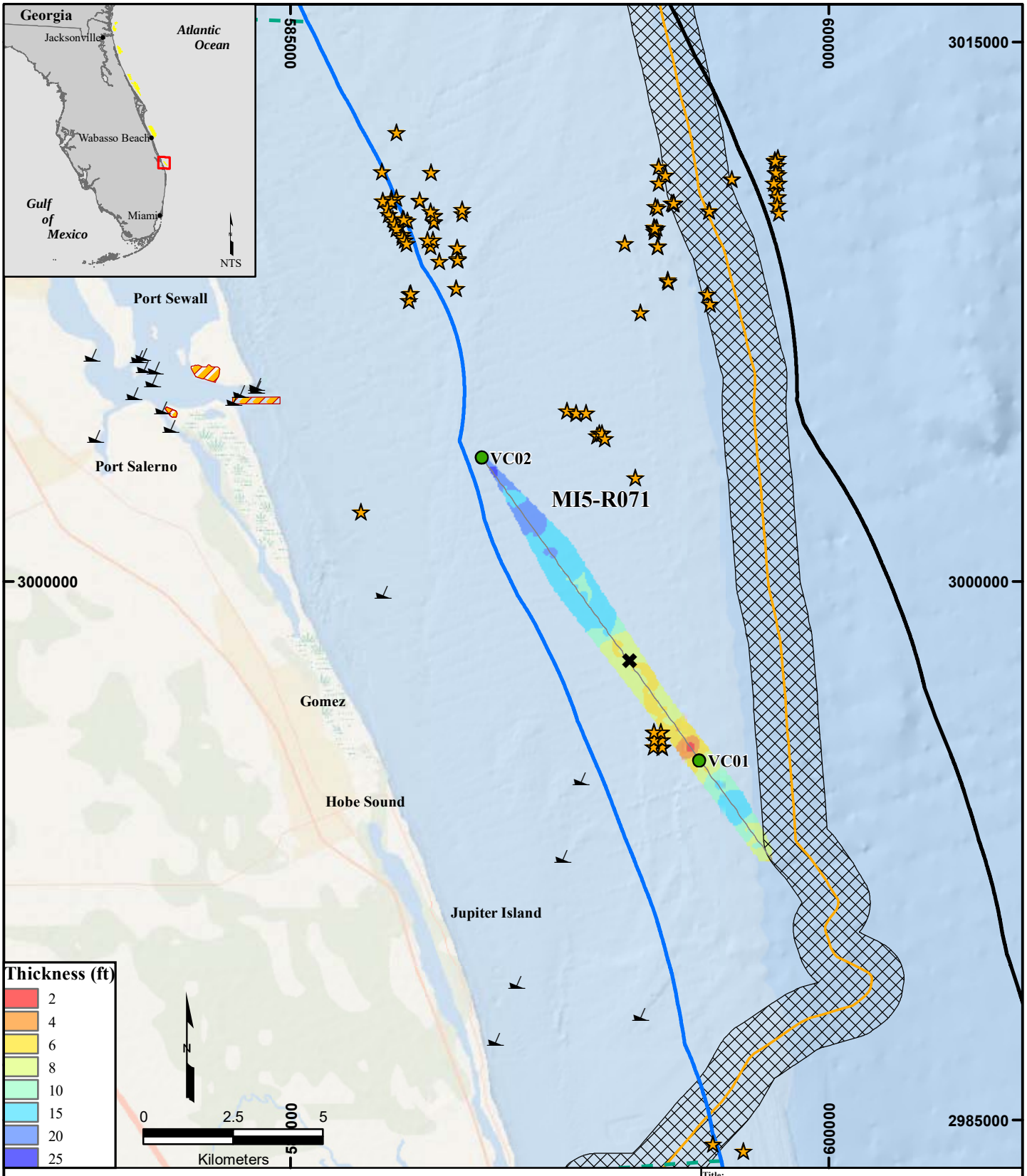

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Geotechnical Samples

- Vibracore - Good
- Reconnaissance As-Run Tracklines
- NOAA AWOIS
- Area Centroid
- Artificial Reefs
- County Boundary
- 8 Nautical Miles
- Federal/State Boundary
- Cables
- 1km Cable Buffer
- USACE/EPA ODMDS

Title: **BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection**

Martin County

App B: Seismic Thickness

Figure No.: 05	Comm No.: 6362179972	Date: 02/27/17

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APPENDIX C

Chirp Sub-bottom Web-Based Project
(Digital Only)

Chirp sub-bottom data are organized by study area and viewable as a project in any standard web-browser software program (including Internet Explorer, Safari, Chrome, etc.). The imagery for each line can be viewed by opening the following file in the Appendix C digital submittal:

2017_FDEP_BOEM_Recon_BE7-R166_Seismic_Data_Viewer.htm
2017_FDEP_BOEM_Recon_NA5-R063_Seismic_Data_Viewer.htm
2017_FDEP_BOEM_Recon_NA7-R009_Seismic_Data_Viewer.htm
2017_FDEP_BOEM_Recon_SJ6-R088_Seismic_Data_Viewer.htm
2017_FDEP_BOEM_Recon_VO5-R041_Seismic_Data_Viewer.htm
2017_FDEP_BOEM_Recon_VO6-R153_Seismic_Data_Viewer.htm
2017_FDEP_BOEM_Recon_IR6-R002_Seismic_Data_Viewer.htm
2017_FDEP_BOEM_Recon_MI5-R071_Seismic_Data_Viewer.htm

Once opened, the webpage will contain imagery for all of the collected chirp sub-bottom data. To view chirp sub-bottom lines, click on the line name link and the chirp sub-bottom line will appear in a new window in a large-scale format. If you would like to see the entire line within the window (at a smaller scale), simply click on the line imagery and it will zoom out to fit the screen. To zoom back in to the original scale, simply click on the imagery again. If your web browser asks for security permissions, please allow them as this will allow you to see the cursor position in georeferenced coordinates as you scroll around the imagery.

APPENDIX D

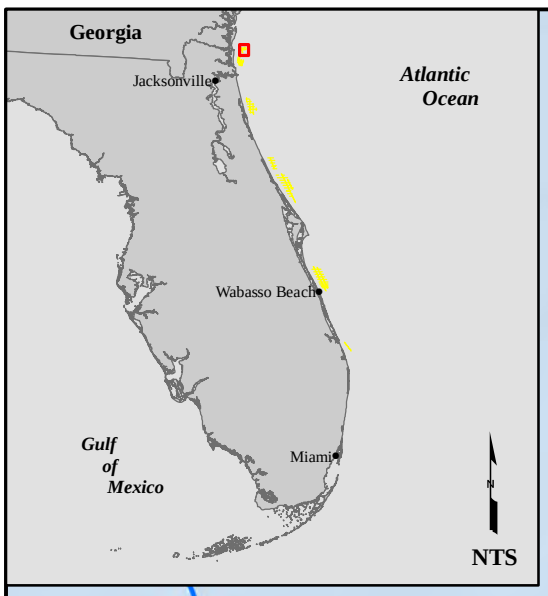
Chirp Sub-bottom Digitized Paleochannels
(Digital Only)

APPENDIX E

Chirp Sub-bottom X/Y/Thickness Files
(Digital Only)

APPENDIX F

Sidescan Sonar Mosaic and Digitized Seafloor Features Map Series



Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

- Scattered Hardbottom
- Sand Waves
- NOAA AWOIS
- State Offshore Administrative Boundary
- 8 Nautical Miles
- Federal/State Boundary
- USACE/EPA Offshore Dredge Material Disposal Site

N

0 0.5 1

Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Nassau County- NA7-R009

App F: Sidescan Sonar Mosaic

Figure Number: 01	Comm No.: 6362179972	Date: 03/02/17

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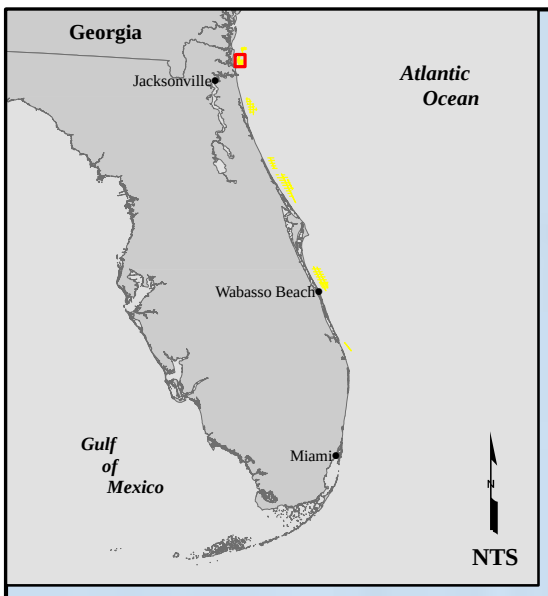

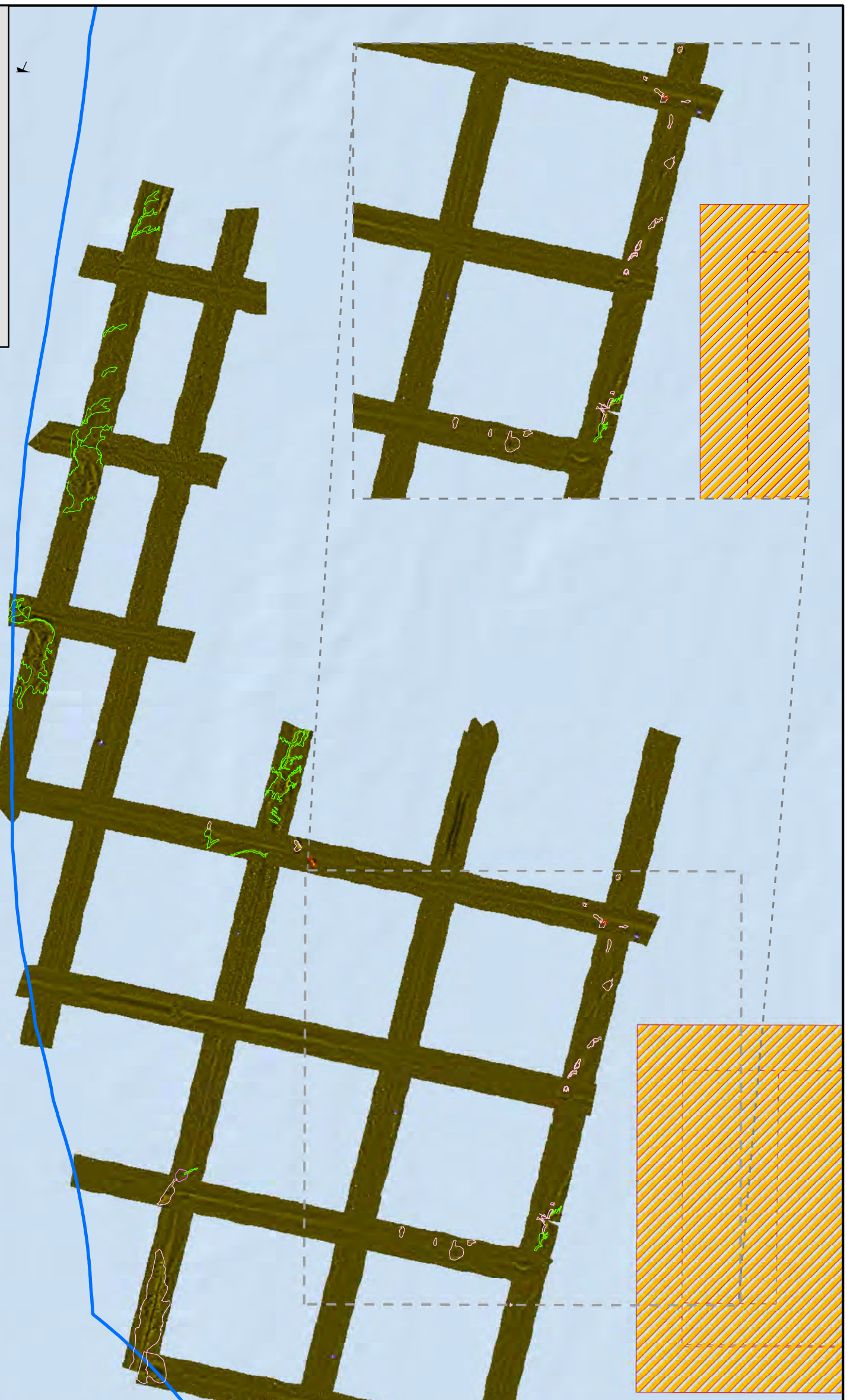

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

- Hardbottom
- Scattered Hardbottom
- Sand Waves
- Potential Debris
- NOAA AWOIS
- Federal/State Boundary
- USACE/EPA Offshore Dredge Material Disposal Site

N

0 0.5 1

Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Nassau County- NA5-R063

App F: Sidescan Sonar Mosaic

Figure Number: 02	Comm No.: 6362179972	Date: 03/02/17

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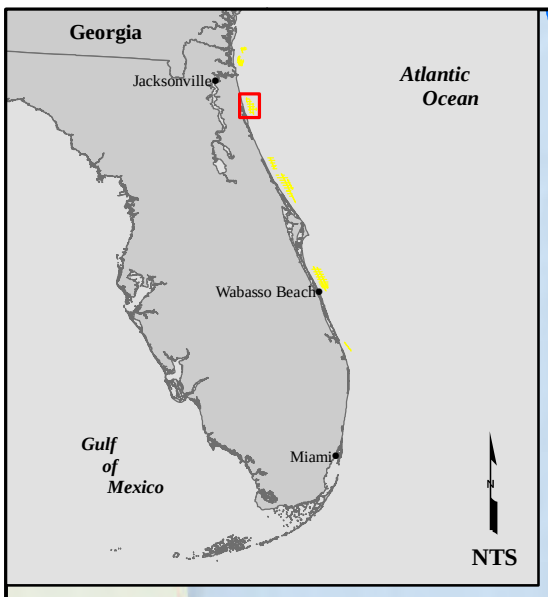

474000

3330000

South Ponte Vedra Beach

3320000

3320000

3310000

3310000

468000

474000

480000

486000

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

- Hardbottom
- Scattered Hardbottom
- Potential Outcrop
- Sand Waves
- Artificial Reefs
- 8 Nautical Miles
- Federal/State Boundary
- Authorized Borrow Areas and Potential Borrow Areas

N

0 1 2

Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

St. Johns County- SJ6-R088

App F: Sidescan Sonar Mosaic

Figure Number: 03	Comm No.: 6362179972	Date: 03/02/17

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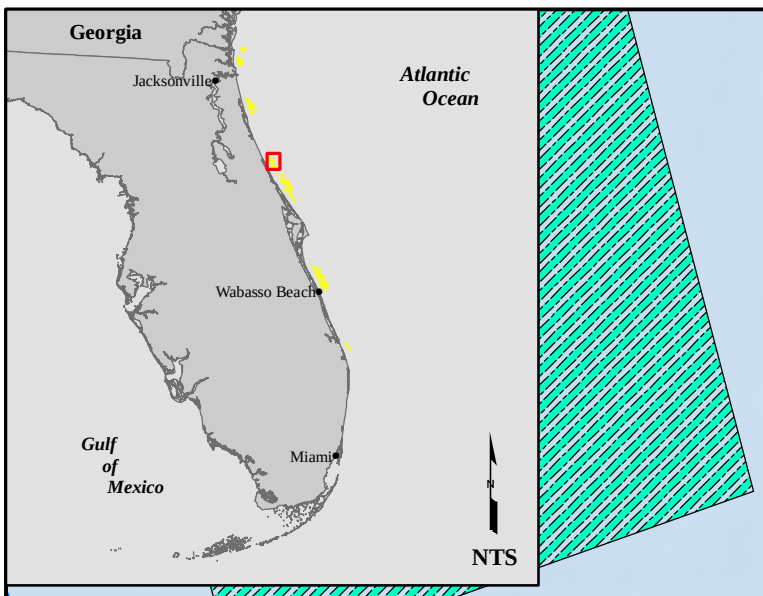

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

- Scattered Hardbottom
- Potential Outcrop
- Sand Waves
- 8 Nautical Miles
- Federal/State Boundary
- Authorized Borrow Areas and Potential Borrow Areas

N

0 0.5 1

Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Volusia County- VO5-R041

App F: Sidescan Sonar Mosaic

Figure Number: 04	Comm No.: 6362179972	Date: 03/02/17

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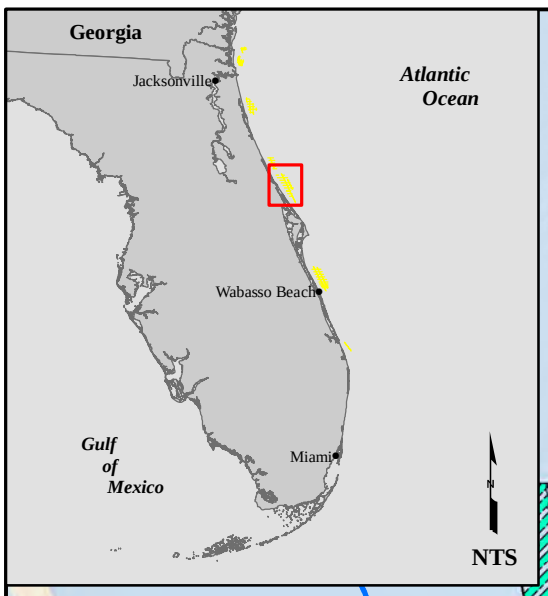

Port Orange

Ponce Inlet

Edgewater

Ariel

Oak Hill

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

- Hardbottom
- Scattered Hardbottom
- Outcrop
- Potential Outcrop
- Sand Waves
- Potential Debris
- Scattered Hardbottom Outcrop
- Potential Mud
- NOAA AWOIS
- Artificial Reefs
- 8 Nautical Miles
- Federal/State Boundary
- ABA and PBAs
- USACE/EPA ODMDS

N

0 1 2

Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Volusia County- VO6-R153

App F: Sidescan Sonar Mosaic

Figure Number: 05	Comm No.: 6362179972	Date: 03/02/17

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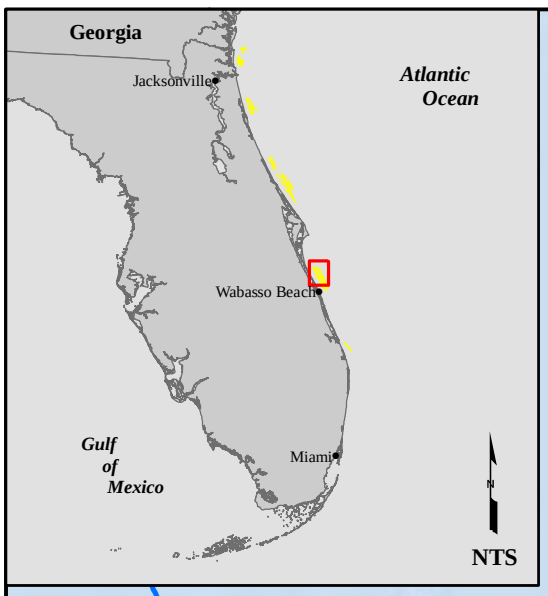

560000

570000

3100000

3090000

Micco

550000

560000

570000

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

- Outcrop
- Potential Outcrop
- Sand Waves
- Scattered Hardbottom Outcrop
- Scattered Hardbottom
- Potential Mud
- 8 Nautical Miles
- Federal/State Boundary
- Cables
- 1km Cable Buffer

N

0 1 2

Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Brevard County- BE7-R166

App F: Sidescan Sonar Mosaic

Figure Number: 06	Comm No.: 6362179972	Date: 03/02/17

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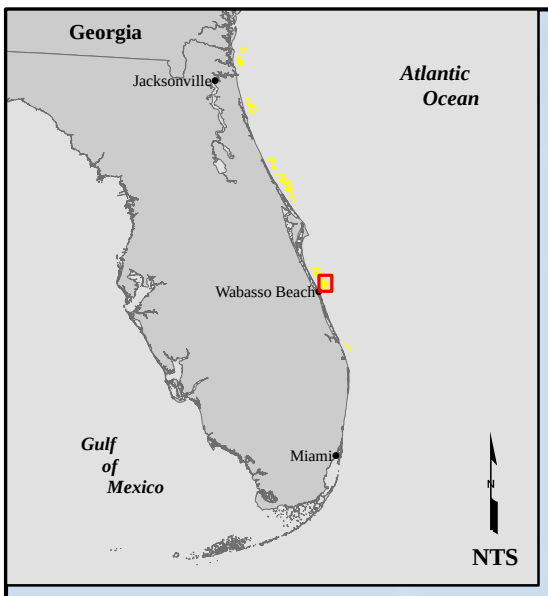

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

- Hardbottom
- Outcrop
- Potential Outcrop
- Sand Waves
- Scattered Hardbottom Outcrop
- Scattered Hardbottom
- Potential Mud
- 8 Nautical Miles
- Federal/State Boundary
- Cables
- 1km Cable Buffer

N

0 0.5 1

Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Indian River County- IR6-R002

App F: Sidescan Sonar Mosaic

Figure Number: 07	Comm No.: 6362179972	Date: 03/02/17

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Fax (727) 565-4659
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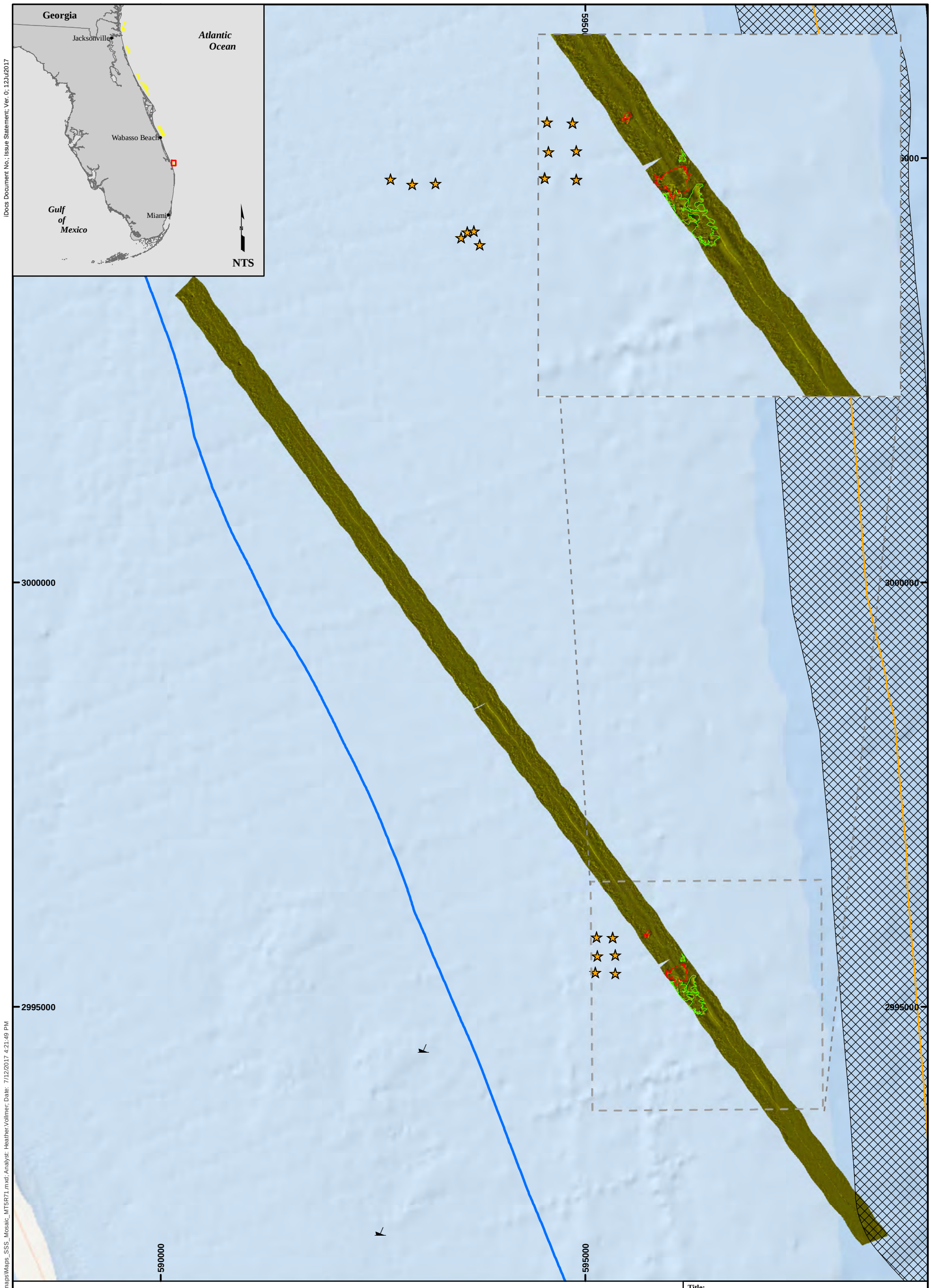

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

- Hardbottom
- Sand Waves
- NOAA AWOIS
- Artificial Reefs
- 8 Nautical Miles
- Federal/State Boundary
- Cables
- 1km Cable Buffer

N

0 0.5 1

Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Martin County- MI5-R071

App F: Sidescan Sonar Mosaic

Figure Number: 08	Comm No.: 6362179972	Date: 03/02/17

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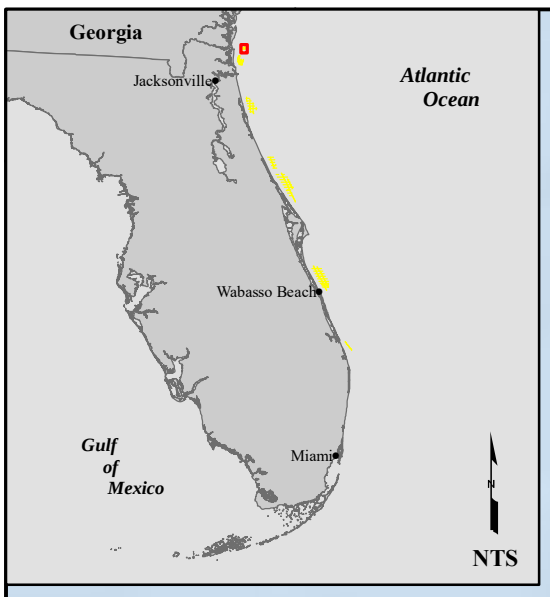
APPENDIX G

Sidescan Sonar Contacts and Magnetic Anomalies Map Series



470000 472000 474000

3402000

Georgia

059-6-nm-22.04g-17.63m
059-5-nm-9.41g-13.14m
118
117

3399000

061-1-nm-60.77g-22.17m
101
102
059-4-mc-21.61g-45.81m
058-1-pm-14.00g-15.84m
103
059-3-dp-28.07g-24.21m
059-2-dp-34.60g-23.42m
059-1-dp-48.72g-29.76m
115
114
113
112
111
119
057-3-dp-40.91g-43.41m
116
060-1-dp-15.67g-14.25m
109
107
110
108

3396000

057-2-nm-9.23g-42.00m
100
104
099
105
106
098
097
057-1-dp-6.98g-48.26m

3393000

468000 470000 472000 474000

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop
- NOAA AWOIS
- State Offshore Administrative Boundary
- Federal/State Boundary
- USACE/EPA ODMDS

N

0 0.5 1
Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Nassau County- NA7-R009

App G: Sidescan and Magnetometer Targets

Figure Number: 01	Comm No.: 6362179972	Date: 03/02/17

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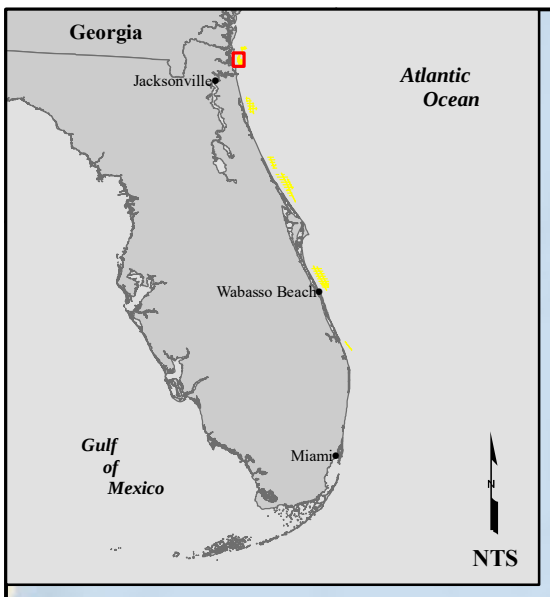

iDocs Document No.; Issue Statement; Ver. 0; 07Jun2017

465000
470000
3390000
3385000
3380000
3375000
460000

056-1-dp-5.48g-8.25m
056-2-pm-5.73g-10.38m
093
046-3-pm-26.94g-8.10m
046-2-dp-4.13g-8.88m
046-1-pm-7.85g-8.59m
095
094
096
054-5-mc-3.11g-17.45m
054-4-mc-4.35g-17.35m
054-3-mc-3.26g-16.95m
054-2-mc-3.55g-9.89m
054-1-mc-3.18g-13.71m
092
091
089
047-2-mc-6.39g-15.84m
047-1-dp-7.64g-5.94m
088
087
053-1-dp-29.35g-31.67m
048-1-mc-7.81g-32.67m
090
048-2-dp-7.56g-23.90m
048-3-mc-18.53g-27.35m
049-1-pm-10.18g-21.01m

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)

- <150

Sidescan Sonar Contacts

- Potential Debris
- Potential Outcrop
- NOAA AWOIS
- Federal/State Boundary
- USACE/EPA Offshore Dredge Material Disposal Site

N

0 0.5 1

Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Nassau County- NA5-R063

App G: Sidescan and Magnetometer Targets

Figure Number: 02	Comm No.: 6362179972	Date: 03/02/17

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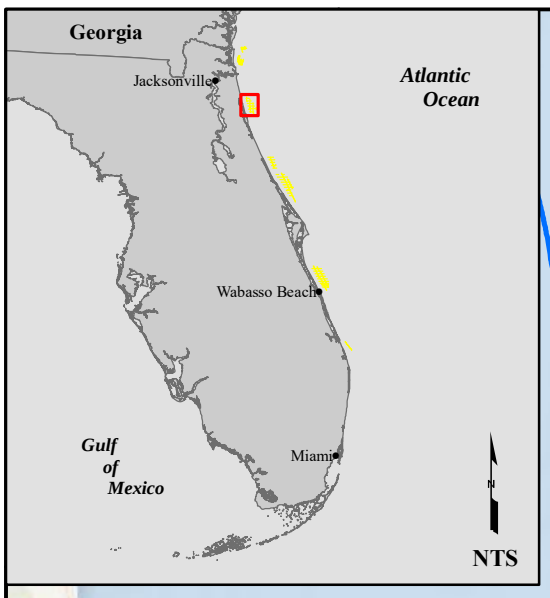
G:\Enterprise\FDEP\6362179972_FDEP_BOEM_ASAP_Processing\maps\Maps_SSS_MagTargets_NA5r063.mxd; Analyst: Heather.Vollmer; Date: 6/7/2017 4:07:56 PM



475000
480000
485000
3330000
3320000
3310000
470000

130
036-1-pm-17.02g-45.14m
129
128
042-1-pm-3.40g-30.13m
126
127
125
South Ponte Vedra Beach
041-1-nm-297.27g-21.03m
080
076
077
079
078
086
085
083
084
081
037-2-mc-6.57g-23.08m
039-2-nm-188.43g-3.25m
039-1-nm-34.00g-2.91m
037-1-pm-4.55g-13.76m
039-3-nm-5922.4g-2.94m
Vilano Beach
082

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150
- >150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop
- Potential Rocks
- Potential buried debris

- 8 Nautical Miles
- Federal/State Boundary
- ABA and PBAs

N

0 1 2
Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

St. Johns County- SJ6-R088

App G: Sidescan and Magnetometer Targets

Figure Number: 03	Comm No.: 6362179972	Date: 03/02/17

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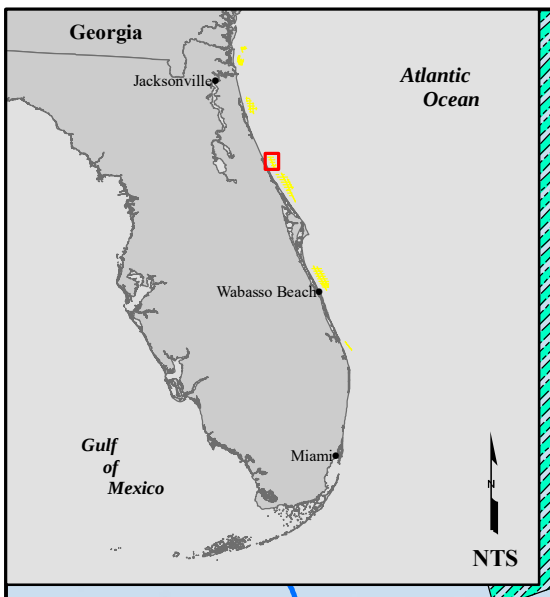

500000

510000

3250000

123 124

029-2-mp-3.52g-39.63m

068

069
071
070
066
067
064
065
072
073
074

063

075

059 060
058
061
062

3240000

500000

510000

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)

- <150

Sidescan Sonar Contacts

- Potential Debris
- Potential Outcrop
- 8 Nautical Miles
- Federal/State Boundary
- Authorized Borrow Areas and Potential Borrow Areas

N

0 0.5 1

Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Volusia County- VO5-R041

App G: Sidescan and Magnetometer Targets

Figure Number: 04	Comm No.: 6362179972	Date: 03/02/17

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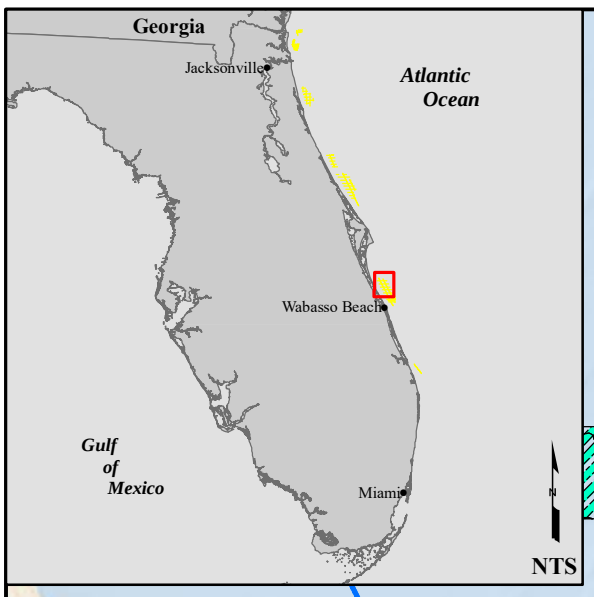

038
037
036
050
048
045
049
047
046
035
034
031
030
014-1-pm-13.56g-12.10m
032
014-3-nm-10.74g-15.01m
014-2-pm-9.96g-11.81m
057
056
055
023-1-pm-5.55g-22.50m
033
023-2-dp-10.09g-23.61m
054
022-1-dp-8.71g-26.20m
Ponce Inlet
021-1-nm-11.03g-32.37m
122
053
014-nm-29.75g-5.83m
020-1-dp-8.45g-55.72m
020-2-nm-5.87g-18.86m
042
043
051
052
041
040
039
Edgewater
017-1-dp-6.89g-18.32m
044
Ariel
Oak Hill

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop
- NOAA AWOIS
- Artificial Reefs
- 8 Nautical Miles
- Federal/State Boundary
- ABA and PBAs
- USACE/EPA ODMDS

N

0 1.5 3
Kilometers

Title:
BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Volusia County- VO6-R153

App G: Sidescan and Magnetometer Targets

Figure Number: 05	Comm No.: 6362179972	Date: 03/02/17

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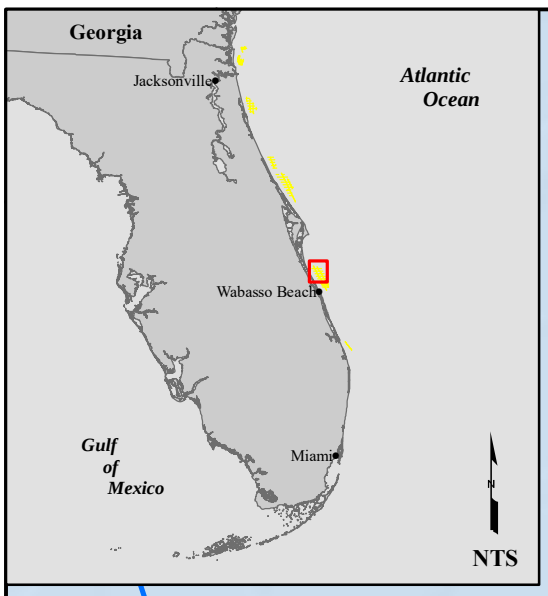

560000

3110000

023 024 022 025 027 029 026 028

002-10-mc-8.72g-30.75m

016 017 015 013 014 019 018 020 021

002-9-mc-15.15g-70.08m

002-8-mc-45.48g-90.57m

002-7-mc-11.2g-51.5m

3100000

012-2-dp-5.36g-11.20m 011

012-1-dp-3.95g-17.15m 012 010

002-6-nm-49.67g-66.01m

002-5-mc-14.77g-53.82m

009

002-4-mc-15.5g-49.00m

008

3090000

120

Micco

550000

560000

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)

<150

Sidescan Sonar Contacts

Potential Debris

8 Nautical Miles

Federal/State Boundary

Cables

1km Cable Buffer

N

0 1 2

Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Brevard County- BE7-R166

App G: Sidescan and Magnetometer Targets

Figure Number: 06	Comm No.: 6362179972	Date: 03/02/17

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Fax (727) 565-4659
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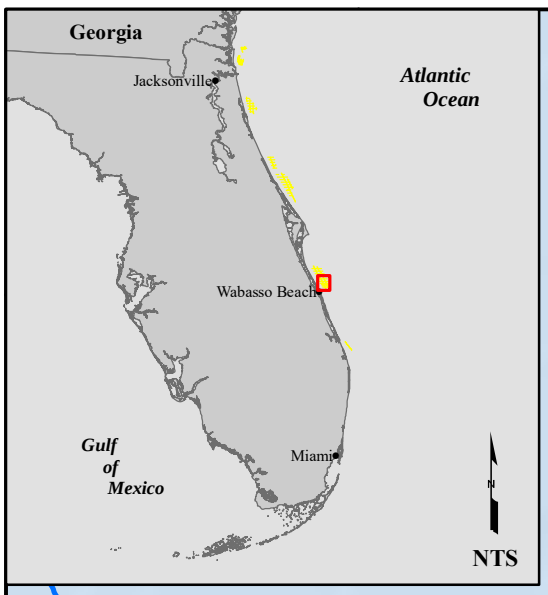


565000
570000
3090000
3080000
560000

003-1-mc-17.89g-73.94m
003-2-mc-16.50g-46.92m
002-2-nm-11.23g-38.32m
002-3-dp-11.45g-37.47m
003
007
006
005
004
003-3-mc-37.88g-43.31m
003-4-dp-23.59g-30.75m
002
121
001
Windsor
002-1-mc-64.49g-82.080m

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop
- Potential cable and/or anchor line.

- NOAA AWOIS
- 8 Nautical Miles
- Federal/State Boundary
- Cables
- 1km Cable Buffer

N

0 0.5 1
Kilometers

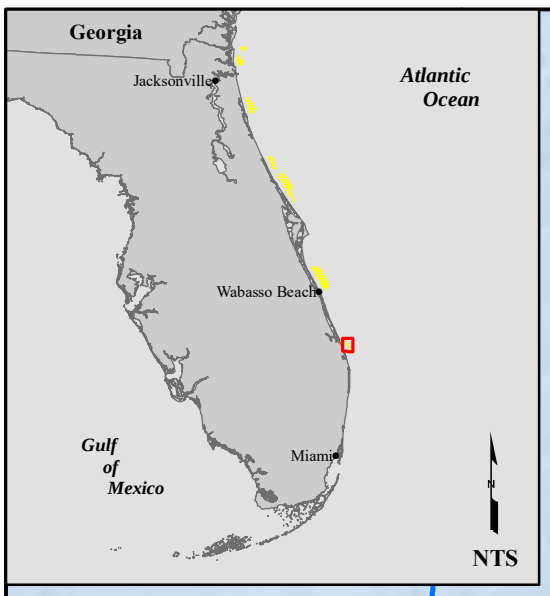
Title:
BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Indian River County- IR6-R002

App G: Sidescan and Magnetometer Targets

Figure Number: 07	Comm No.: 6362179972	Date: 03/02/17

CBI
101 16th Ave. South, Suite 6
St. Petersburg, FL, 33701
Ph. (727) 565-4660
Fax (727) 565-4659
www.CBI.com



001-1-mc-78.65g-69.50m

595000
3005000
3000000
2995000
590000

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)

- <150
- NOAA AWOIS
- Artificial Reefs
- 8 Nautical Miles
- Federal/State Boundary
- Cables
- 1km Cable Buffer

N

0 0.5 1

Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Martin County- MI5-R071

App G: Sidescan and Magnetometer Targets

Figure Number: 08	Comm No.: 6362179972	Date: 03/02/17

101 16th Ave. South, Suite 6
St. Petersburg, FL, 33701
Ph. (727) 565-4660
Fax (727) 565-4659
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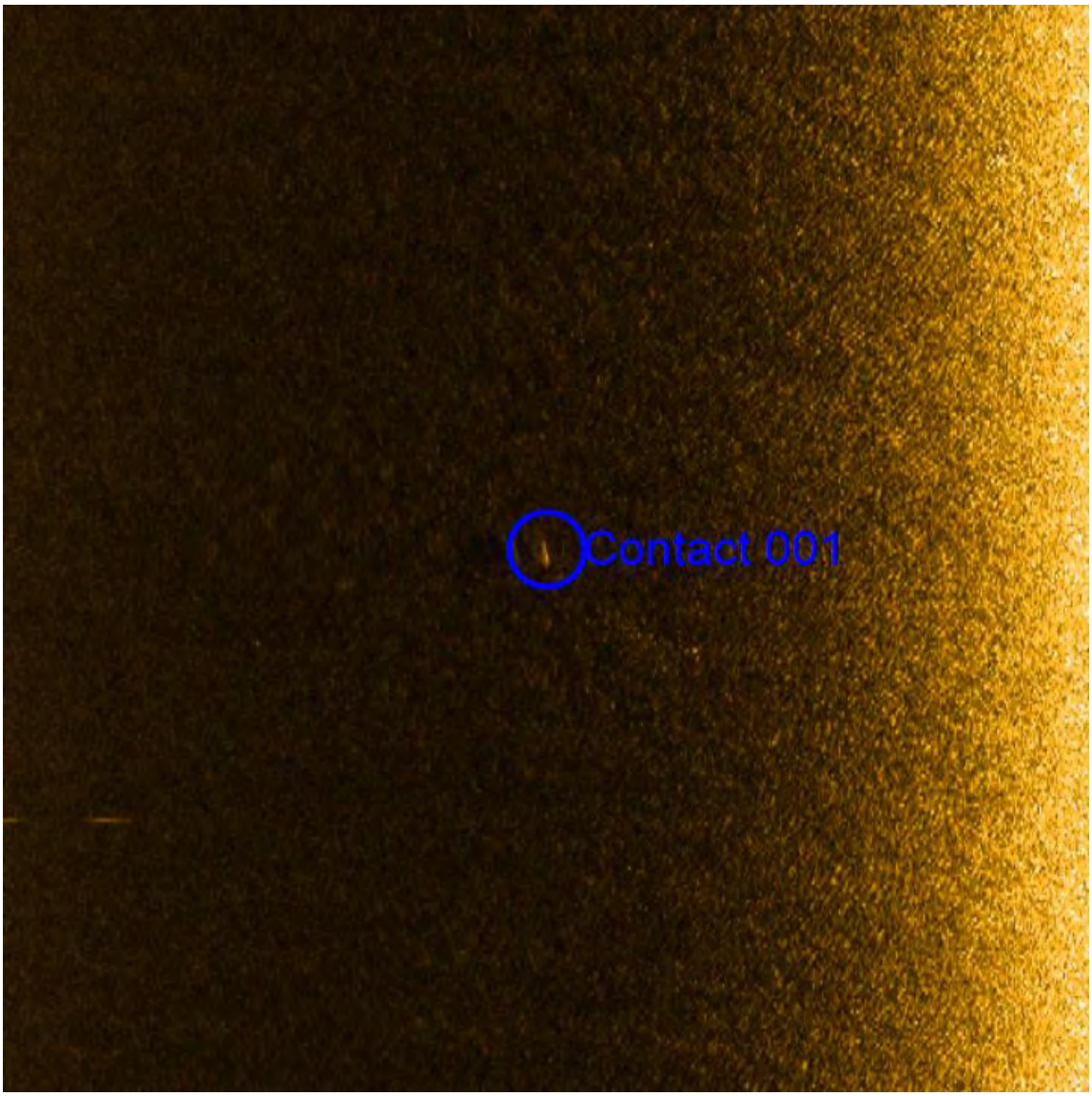
APPENDIX H

Sidescan Sonar Contact Report

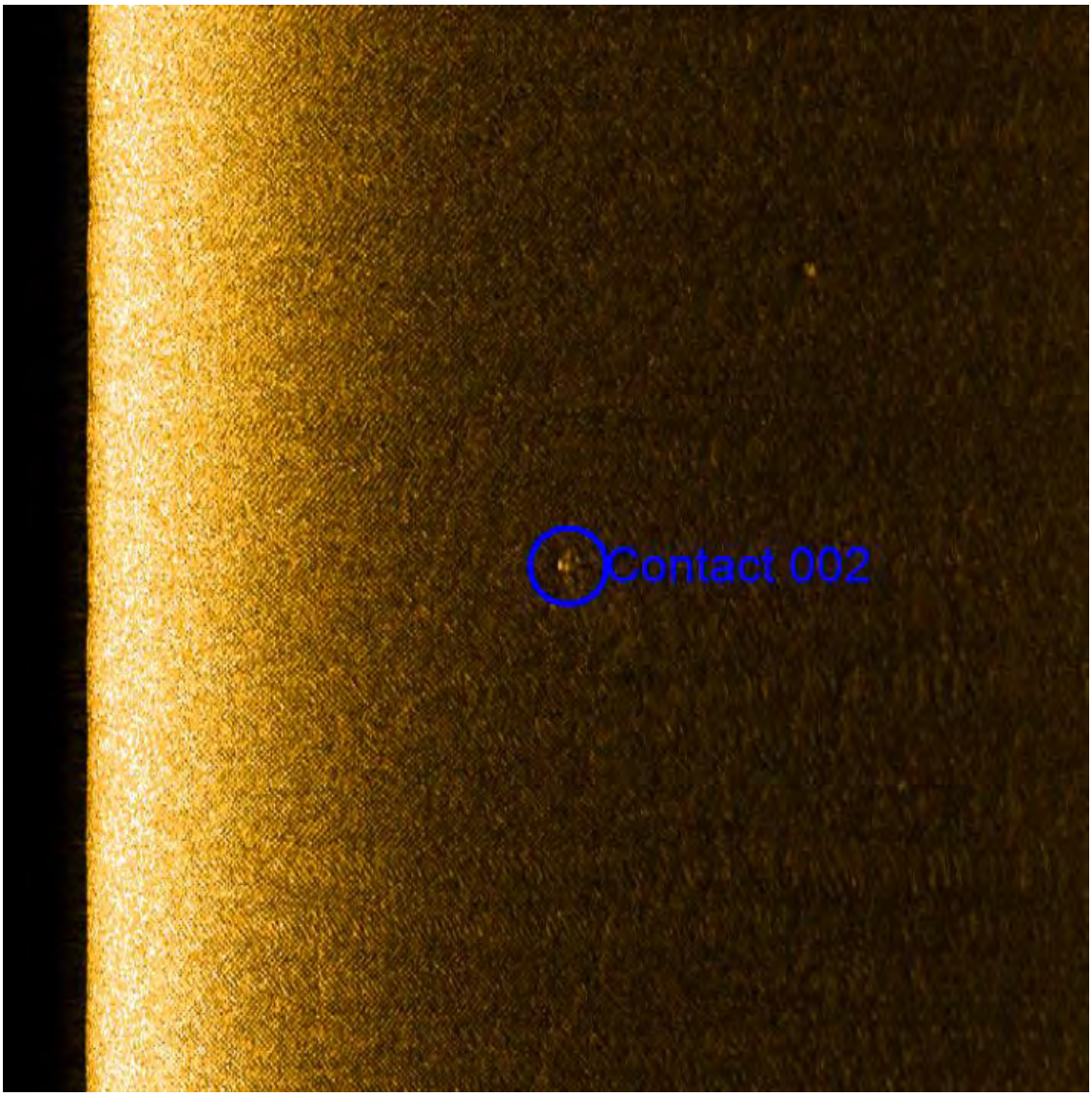


Contact 001

- Sonar Time at Target: 4/21/2015 3:06:39 PM
- Click Position
  27.8325316371 -80.3043048219 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_005.001.jsf
- Ping Number: 78461
- Range to target: 81.72 Meters
- Heading: 83.890 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_005.001

Dimensions and attributes

- Target Width: 0.67 Meters
- Target Height: 0.00 Meters
- Target Length: 3.13 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

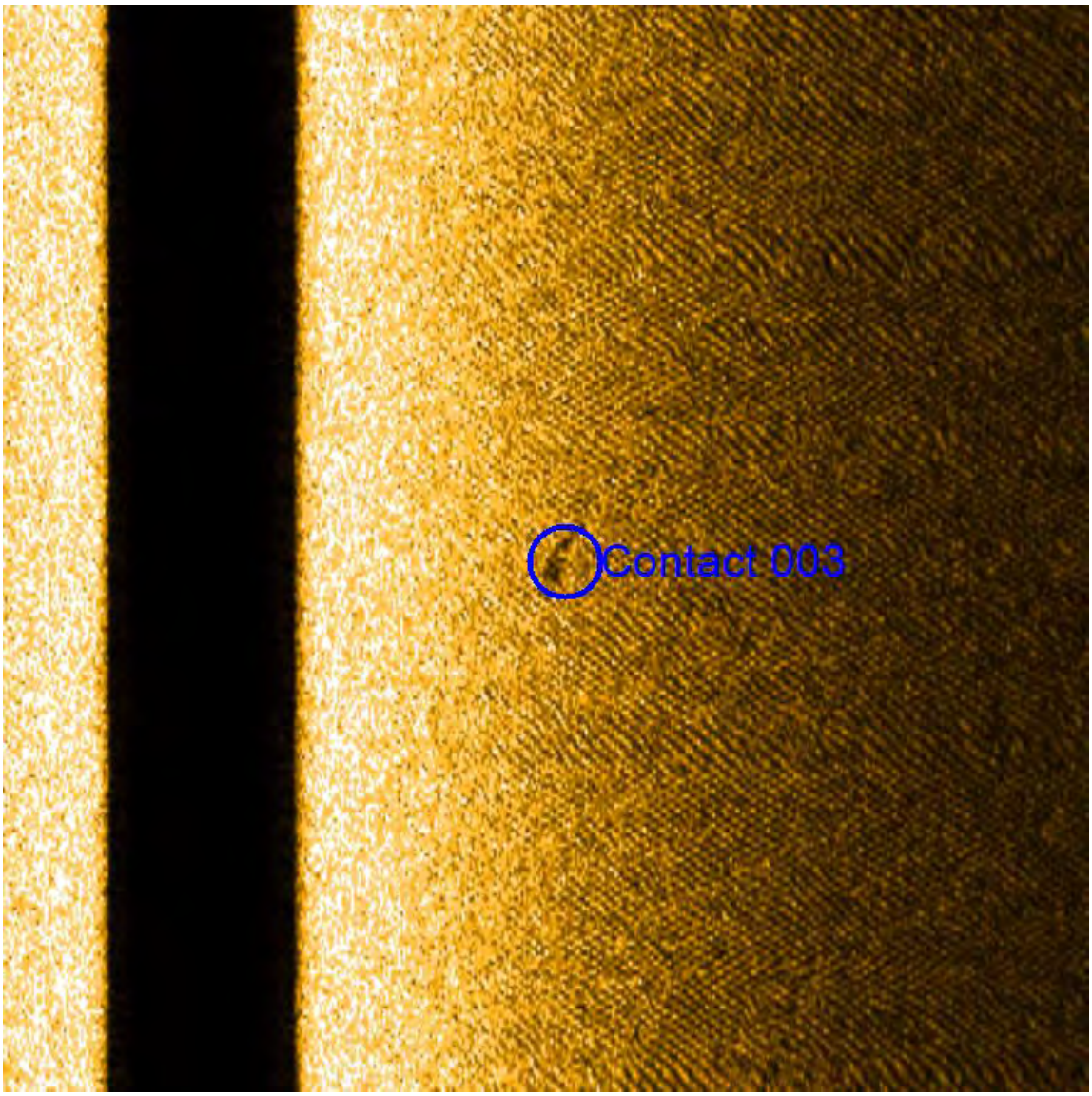


Contact 002

- Sonar Time at Target: 4/21/2015 5:17:16 PM
- Click Position
  27.8633368517 -80.3503351722 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_007.001.jsf
- Ping Number: 115037
- Range to target: 77.76 Meters
- Heading: 85.290 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_007.001

Dimensions and attributes

- Target Width: 3.60 Meters
- Target Height: 0.00 Meters
- Target Length: 6.34 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

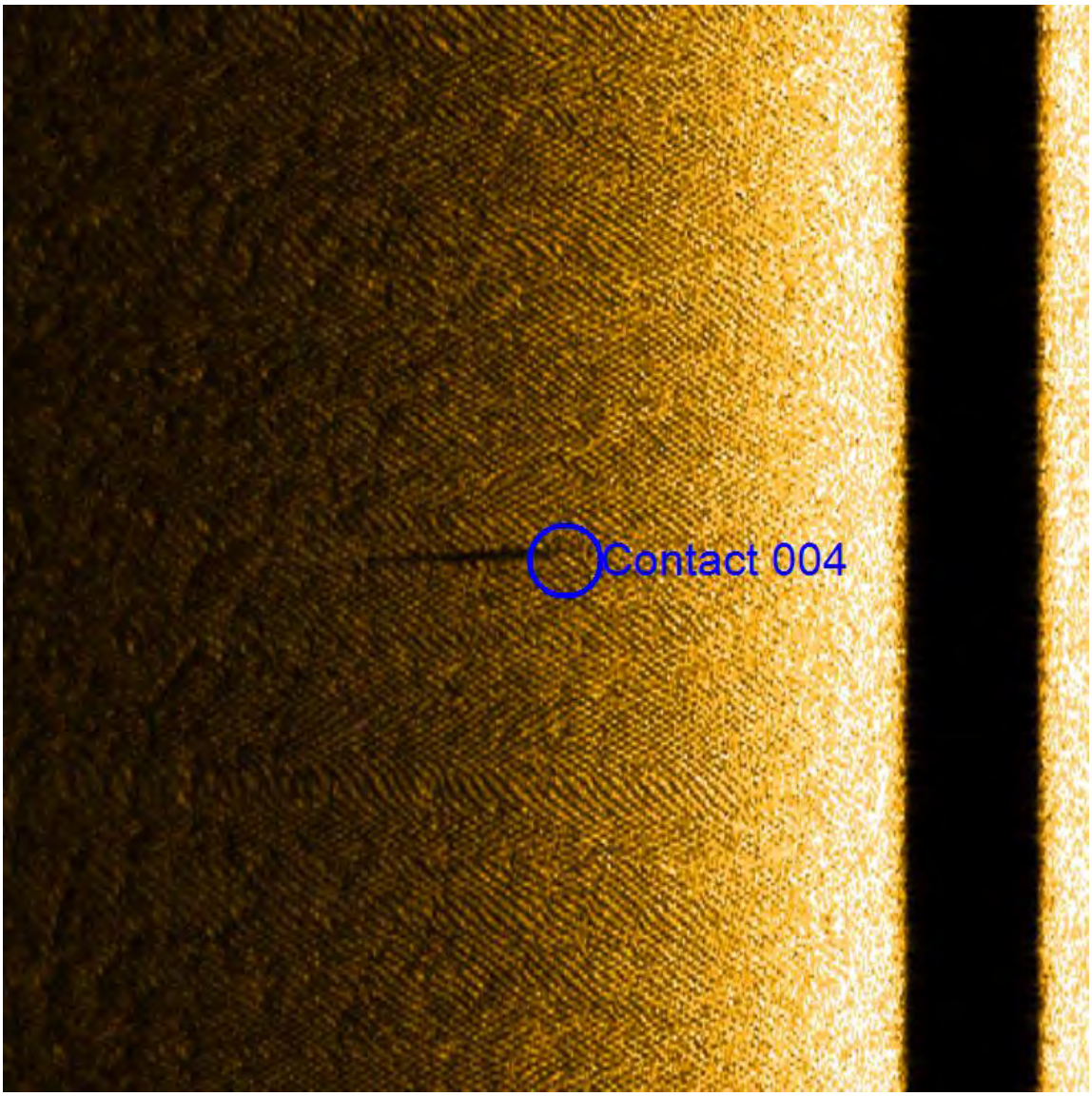


Contact 003

- Sonar Time at Target: 4/21/2015 6:49:10 PM
- Click Position
  27.8805873033 -80.3204063685 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_008.jsf
- Ping Number: 140776
- Range to target: 29.80 Meters
- Heading: 283.590 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_008

Dimensions and attributes

- Target Width: 1.92 Meters
- Target Height: 0.00 Meters
- Target Length: 4.61 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

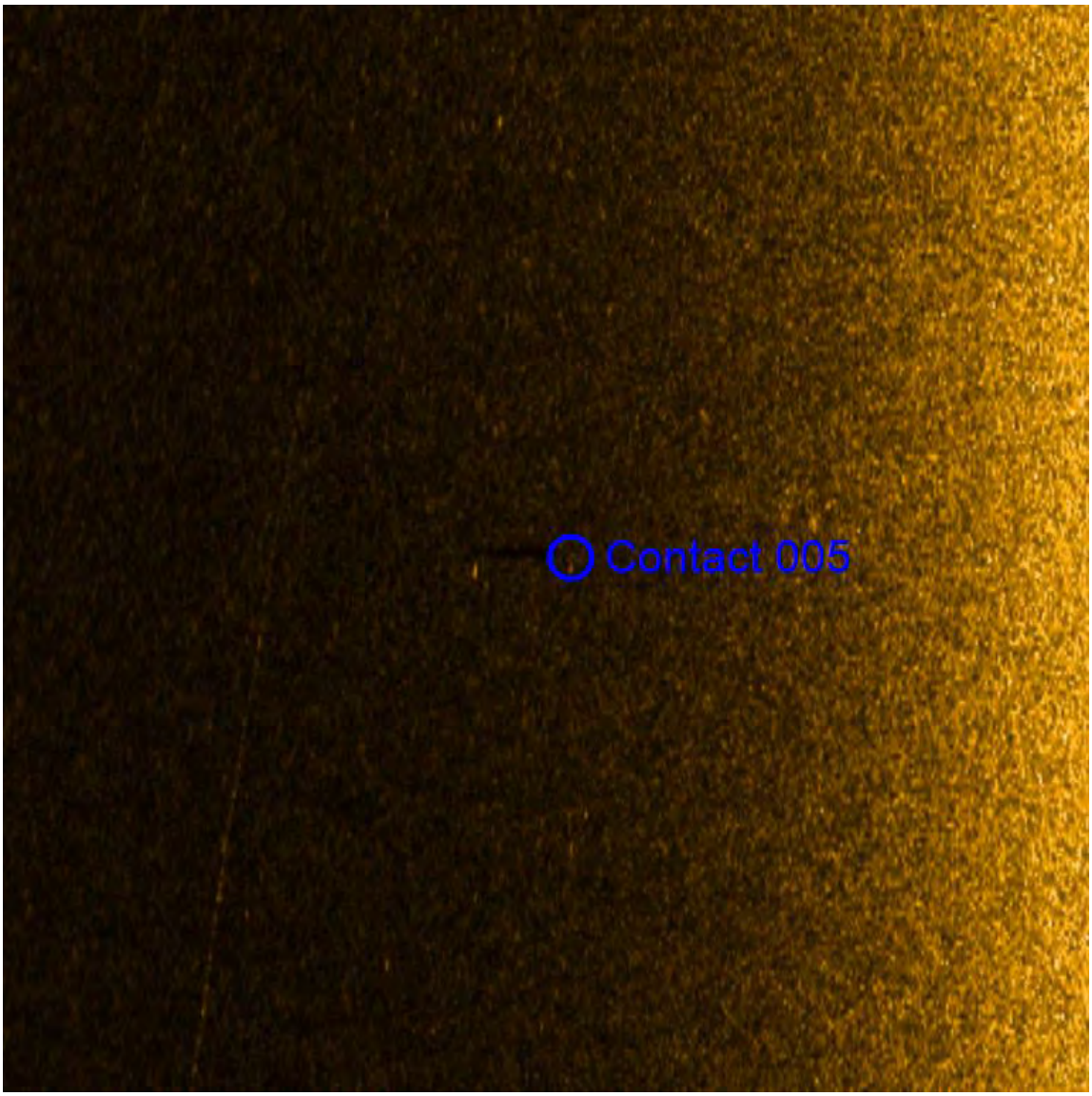


Contact 004

- Sonar Time at Target: 4/21/2015 7:04:41 PM
- Click Position
  27.8799438689 -80.3388326869 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_008.001.jsf
- Ping Number: 145119
- Range to target: 38.55 Meters
- Heading: 281.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_008.001

Dimensions and attributes

- Target Width: 1.90 Meters
- Target Height: 1.99 Meters
- Target Length: 1.07 Meters
- Target Shadow: 18.04 Meters
- Classification1: debris
- Description: Potential Debris

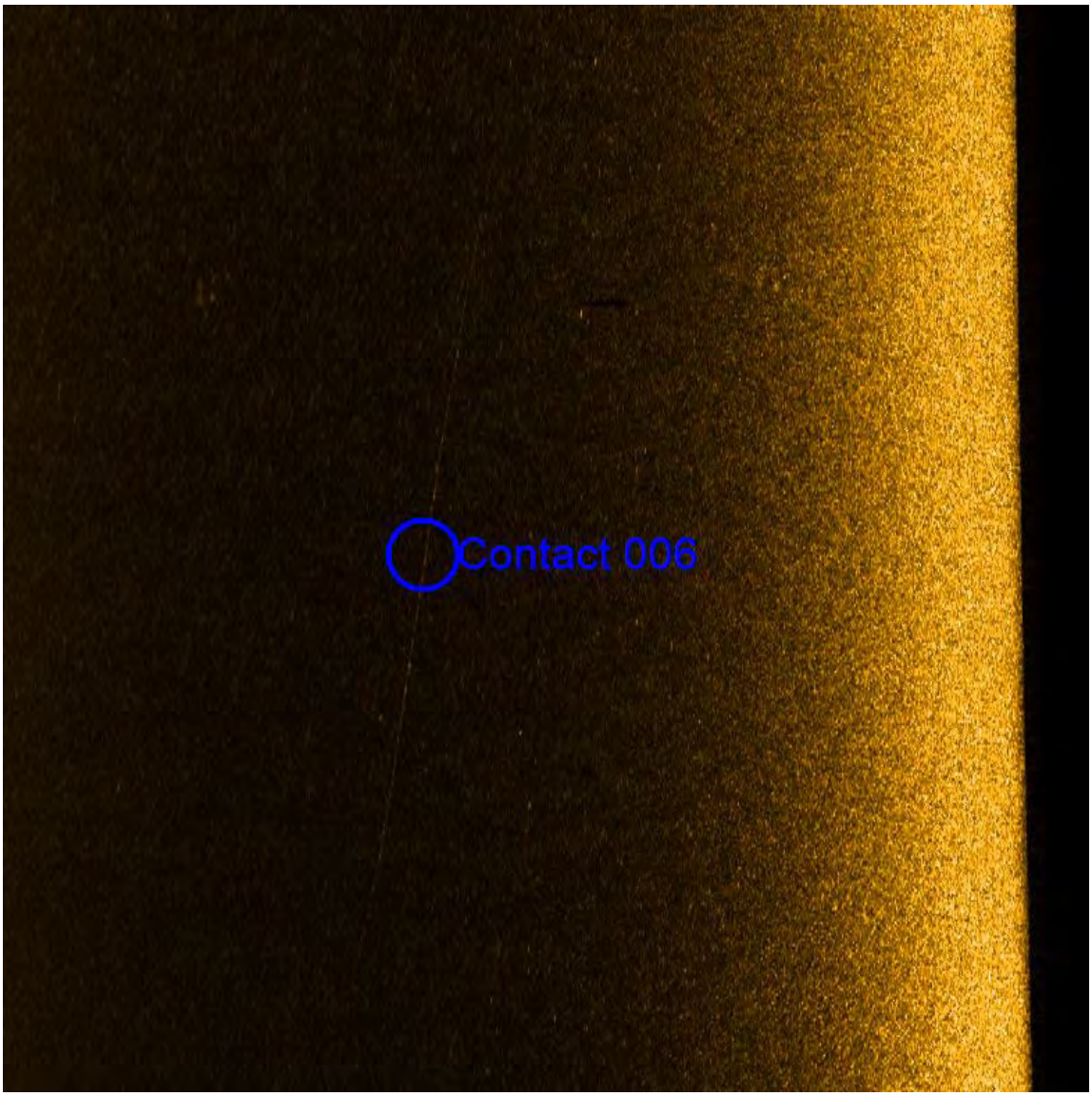


Contact 005

- Sonar Time at Target: 4/21/2015 7:41:00 PM
- Click Position
  27.8795190326 -80.3817317071 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_008.002.jsf
- Ping Number: 155293
- Range to target: 65.85 Meters
- Heading: 278.090 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_008.002

Dimensions and attributes

- Target Width: 0.83 Meters
- Target Height: 0.95 Meters
- Target Length: 1.66 Meters
- Target Shadow: 6.66 Meters
- Classification1: debris
- Description: Potential Debris

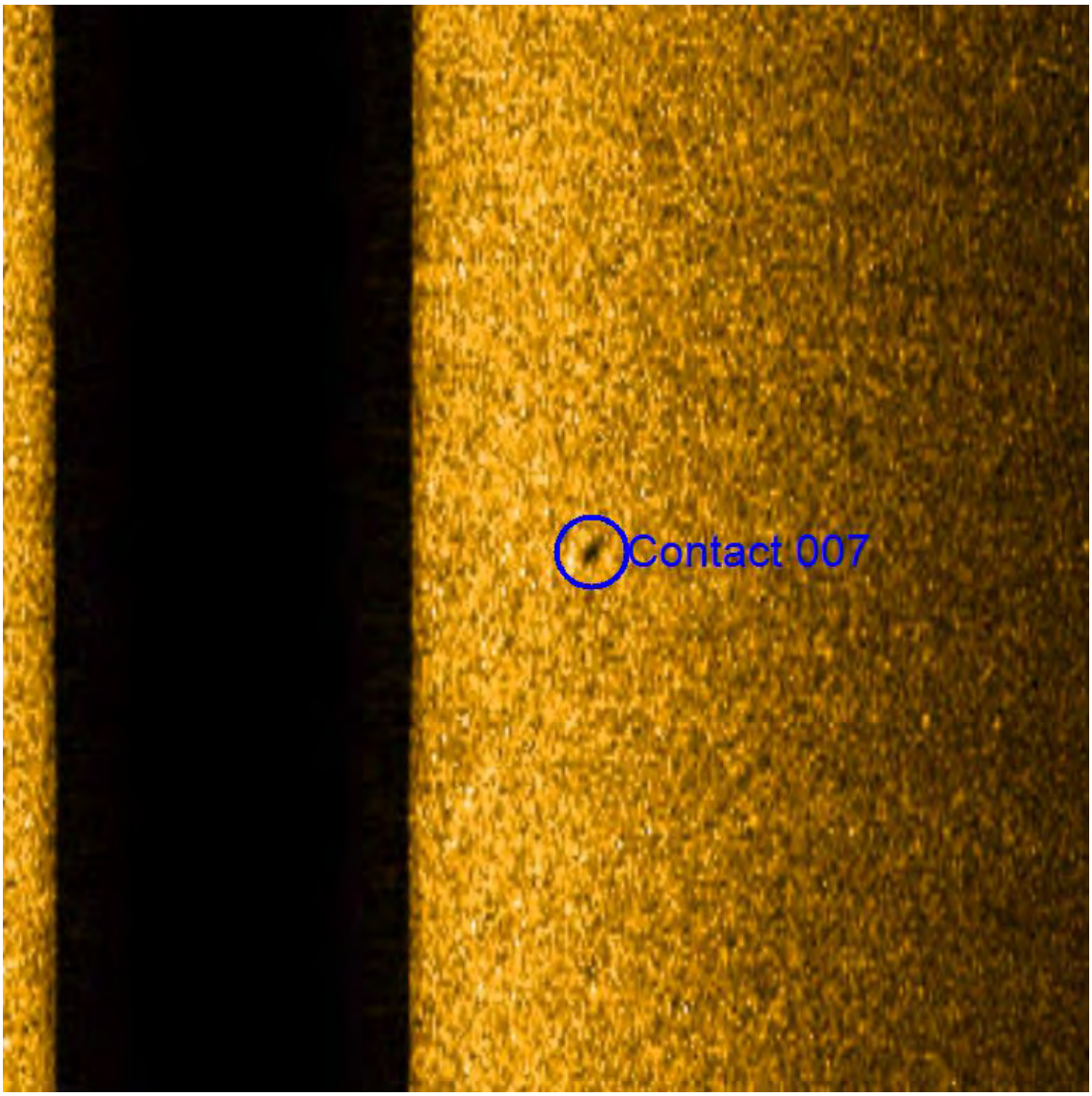


Contact 006

- Sonar Time at Target: 4/21/2015 7:41:19 PM
- Click Position
  27.8792189245 -80.3819986086 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_008.002.jsf
- Ping Number: 155381
- Range to target: 97.44 Meters
- Heading: 277.090 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_008.002

Dimensions and attributes

- Target Width: 0.29 Meters
- Target Height: 0.00 Meters
- Target Length: 87.82 Meters
- Target Shadow: 0.00 Meters
- Classification1: cable
- Description: Potential cable and/or anchor line.

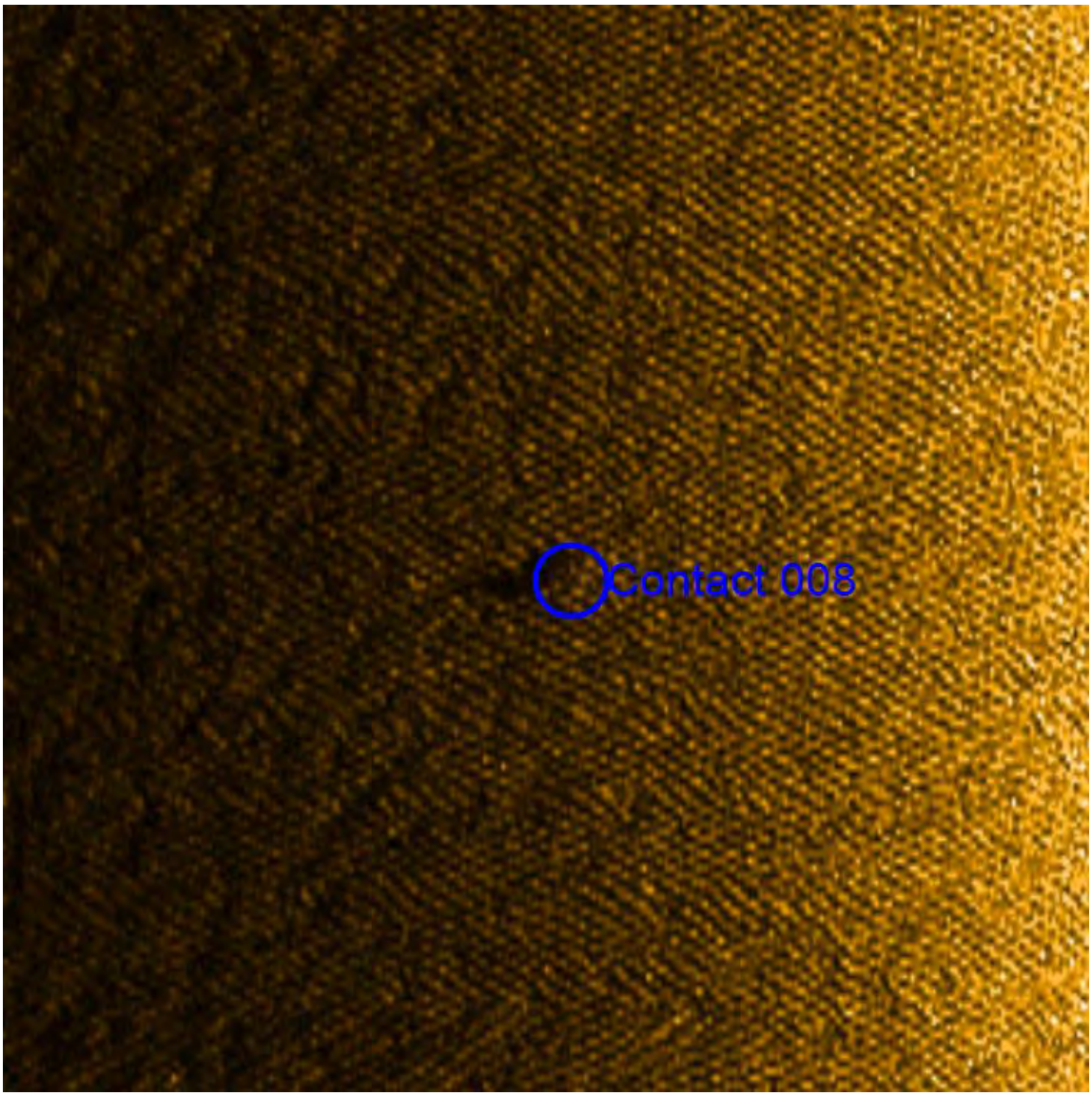


Contact 007

- Sonar Time at Target: 4/21/2015 7:40:04 PM
- Click Position
  27.8803083271 -80.3806357158 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_008.002.jsf
- Ping Number: 155030
- Range to target: 19.38 Meters
- Heading: 283.090 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_008.002

Dimensions and attributes

- Target Width: 0.83 Meters
- Target Height: 0.69 Meters
- Target Length: 1.86 Meters
- Target Shadow: 1.45 Meters
- Classification1: debris
- Description: Potential Debris

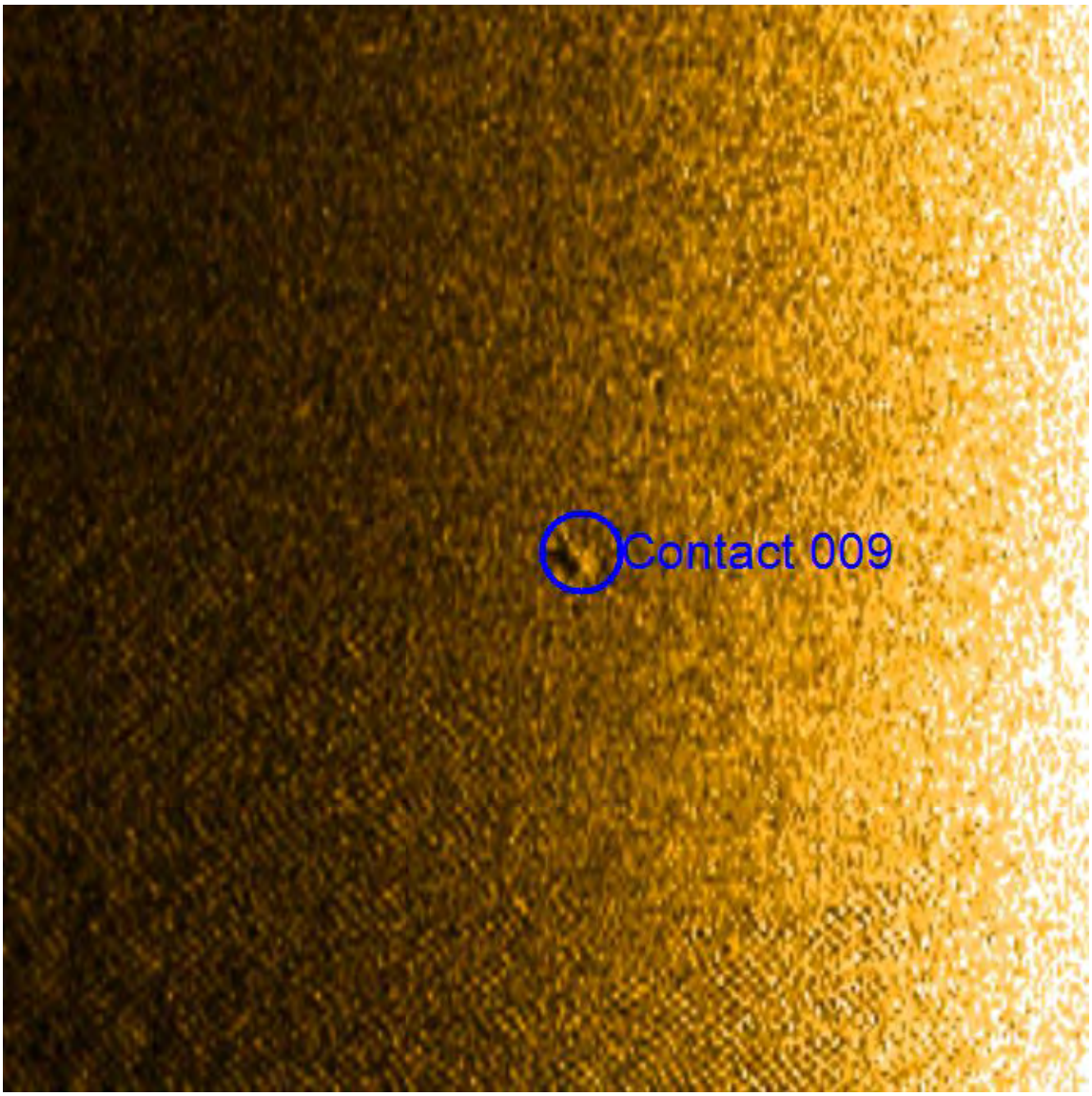


Contact 008

- Sonar Time at Target: 4/22/2015 10:57:40 AM
- Click Position
  27.9444728472 -80.3646783572 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_010.001.jsf
- Ping Number: 50781
- Range to target: 49.91 Meters
- Heading: 281.800 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_010.001

Dimensions and attributes

- Target Width: 1.06 Meters
- Target Height: 0.47 Meters
- Target Length: 1.71 Meters
- Target Shadow: 4.88 Meters
- Classification1: debris
- Description: Potential Debris

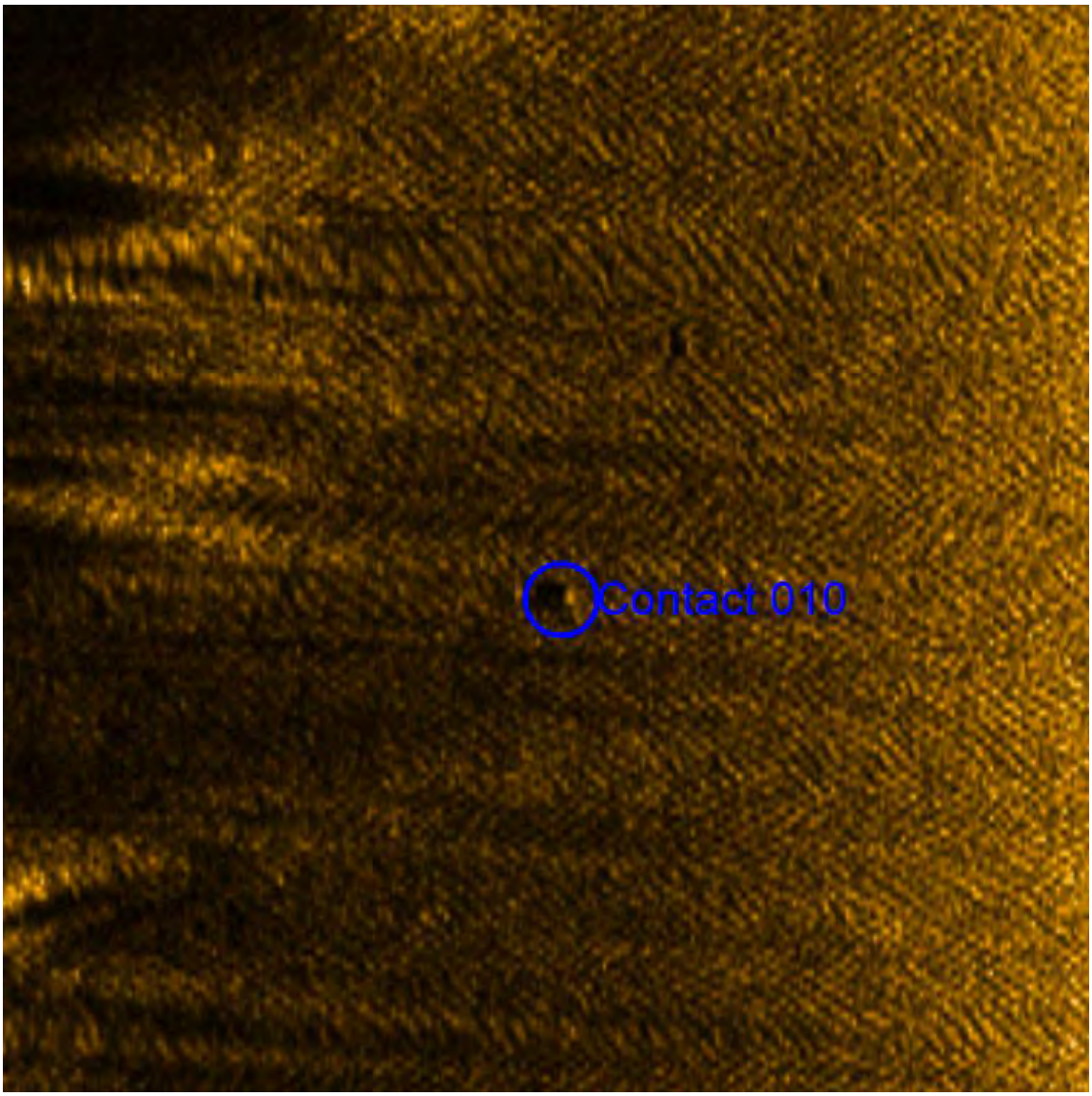


Contact 009

- Sonar Time at Target: 4/22/2015 4:00:49 PM
- Click Position
  27.9773013636 -80.4419249194 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_011.jsf
- Ping Number: 135209
- Range to target: 42.15 Meters
- Heading: 89.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_011

Dimensions and attributes

- Target Width: 1.41 Meters
- Target Height: 0.15 Meters
- Target Length: 2.97 Meters
- Target Shadow: 1.16 Meters
- Classification1: debris
- Description: Potential Debris

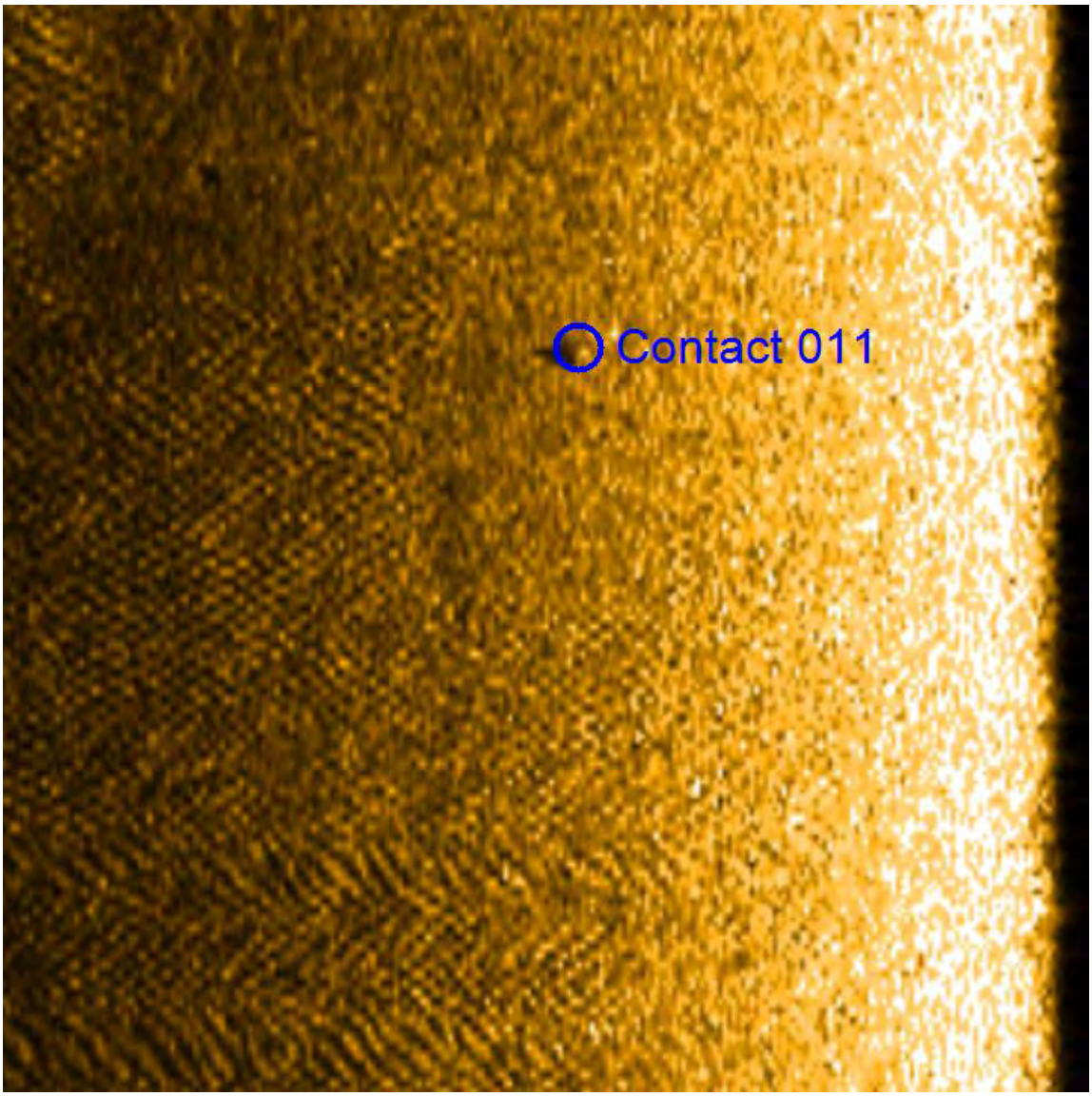


Contact 010

- Sonar Time at Target: 4/22/2015 5:54:51 PM
- Click Position
  28.0090339028 -80.3796462606 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_012.jsf
- Ping Number: 167144
- Range to target: 65.04 Meters
- Heading: 285.300 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_012

Dimensions and attributes

- Target Width: 0.64 Meters
- Target Height: 0.00 Meters
- Target Length: 2.37 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

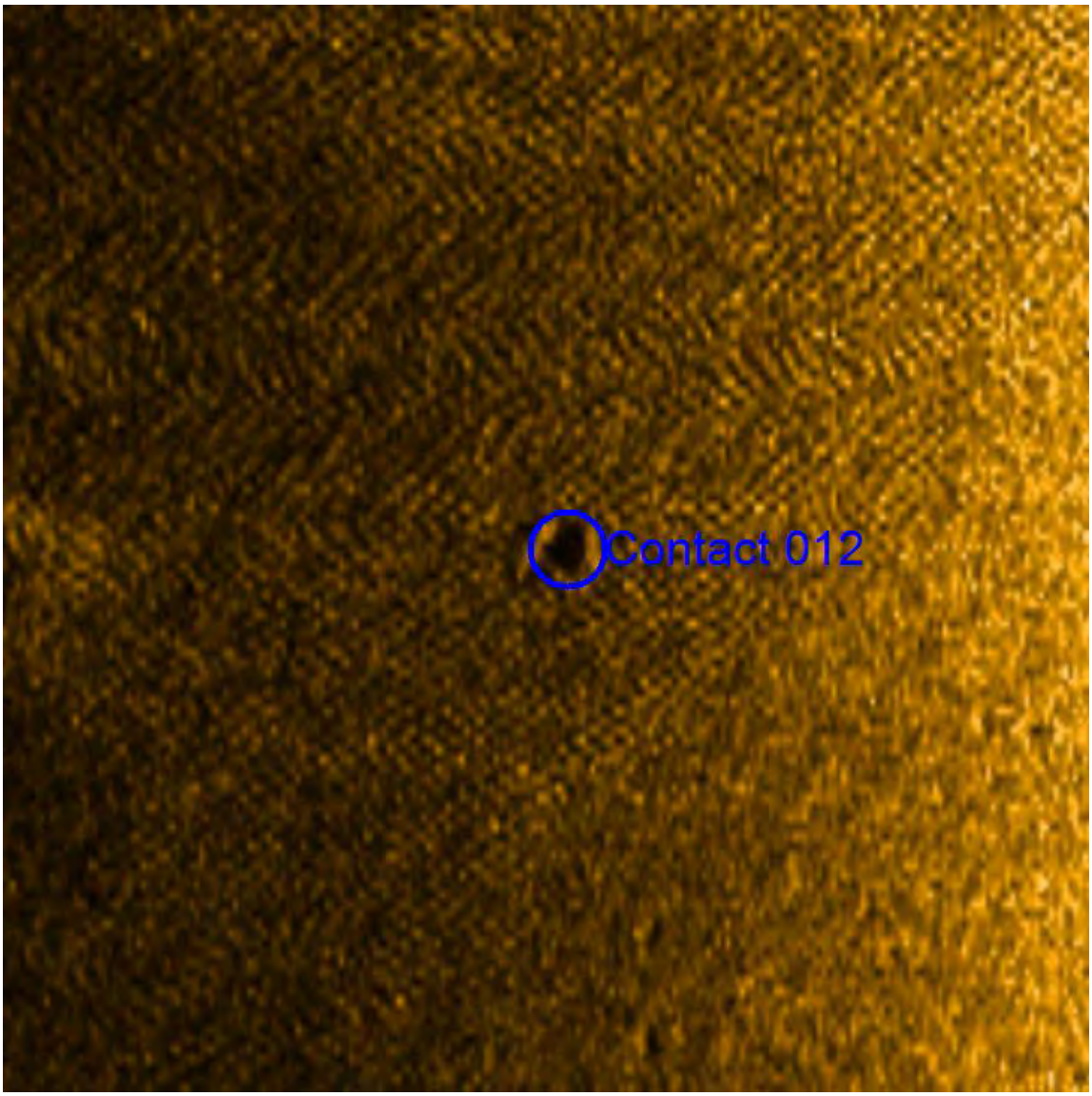


Contact 011

- Sonar Time at Target: 4/22/2015 6:34:49 PM
- Click Position
  28.0092270768 -80.4293965012 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_012.002.jsf
- Ping Number: 178337
- Range to target: 28.40 Meters
- Heading: 284.690 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_012.002

Dimensions and attributes

- Target Width: 0.89 Meters
- Target Height: 0.33 Meters
- Target Length: 0.89 Meters
- Target Shadow: 1.78 Meters
- Classification1: debris
- Description: Potential Debris

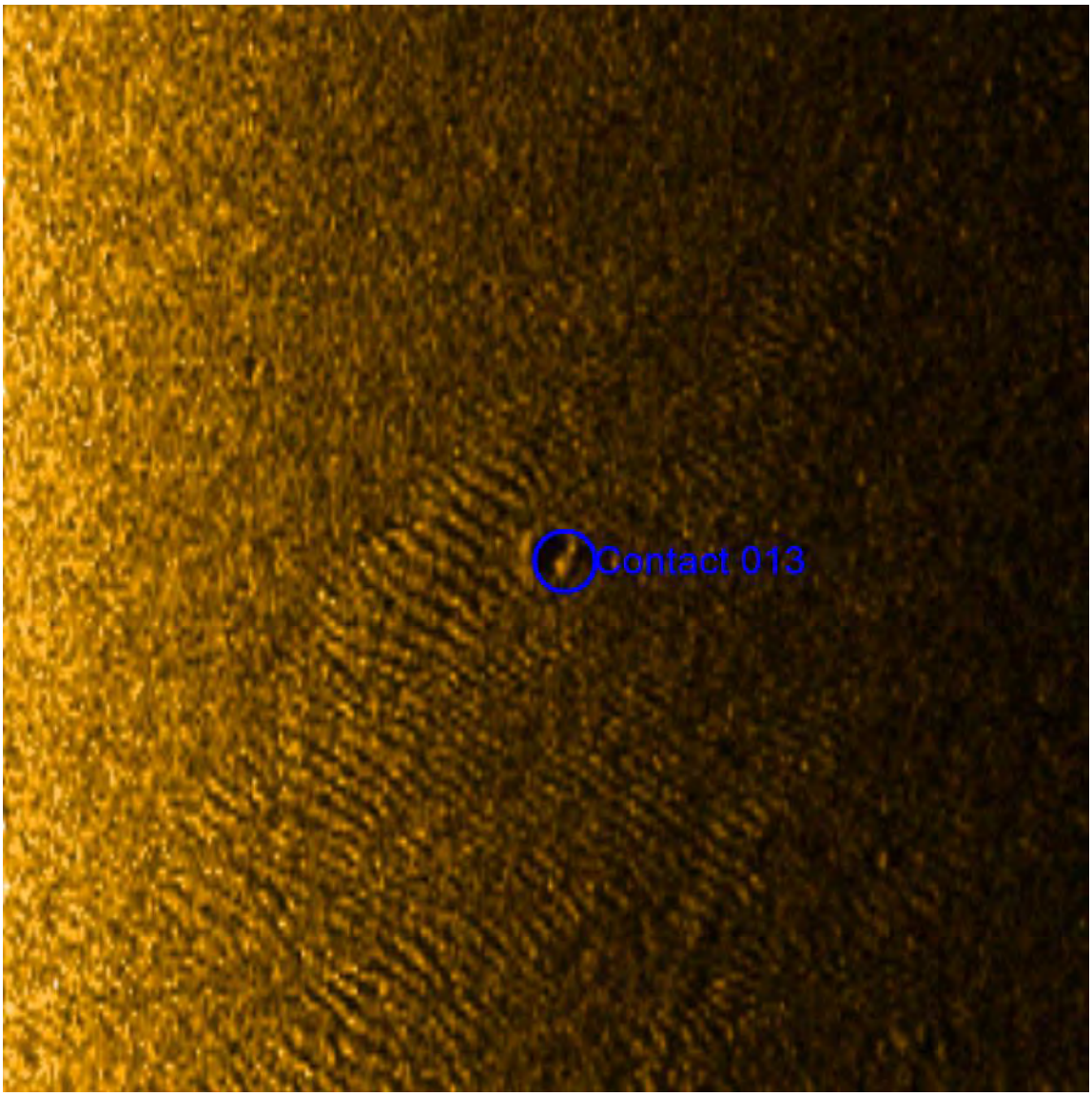


Contact 012

- Sonar Time at Target: 4/22/2015 6:15:13 PM
- Click Position
  28.0091023555 -80.4049171140 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_012.001.jsf
- Ping Number: 172843
- Range to target: 48.48 Meters
- Heading: 285.800 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_012.001

Dimensions and attributes

- Target Width: 4.02 Meters
- Target Height: 0.00 Meters
- Target Length: 3.33 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

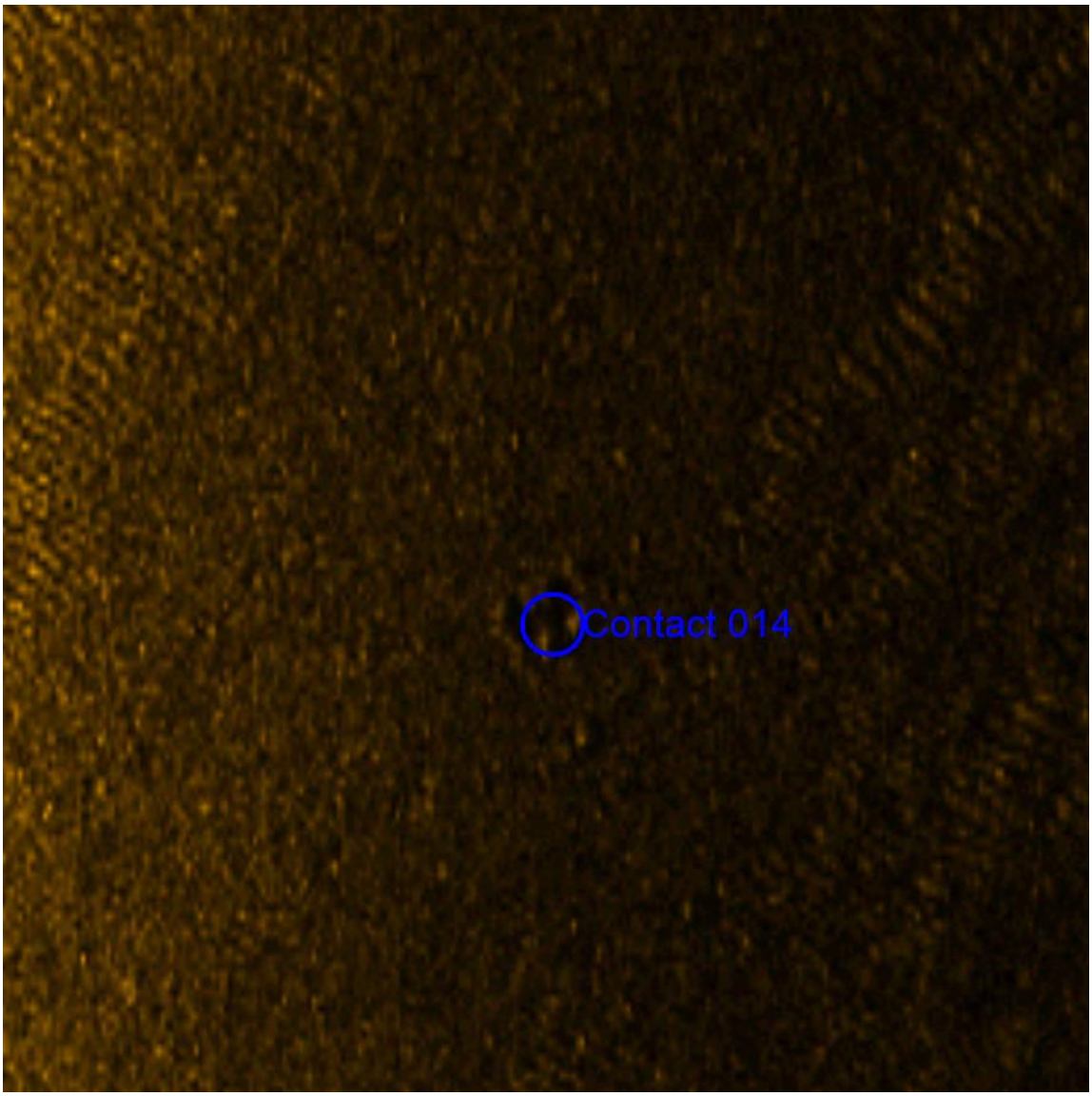


Contact 013

- Sonar Time at Target: 4/23/2015 8:32:52 AM
- Click Position
  28.0413082097 -80.4371543170 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.001.jsf
- Ping Number: 19127
- Range to target: 47.06 Meters
- Heading: 82.390 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.001

Dimensions and attributes

- Target Width: 0.74 Meters
- Target Height: 0.00 Meters
- Target Length: 2.26 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

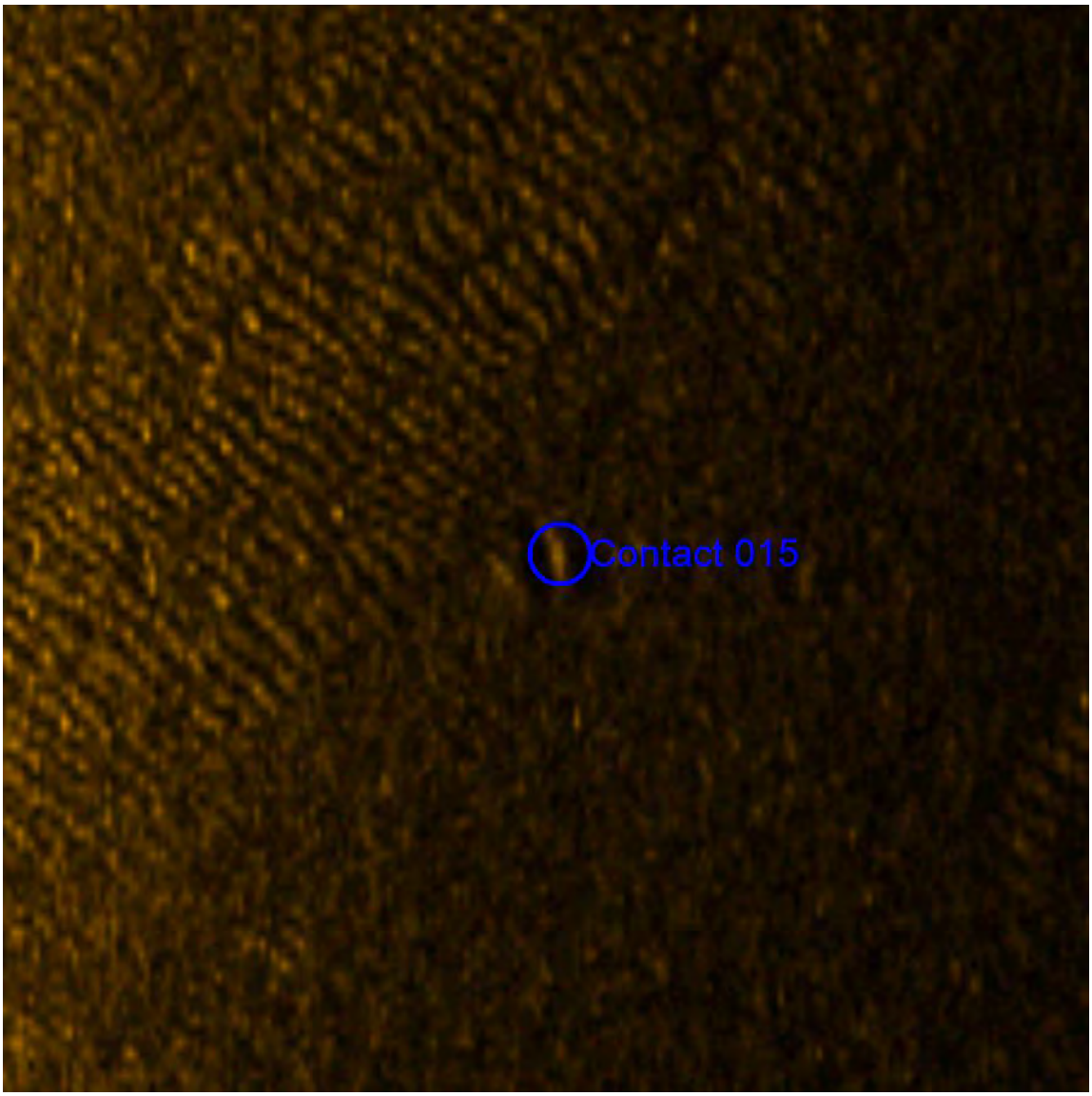


Contact 014

- Sonar Time at Target: 4/23/2015 8:32:31 AM
- Click Position
  28.0411799526 -80.4375254606 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.001.jsf
- Ping Number: 19030
- Range to target: 61.66 Meters
- Heading: 86.600 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.001

Dimensions and attributes

- Target Width: 1.14 Meters
- Target Height: 0.00 Meters
- Target Length: 3.04 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

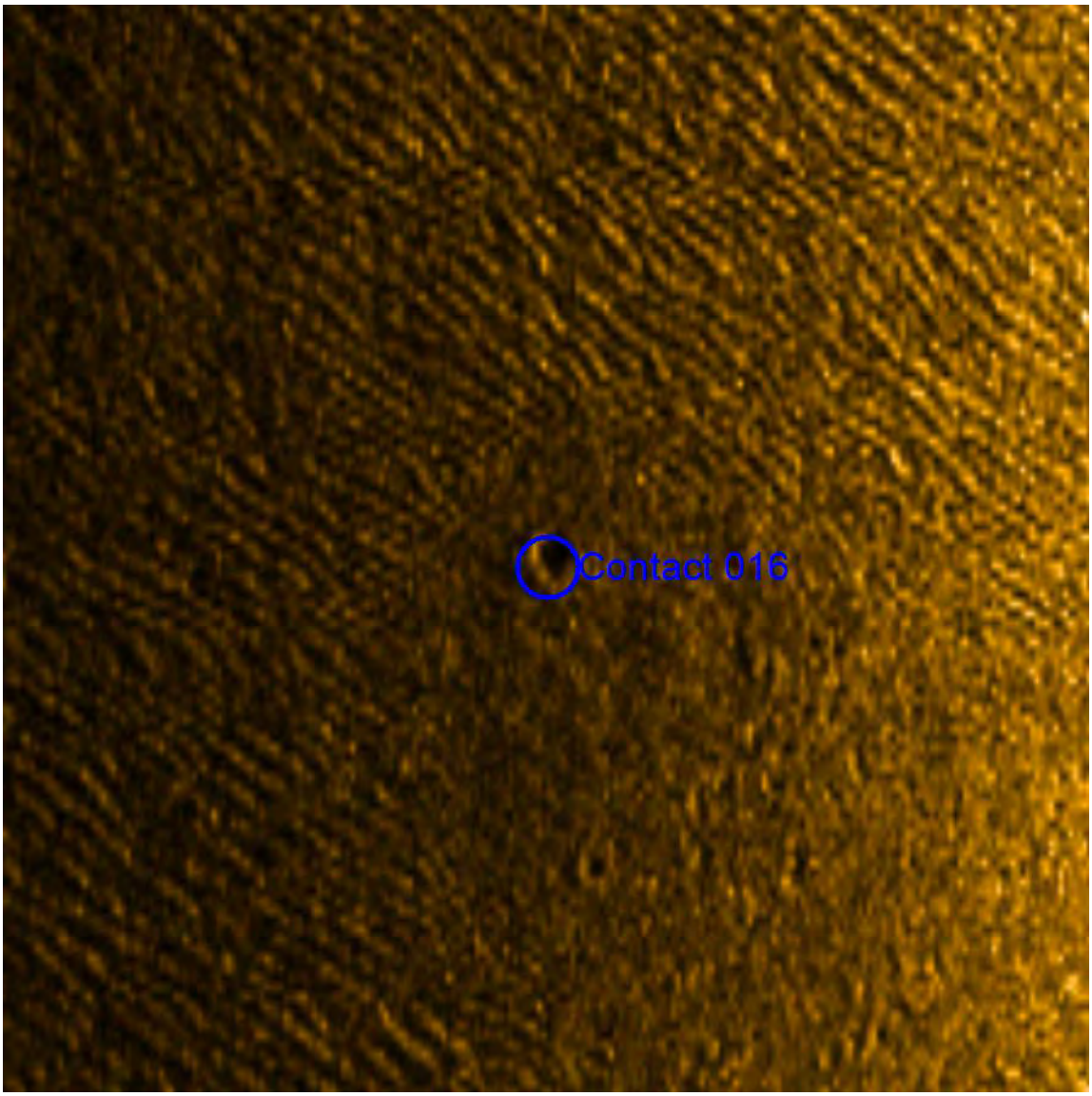


Contact 015

- Sonar Time at Target: 4/23/2015 8:32:10 AM
- Click Position
  28.0411999742 -80.4378875053 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.001.jsf
- Ping Number: 18930
- Range to target: 60.57 Meters
- Heading: 87.790 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.001

Dimensions and attributes

- Target Width: 0.56 Meters
- Target Height: 0.00 Meters
- Target Length: 2.59 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

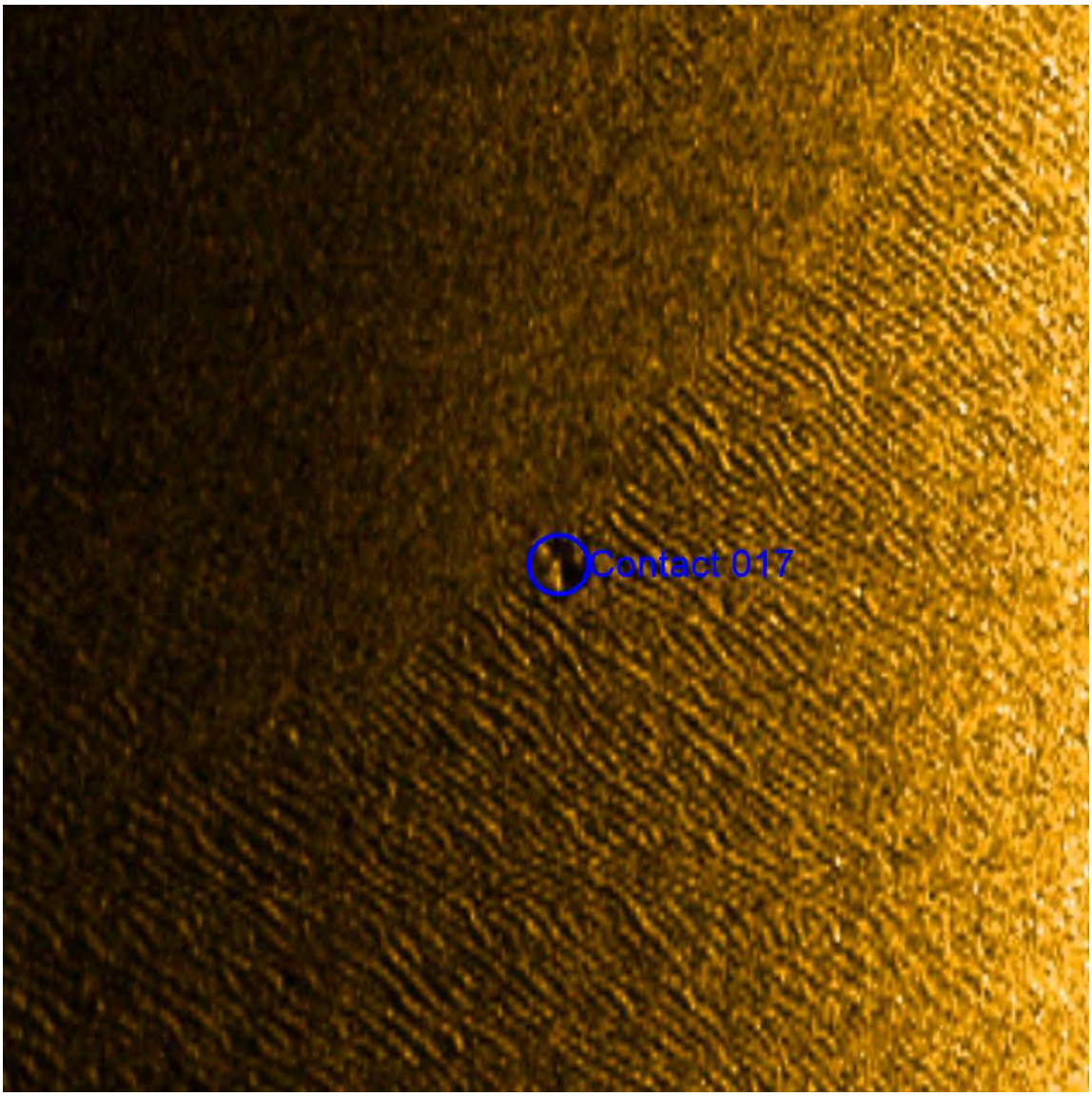


Contact 016

- Sonar Time at Target: 4/23/2015 8:26:00 AM
- Click Position
  28.0421448981 -80.4440872212 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.001.jsf
- Ping Number: 17201
- Range to target: 48.55 Meters
- Heading: 86.200 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.001

Dimensions and attributes

- Target Width: 0.54 Meters
- Target Height: 0.00 Meters
- Target Length: 3.93 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

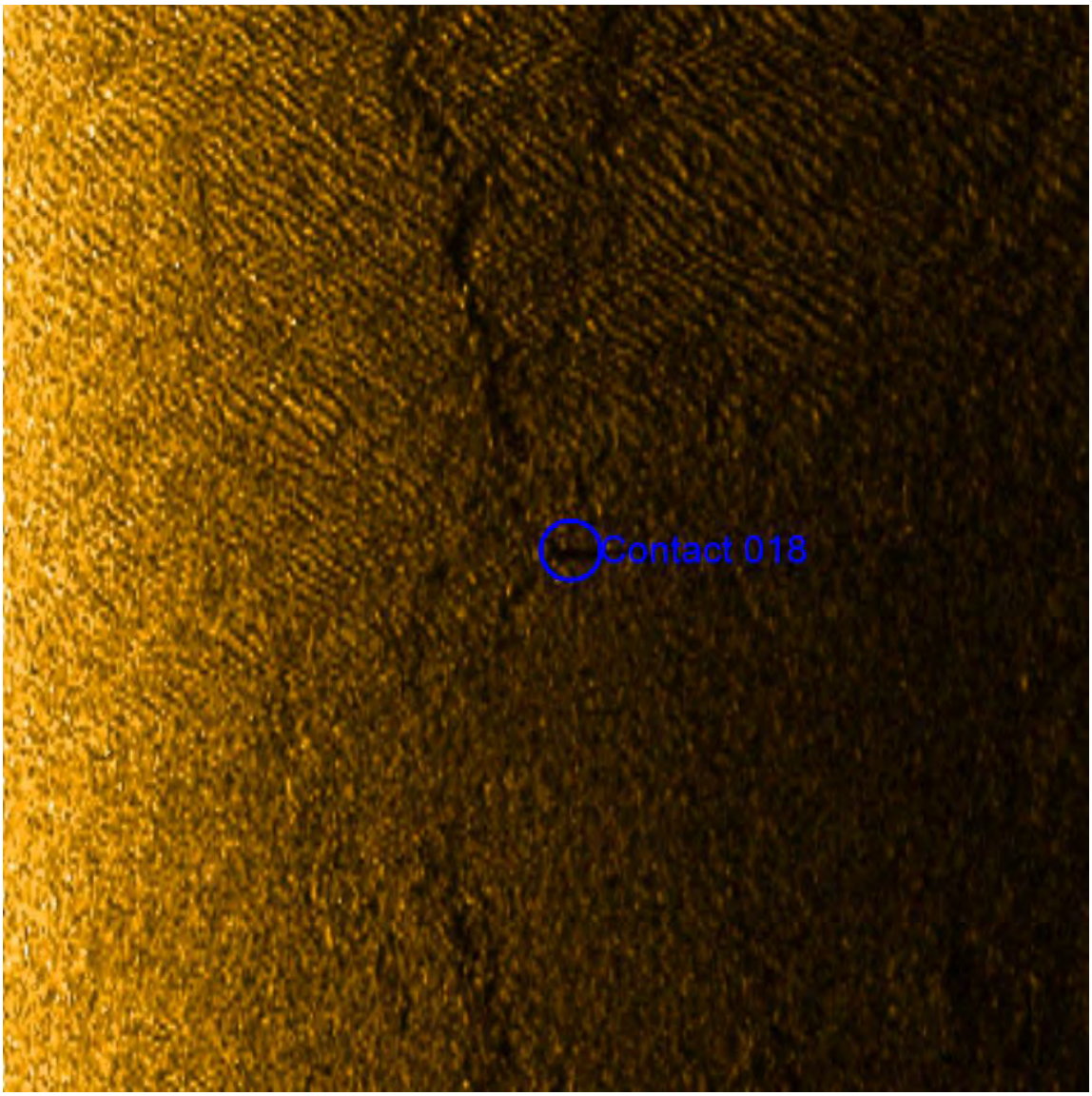


Contact 017

- Sonar Time at Target: 4/23/2015 8:25:22 AM
- Click Position
  28.0421202927 -80.4446644676 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.001.jsf
- Ping Number: 17026
- Range to target: 44.80 Meters
- Heading: 88.790 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.001

Dimensions and attributes

- Target Width: 0.78 Meters
- Target Height: 0.00 Meters
- Target Length: 2.77 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

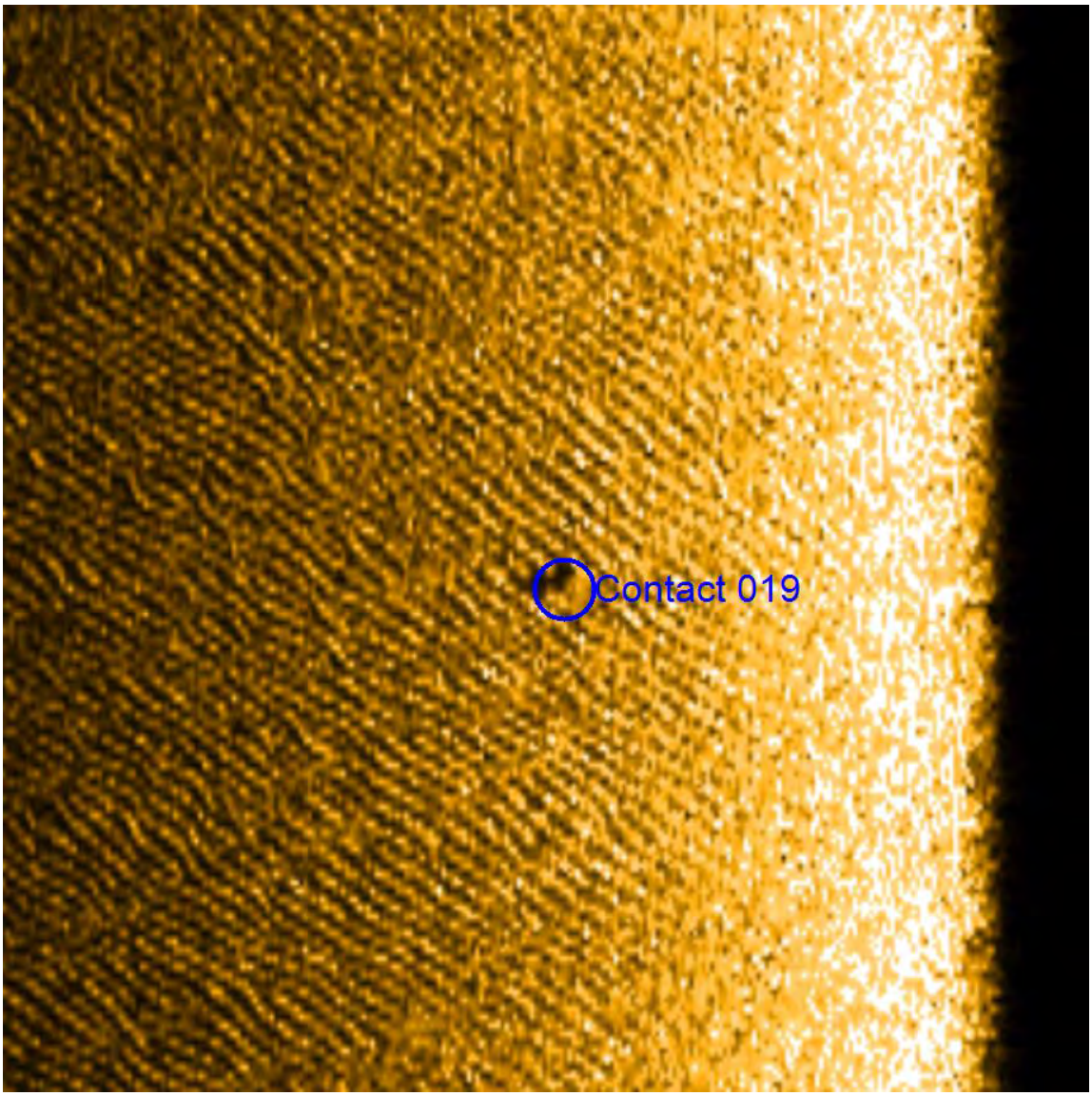


Contact 018

- Sonar Time at Target: 4/23/2015 8:48:31 AM
- Click Position
  28.0413424350 -80.4213524812 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.001.jsf
- Ping Number: 23509
- Range to target: 52.62 Meters
- Heading: 84.200 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.001

Dimensions and attributes

- Target Width: 1.41 Meters
- Target Height: 0.32 Meters
- Target Length: 1.25 Meters
- Target Shadow: 3.35 Meters
- Classification1: debris
- Description: Potential Debris

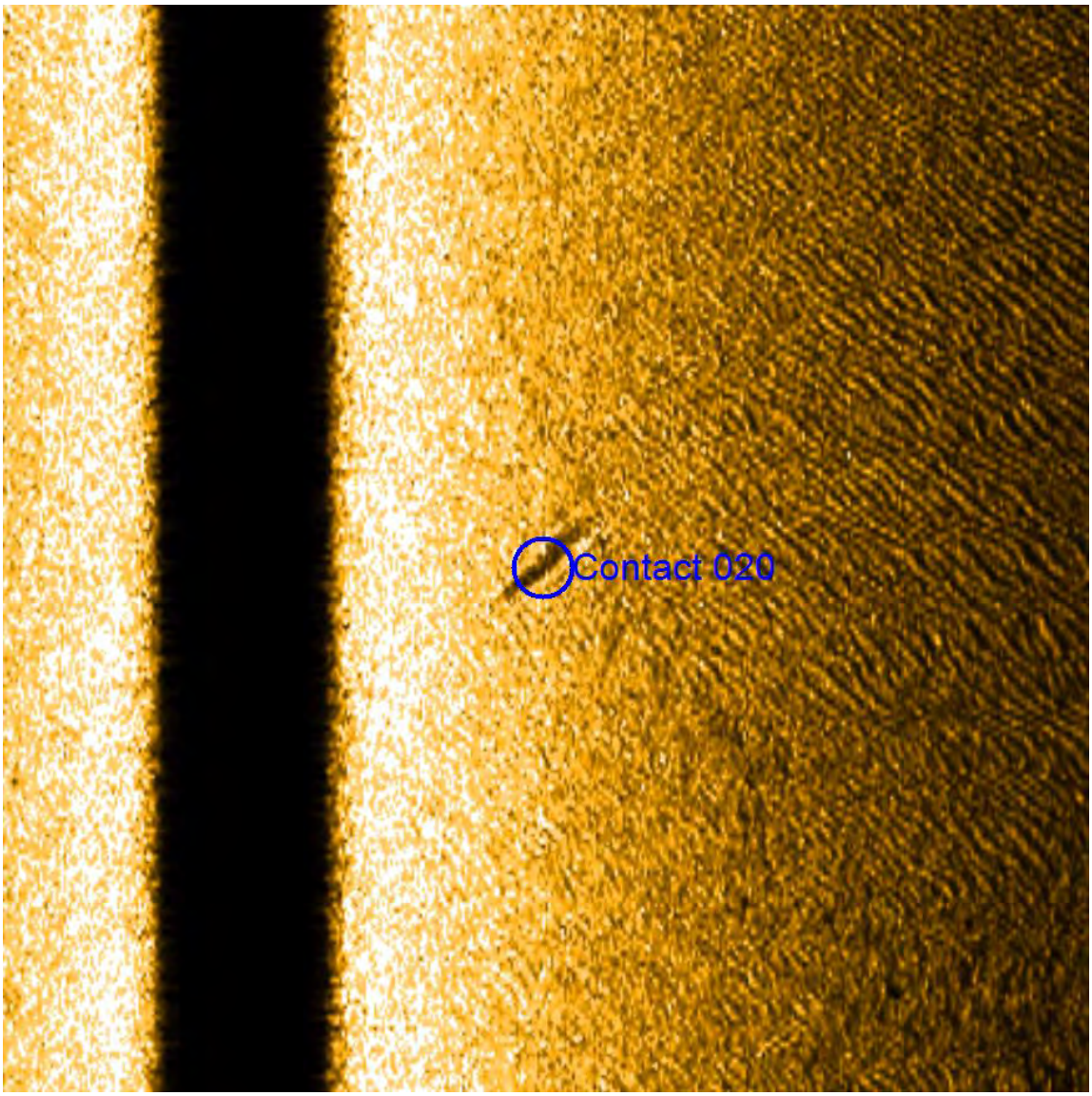


Contact 019

- Sonar Time at Target: 4/23/2015 8:48:21 AM
- Click Position
  28.0420116576 -80.4216238811 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.001.jsf
- Ping Number: 23460
- Range to target: 22.70 Meters
- Heading: 82.200 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.001

Dimensions and attributes

- Target Width: 0.89 Meters
- Target Height: 0.41 Meters
- Target Length: 1.40 Meters
- Target Shadow: 1.93 Meters
- Classification1: debris
- Description: Potential Debris

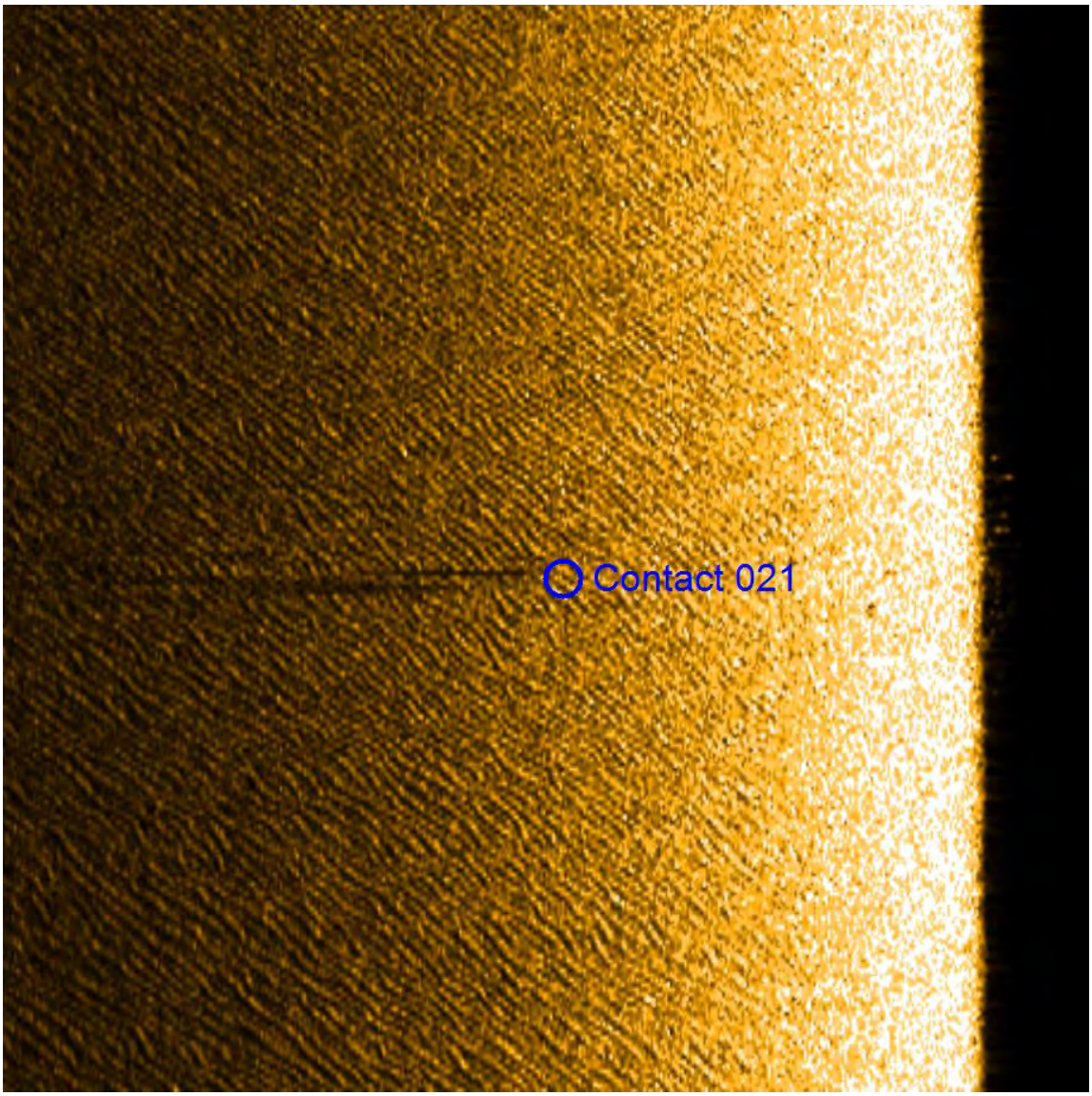


Contact 020

- Sonar Time at Target: 4/23/2015 8:52:21 AM
- Click Position
  28.0416745319 -80.4176384748 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.002.jsf
- Ping Number: 24583
- Range to target: 18.33 Meters
- Heading: 83.790 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.002

Dimensions and attributes

- Target Width: 1.11 Meters
- Target Height: 0.10 Meters
- Target Length: 8.15 Meters
- Target Shadow: 0.35 Meters
- Classification1: debris
- Description: Potential Debris

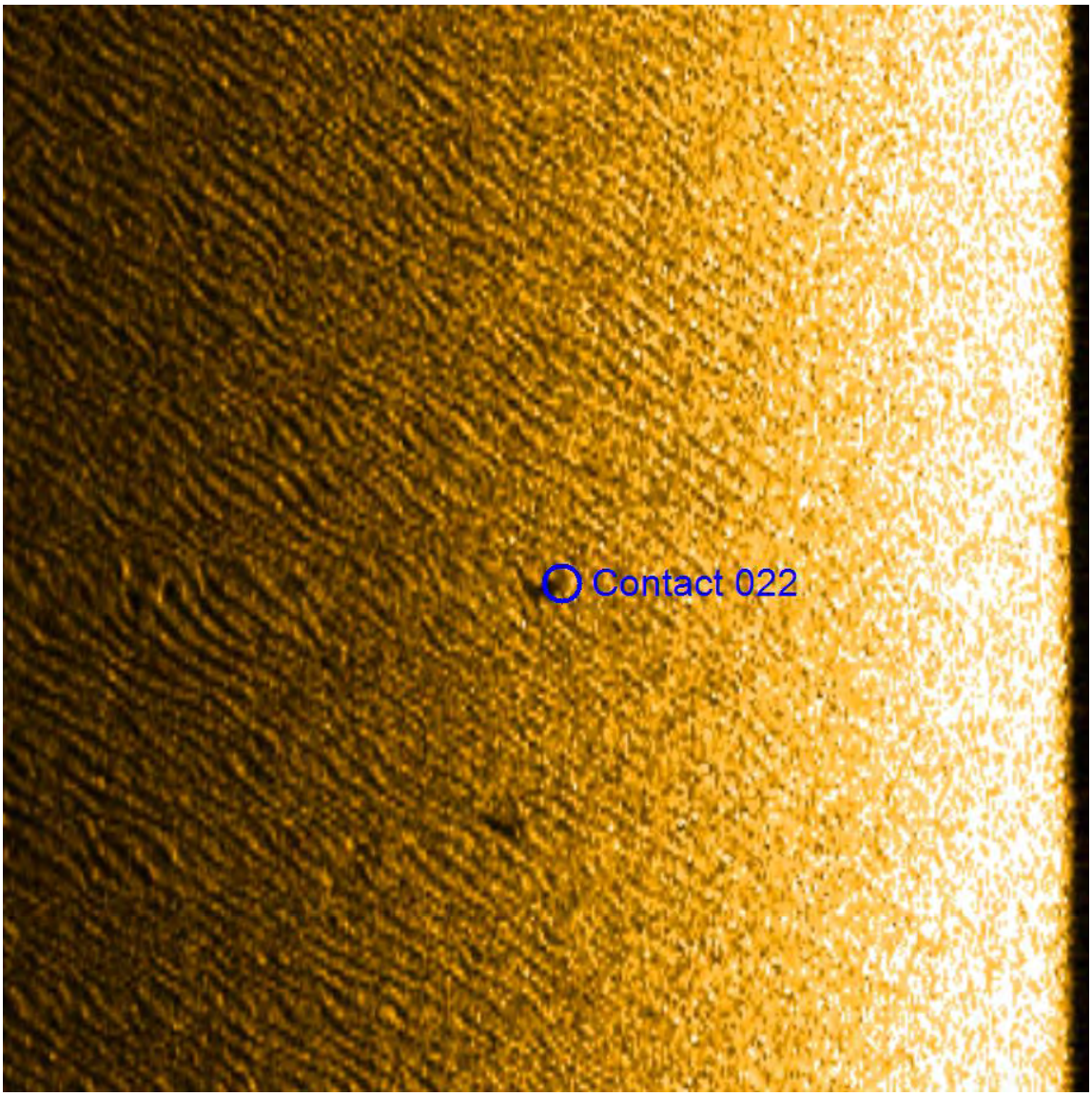


Contact 021

- Sonar Time at Target: 4/23/2015 9:05:43 AM
- Click Position
  28.0422230179 -80.4044242996 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.002.jsf
- Ping Number: 28325
- Range to target: 36.89 Meters
- Heading: 88.890 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.002

Dimensions and attributes

- Target Width: 1.22 Meters
- Target Height: 1.79 Meters
- Target Length: 1.05 Meters
- Target Shadow: 13.96 Meters
- Classification1: debris
- Description: Potential Debris

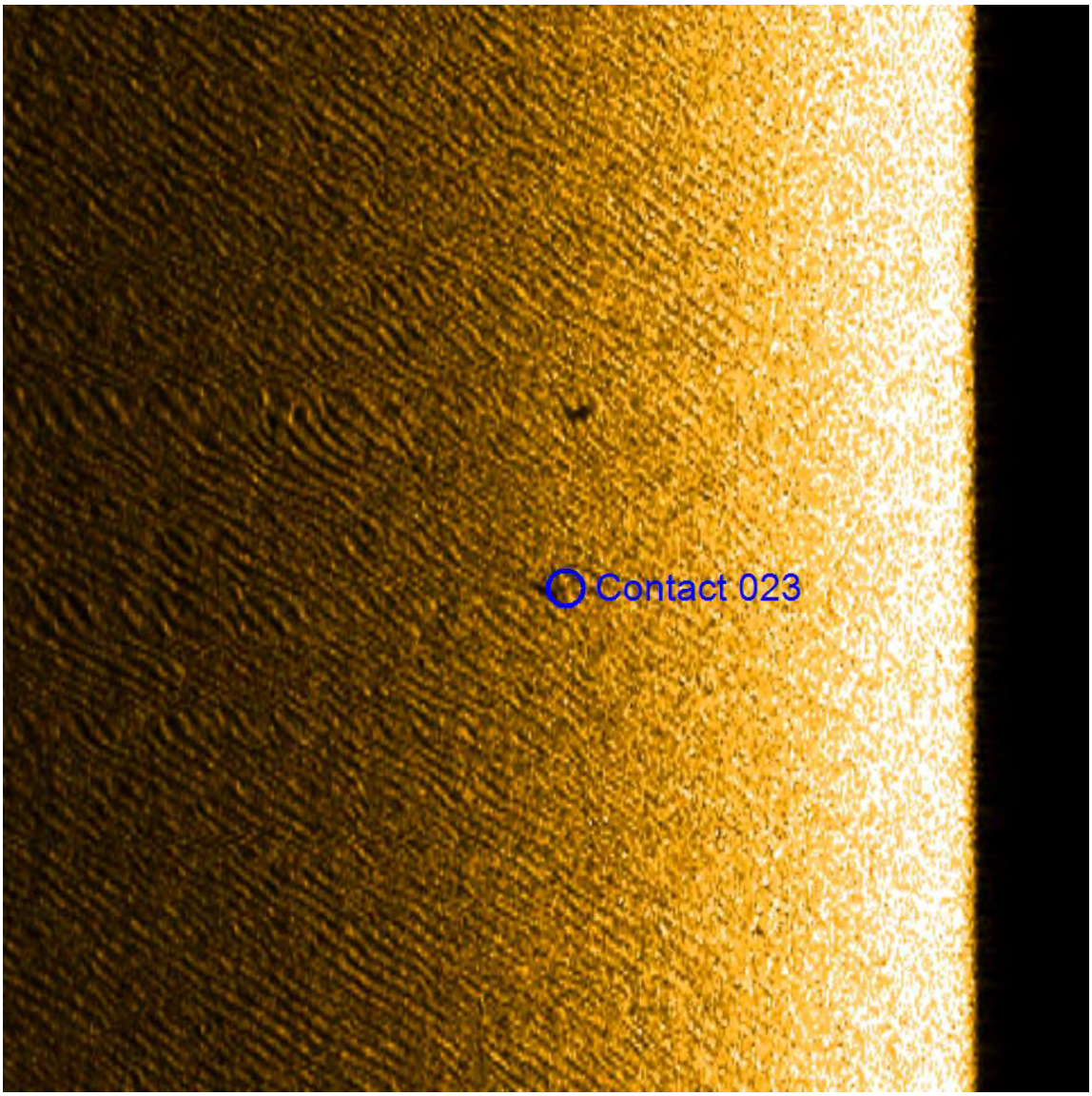


Contact 022

- Sonar Time at Target: 4/23/2015 9:11:22 AM
- Click Position
  28.0422366281 -80.3988009842 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.002.jsf
- Ping Number: 29909
- Range to target: 36.18 Meters
- Heading: 88.200 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.002

Dimensions and attributes

- Target Width: 1.24 Meters
- Target Height: 0.30 Meters
- Target Length: 1.93 Meters
- Target Shadow: 1.58 Meters
- Classification1: debris
- Description: Potential Debris

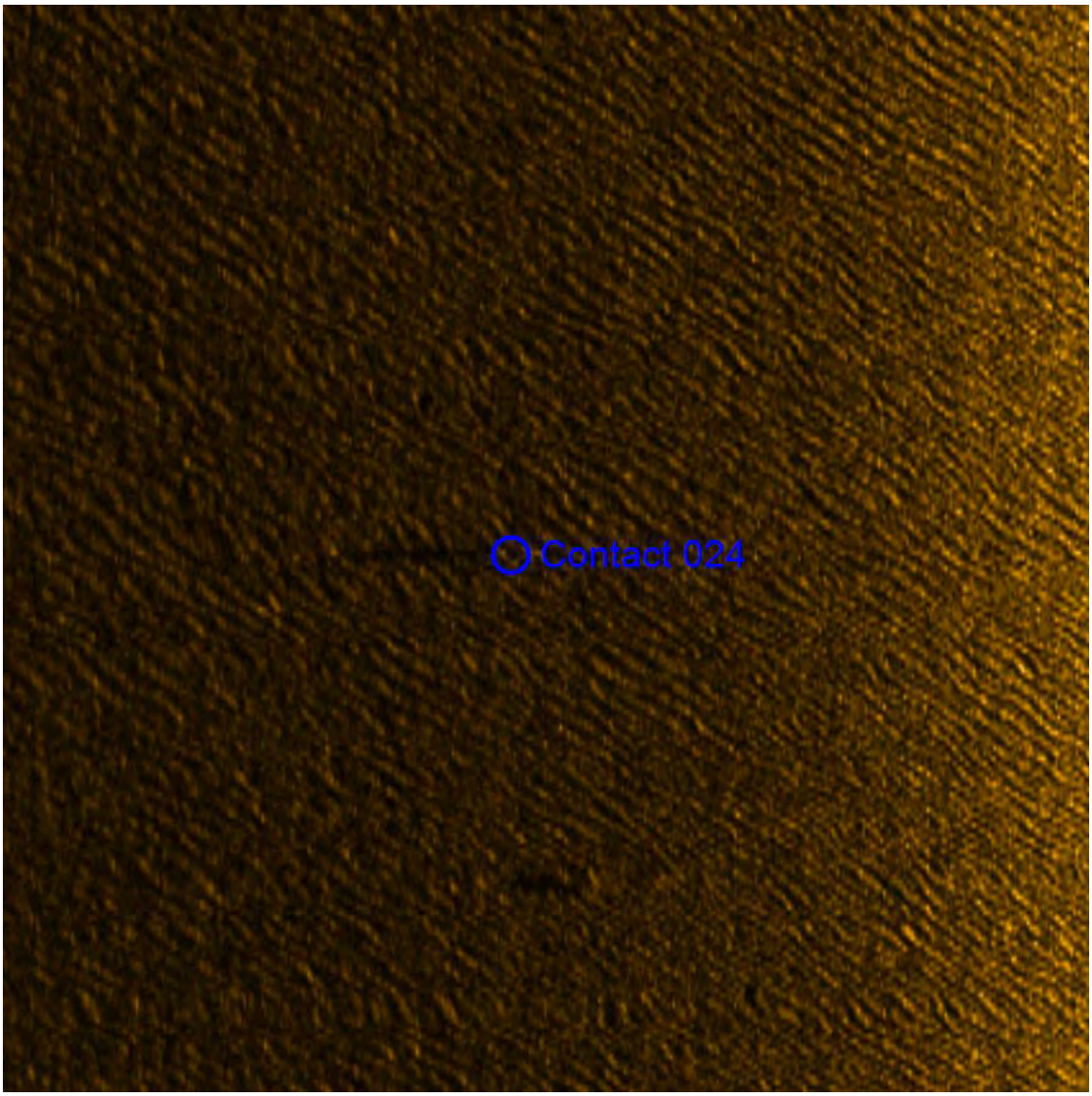


Contact 023

- Sonar Time at Target: 4/23/2015 9:11:31 AM
- Click Position
  28.0422579785 -80.3986620420 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.002.jsf
- Ping Number: 29949
- Range to target: 38.55 Meters
- Heading: 84.700 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.002

Dimensions and attributes

- Target Width: 0.89 Meters
- Target Height: 0.40 Meters
- Target Length: 2.83 Meters
- Target Shadow: 2.28 Meters
- Classification1: debris
- Description: Potential Debris

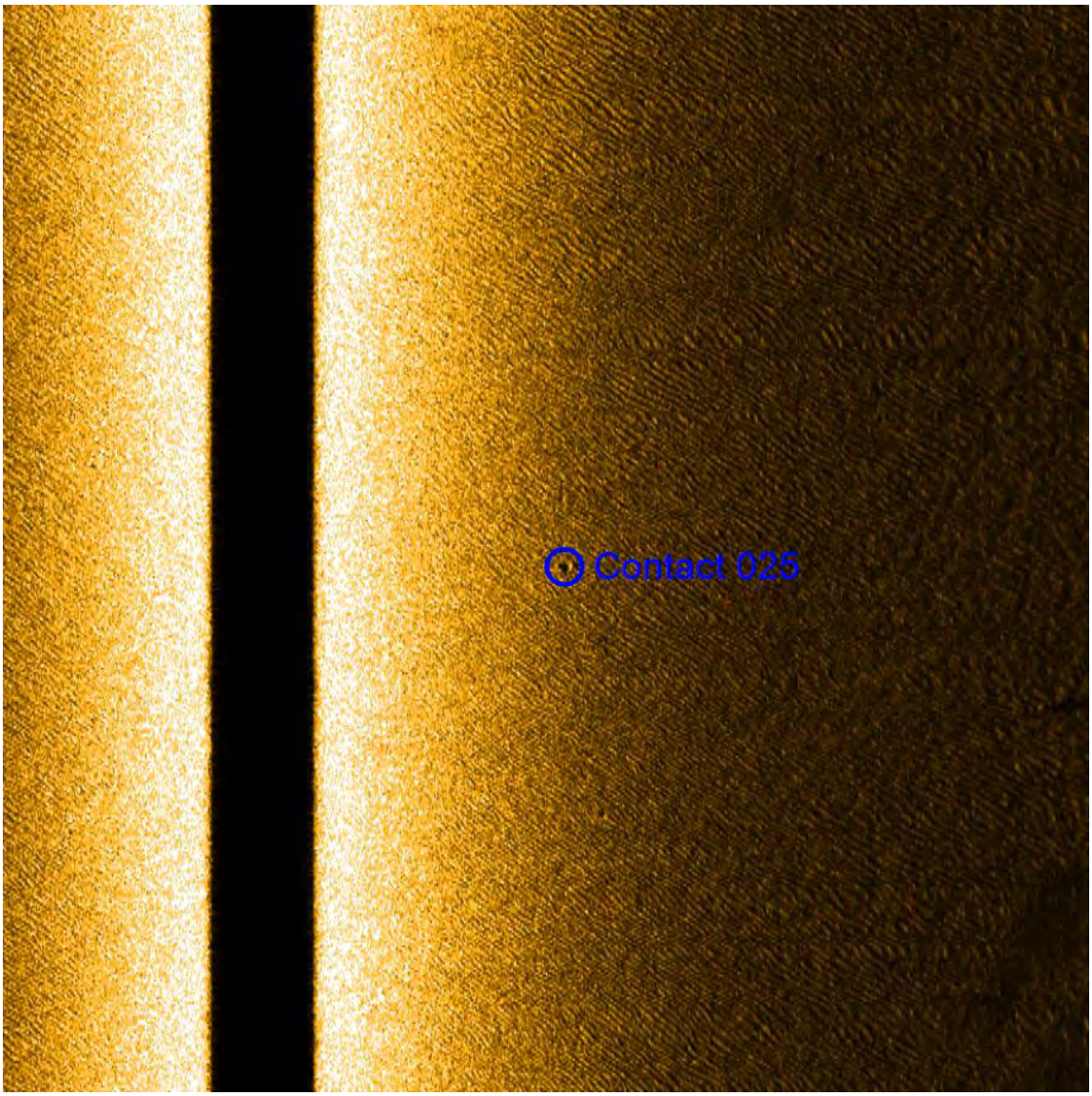


Contact 024

- Sonar Time at Target: 4/23/2015 9:12:10 AM
- Click Position
  28.0426716830 -80.3980185623 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.002.jsf
- Ping Number: 30130
- Range to target: 83.25 Meters
- Heading: 86.200 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.002

Dimensions and attributes

- Target Width: 0.87 Meters
- Target Height: 0.66 Meters
- Target Length: 1.02 Meters
- Target Shadow: 8.22 Meters
- Classification1: debris
- Description: Potential Debris

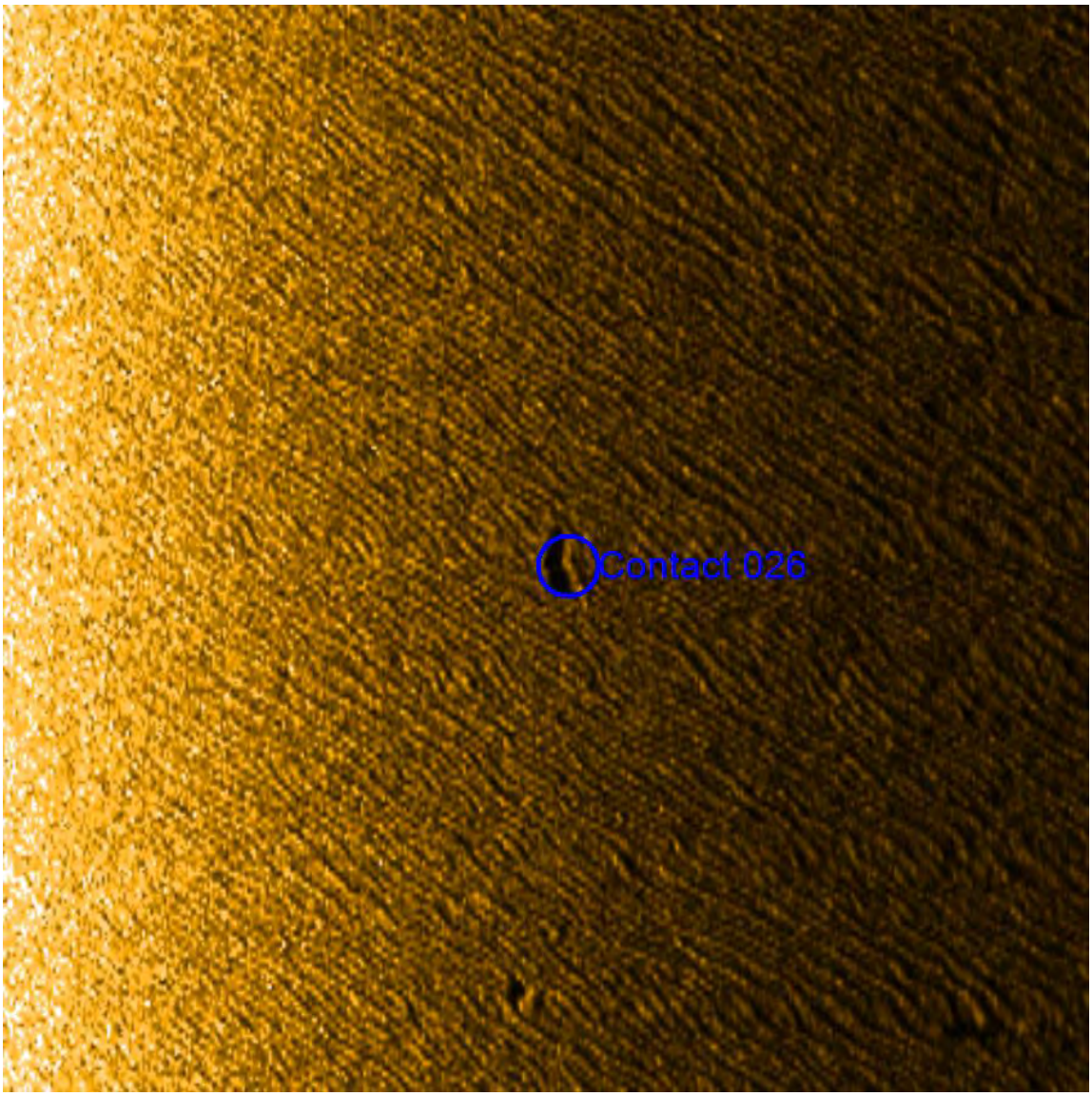


Contact 025

- Sonar Time at Target: 4/23/2015 9:11:56 AM
- Click Position
  28.0415312339 -80.3982327752 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.002.jsf
- Ping Number: 30067
- Range to target: 42.33 Meters
- Heading: 86.700 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.002

Dimensions and attributes

- Target Width: 0.09 Meters
- Target Height: 0.00 Meters
- Target Length: 1.00 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

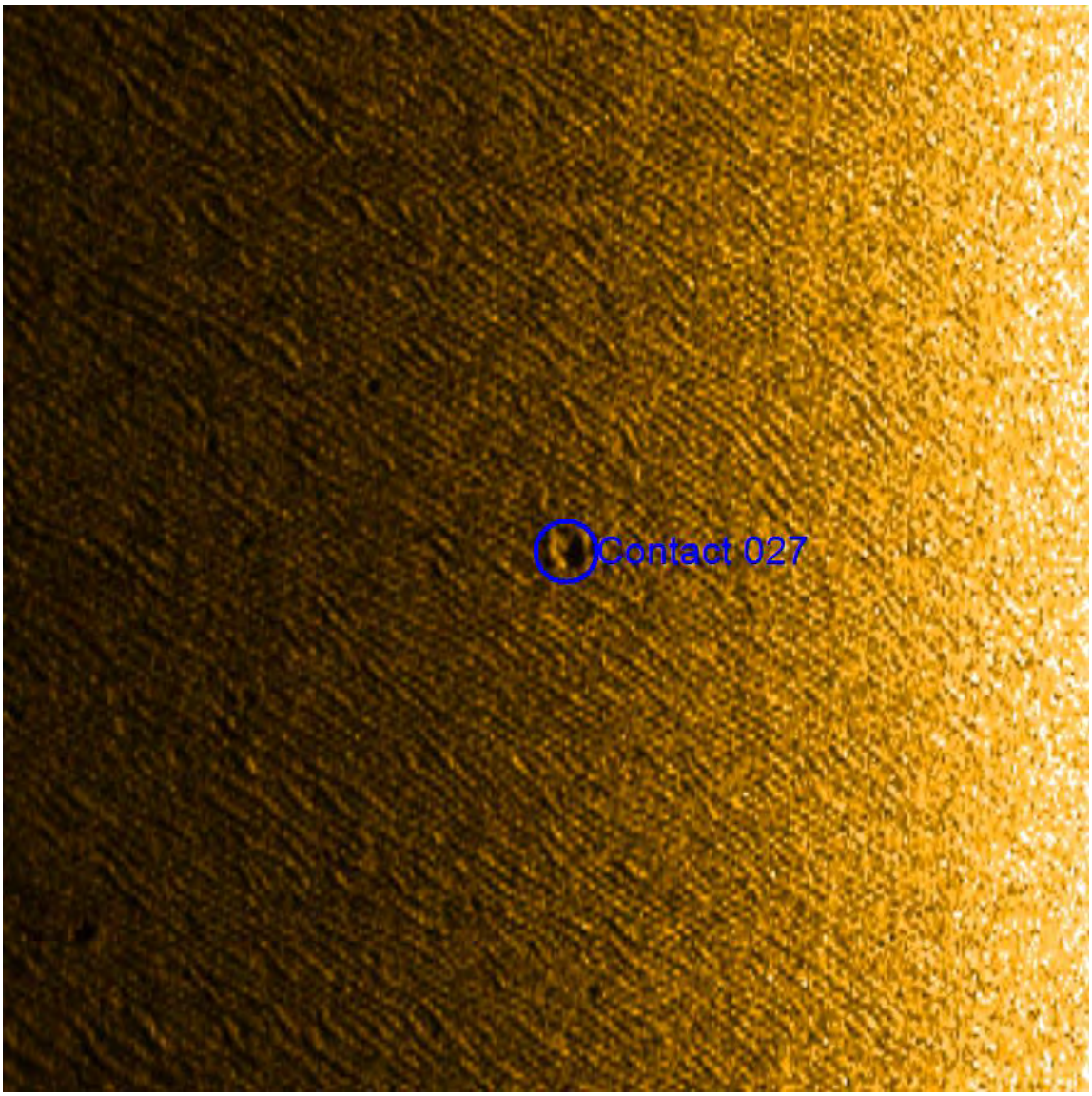


Contact 026

- Sonar Time at Target: 4/23/2015 9:28:51 AM
- Click Position
  28.0414995753 -80.3812837052 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.003.jsf
- Ping Number: 34807
- Range to target: 53.15 Meters
- Heading: 84.790 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.003

Dimensions and attributes

- Target Width: 0.53 Meters
- Target Height: 0.00 Meters
- Target Length: 5.22 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

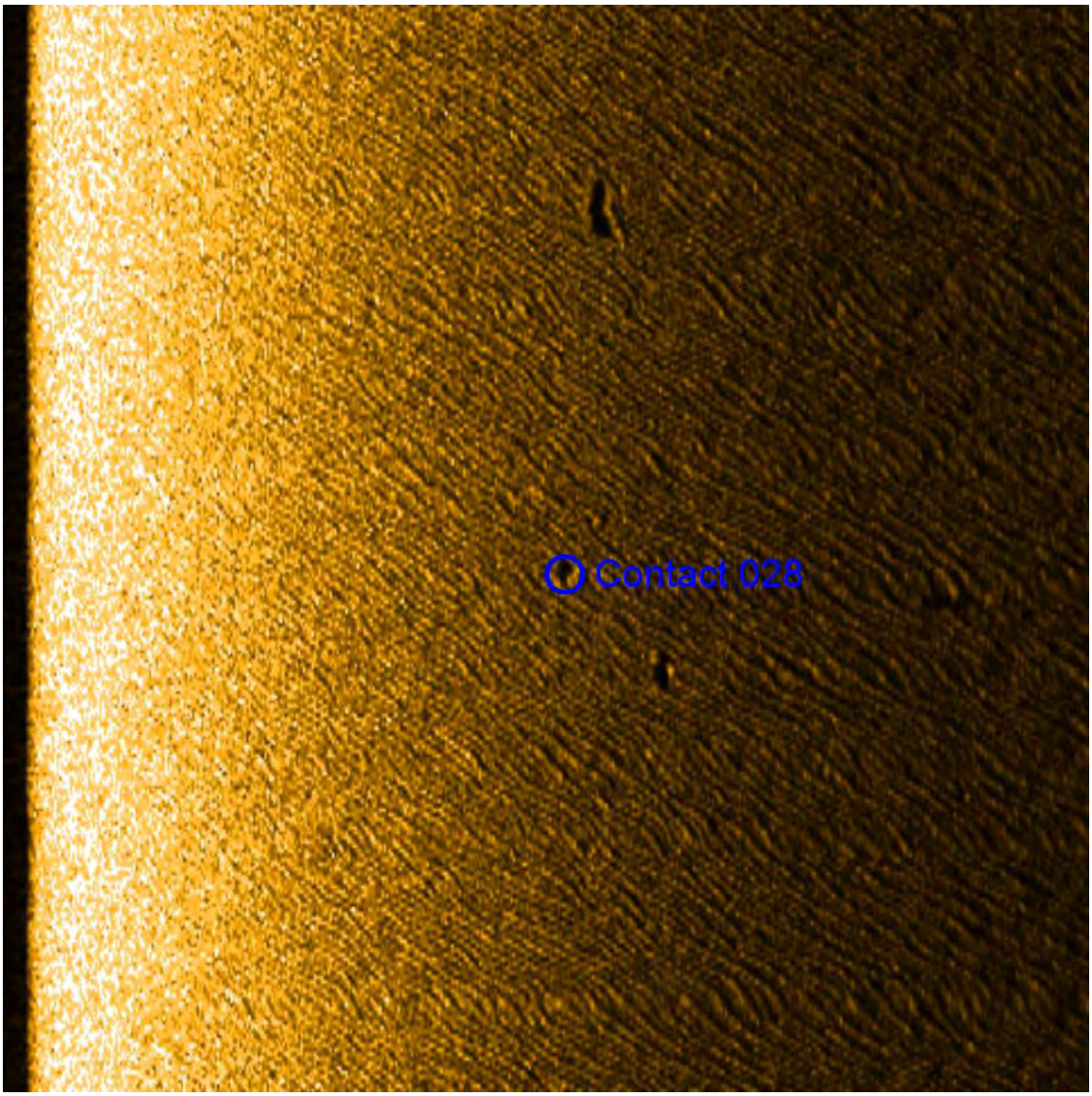


Contact 027

- Sonar Time at Target: 4/23/2015 9:28:34 AM
- Click Position
  28.0423961283 -80.3816757859 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.003.jsf
- Ping Number: 34724
- Range to target: 48.01 Meters
- Heading: 85.890 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.003

Dimensions and attributes

- Target Width: 1.08 Meters
- Target Height: 0.00 Meters
- Target Length: 2.72 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

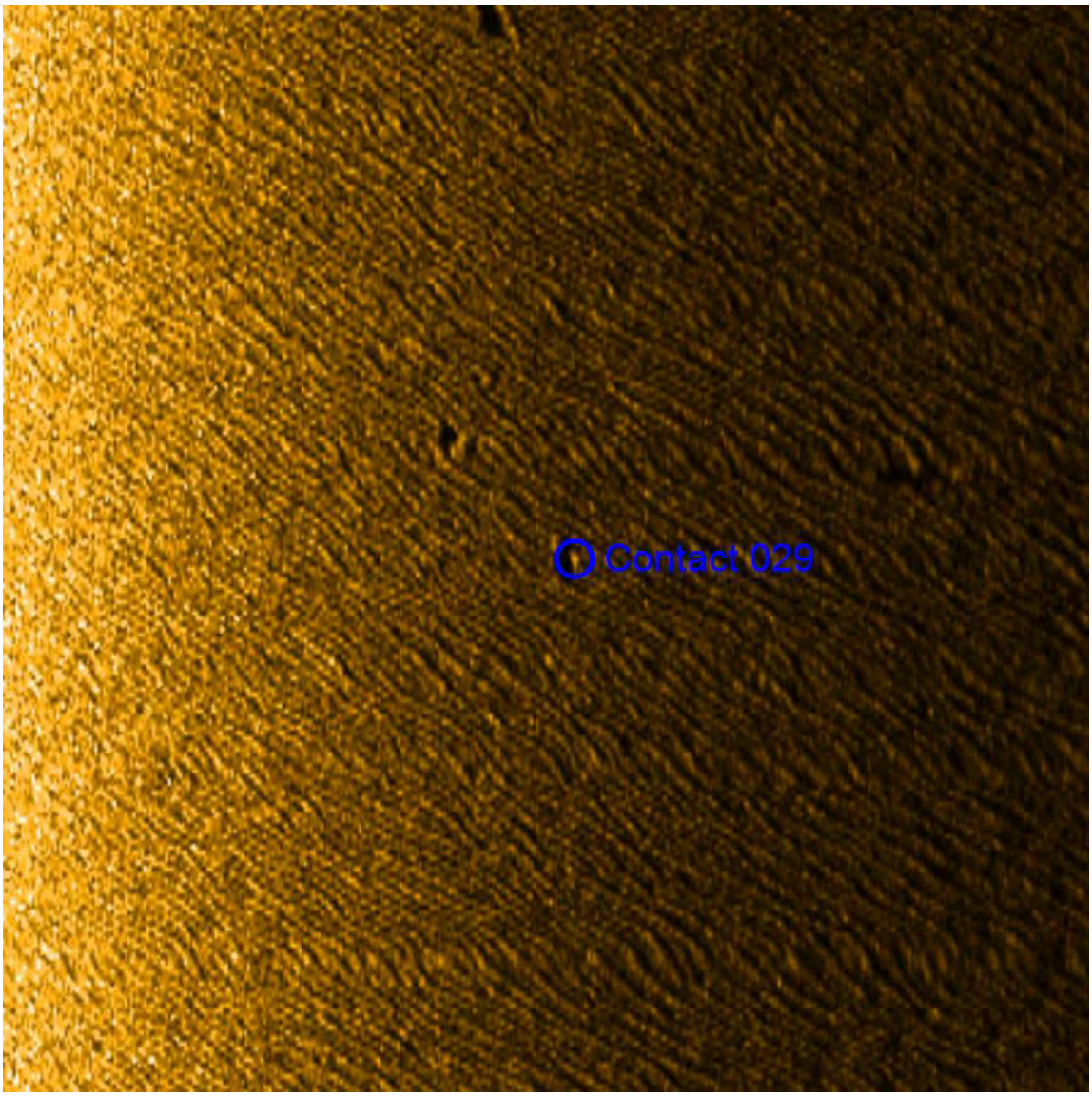


Contact 028

- Sonar Time at Target: 4/23/2015 9:29:09 AM
- Click Position
  28.0415419607 -80.3810223241 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.003.jsf
- Ping Number: 34886
- Range to target: 49.66 Meters
- Heading: 88.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.003

Dimensions and attributes

- Target Width: 1.26 Meters
- Target Height: 0.00 Meters
- Target Length: 1.60 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

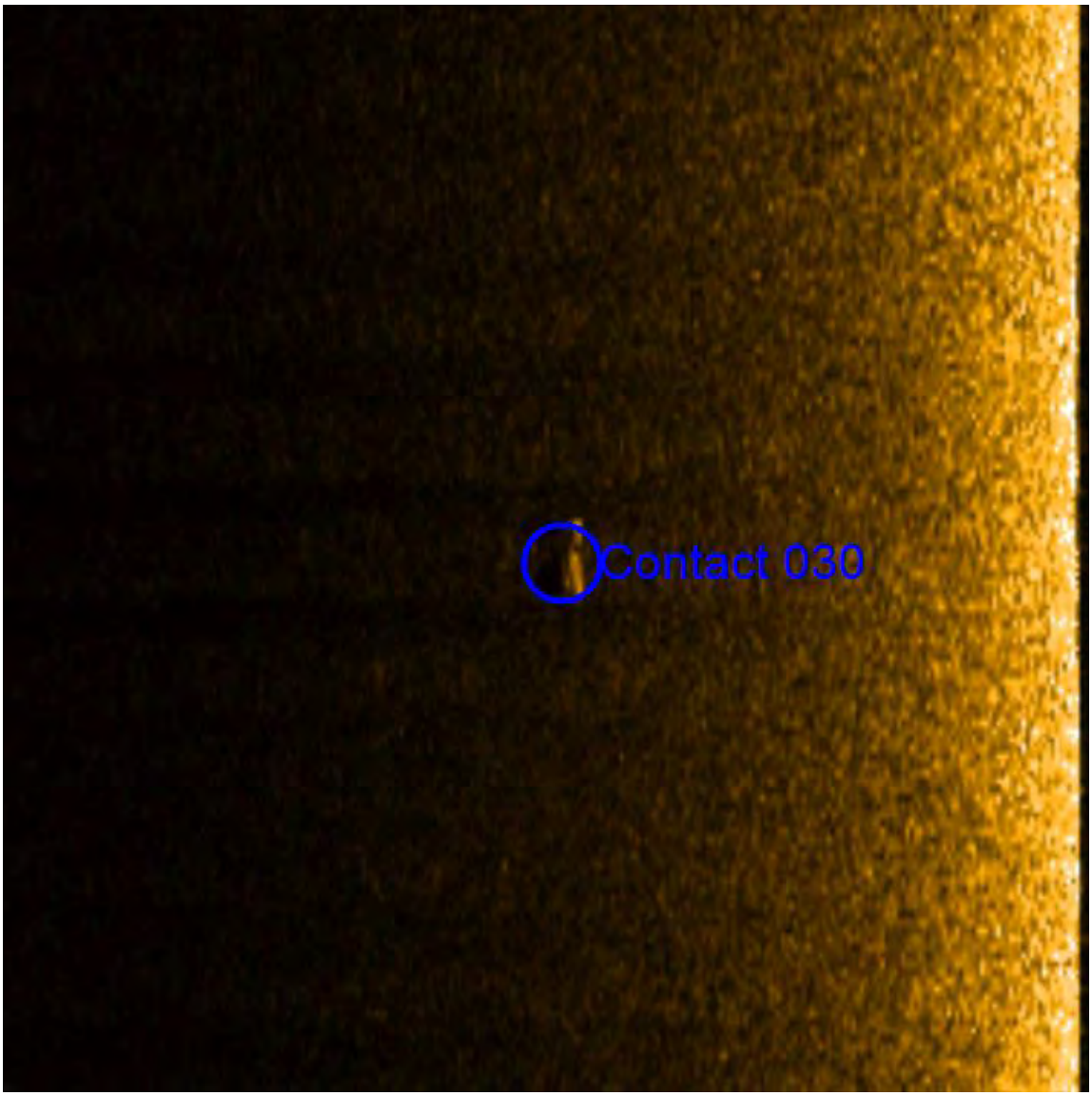


Contact 029

- Sonar Time at Target: 4/23/2015 9:29:14 AM
- Click Position
  28.0414699072 -80.3809660328 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_013.003.jsf
- Ping Number: 34908
- Range to target: 57.98 Meters
- Heading: 86.600 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_013.003

Dimensions and attributes

- Target Width: 0.54 Meters
- Target Height: 0.00 Meters
- Target Length: 1.82 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

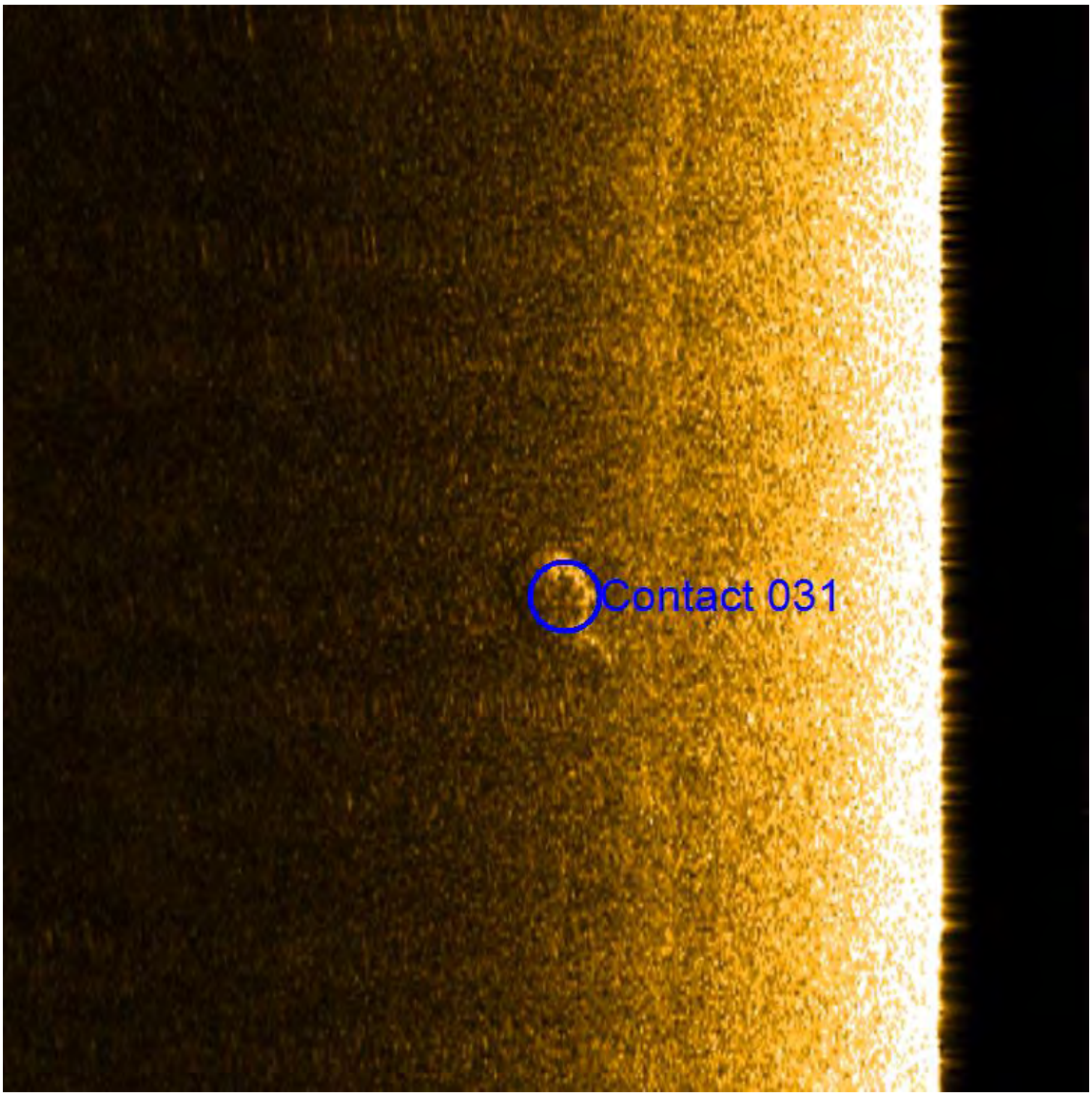


Contact 030

- Sonar Time at Target: 4/24/2015 10:08:07 AM
- Click Position
  29.1835232044 -80.8422503015 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_025.jsf
- Ping Number: 18169
- Range to target: 35.47 Meters
- Heading: 280.800 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_025

Dimensions and attributes

- Target Width: 1.13 Meters
- Target Height: 0.26 Meters
- Target Length: 4.51 Meters
- Target Shadow: 1.13 Meters
- Classification1: debris
- Description: Potential Debris

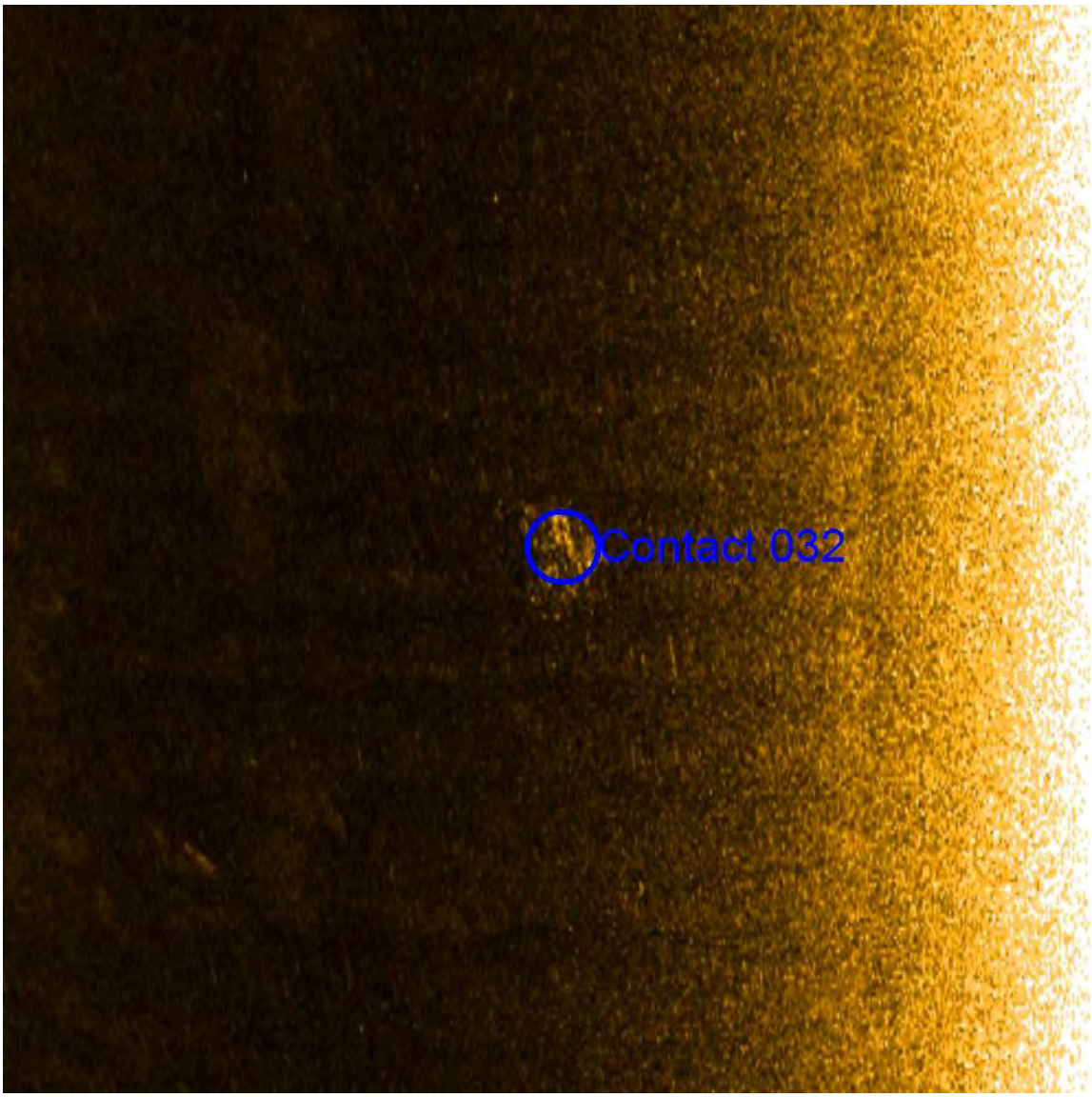


Contact 031

- Sonar Time at Target: 4/24/2015 11:15:37 AM
- Click Position
  29.1852758852 -80.8468314006 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_014.001.jsf
- Ping Number: 33859
- Range to target: 37.63 Meters
- Heading: 181.100 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_014.001

Dimensions and attributes

- Target Width: 6.61 Meters
- Target Height: 0.00 Meters
- Target Length: 7.82 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

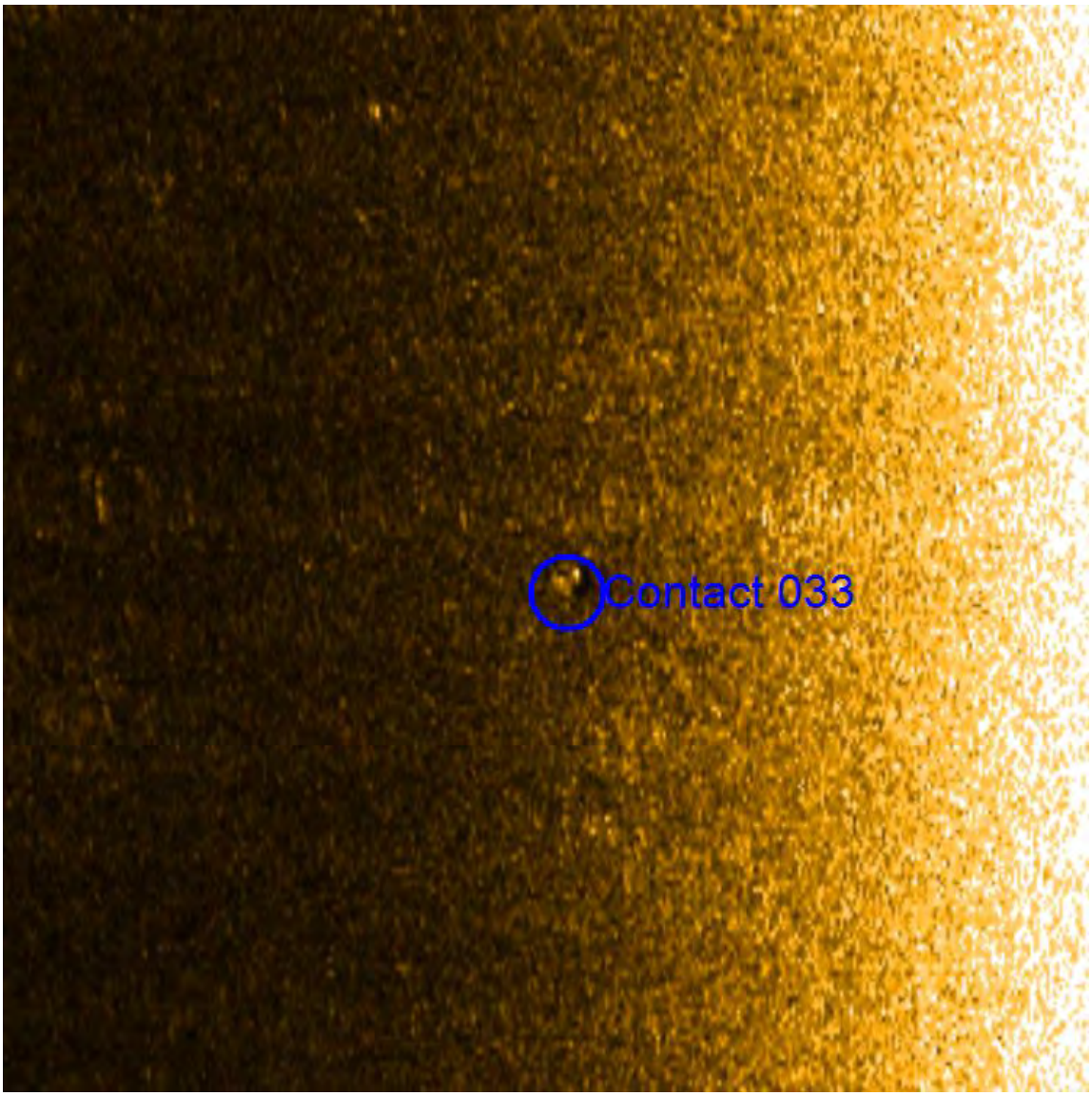


Contact 032

- Sonar Time at Target: 4/24/2015 11:32:43 AM
- Click Position
  29.1687457151 -80.8385776761 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_014.001.jsf
- Ping Number: 38642
- Range to target: 58.93 Meters
- Heading: 187.090 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_014.001

Dimensions and attributes

- Target Width: 6.51 Meters
- Target Height: 0.00 Meters
- Target Length: 9.87 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

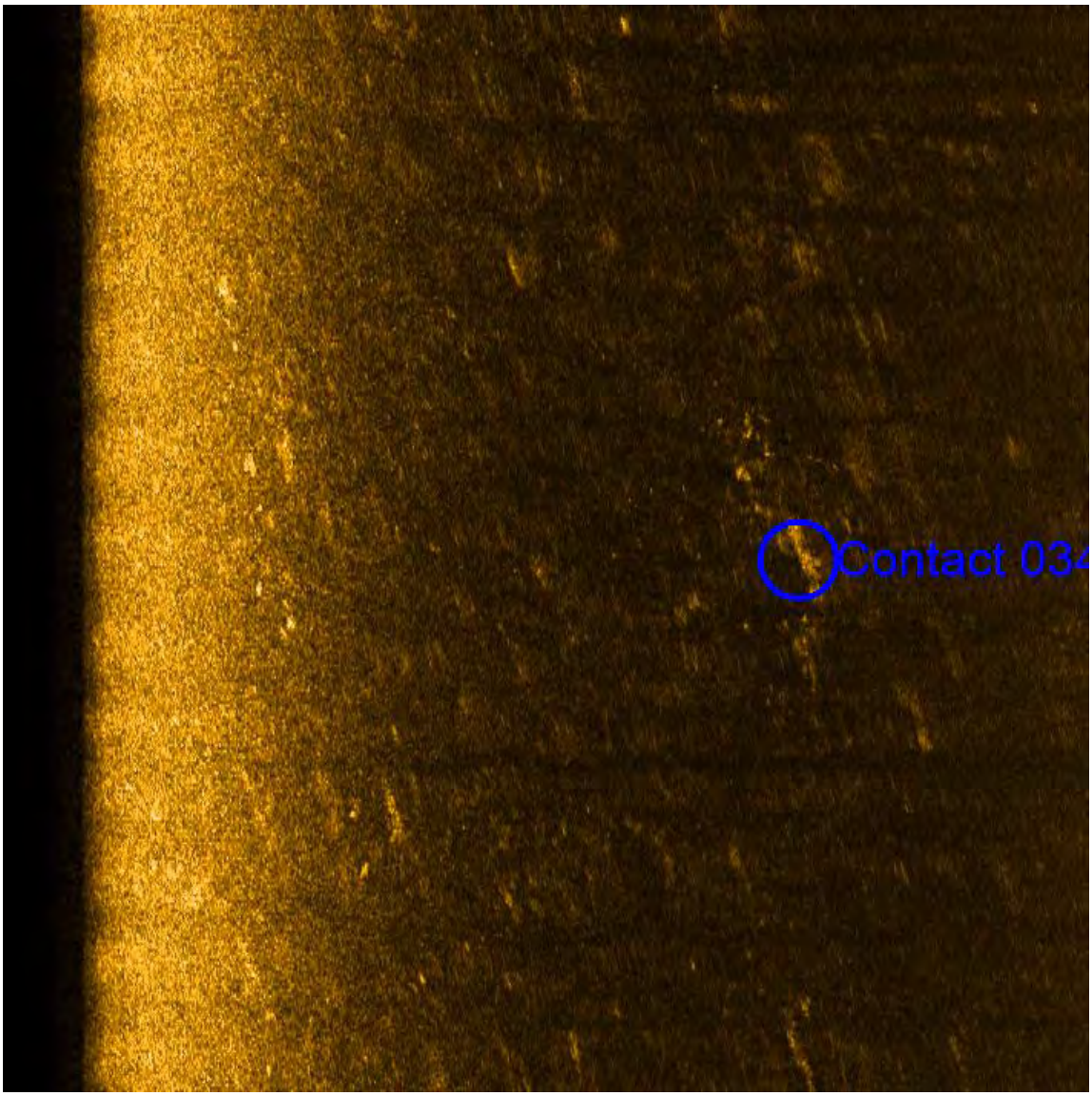


Contact 033

- Sonar Time at Target: 4/24/2015 11:51:55 AM
- Click Position
  29.1502131535 -80.8294810435 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_014.001.jsf
- Ping Number: 44006
- Range to target: 49.23 Meters
- Heading: 197.600 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_014.001

Dimensions and attributes

- Target Width: 2.11 Meters
- Target Height: 0.00 Meters
- Target Length: 2.43 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

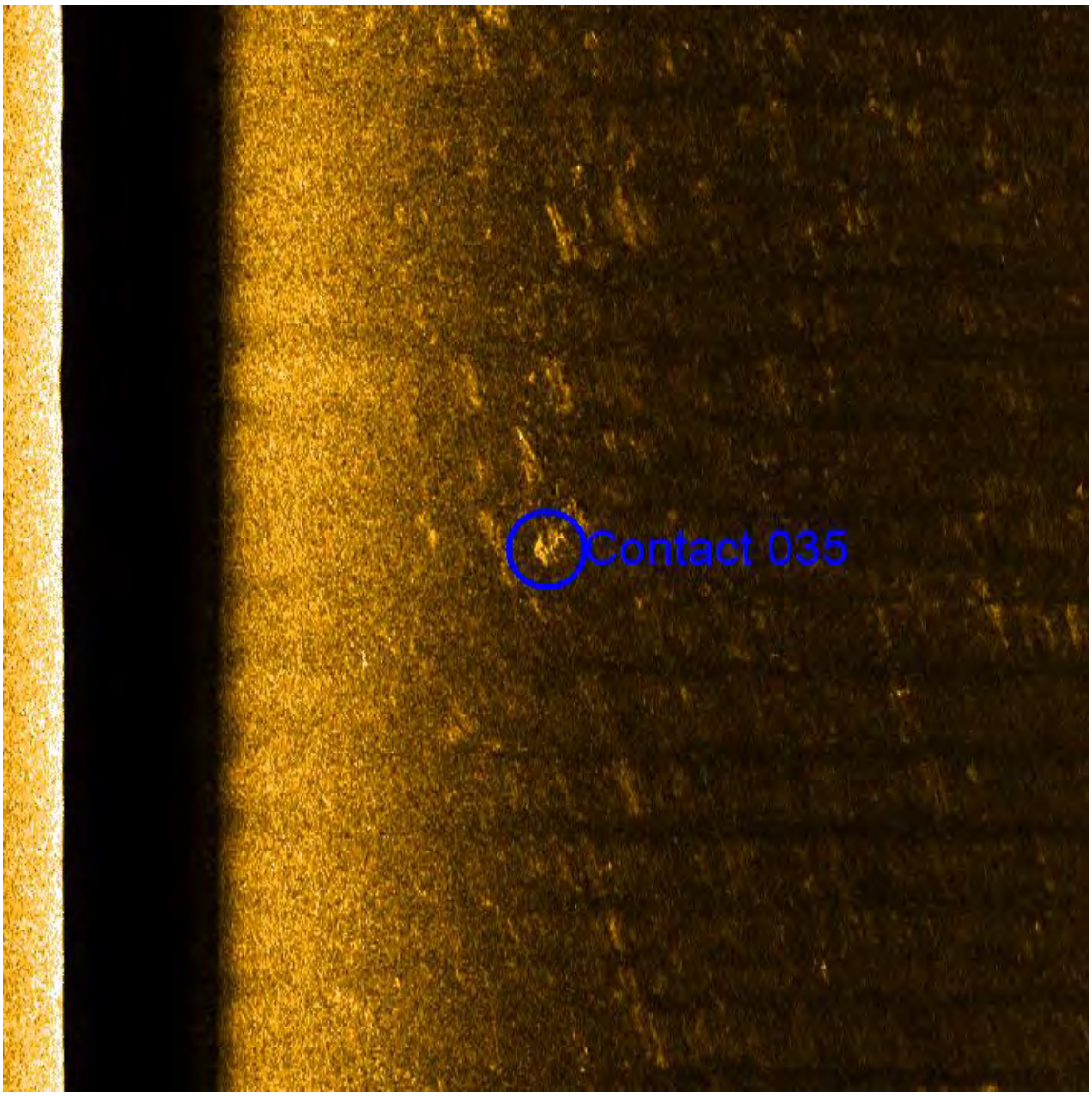


Contact 034

- Sonar Time at Target: 4/24/2015 2:38:51 PM
- Click Position
  28.9840168151 -80.7507775415 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_014.002.jsf
- Ping Number: 90657
- Range to target: 116.45 Meters
- Heading: 196.790 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_014.002

Dimensions and attributes

- Target Width: 3.57 Meters
- Target Height: 0.00 Meters
- Target Length: 18.59 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

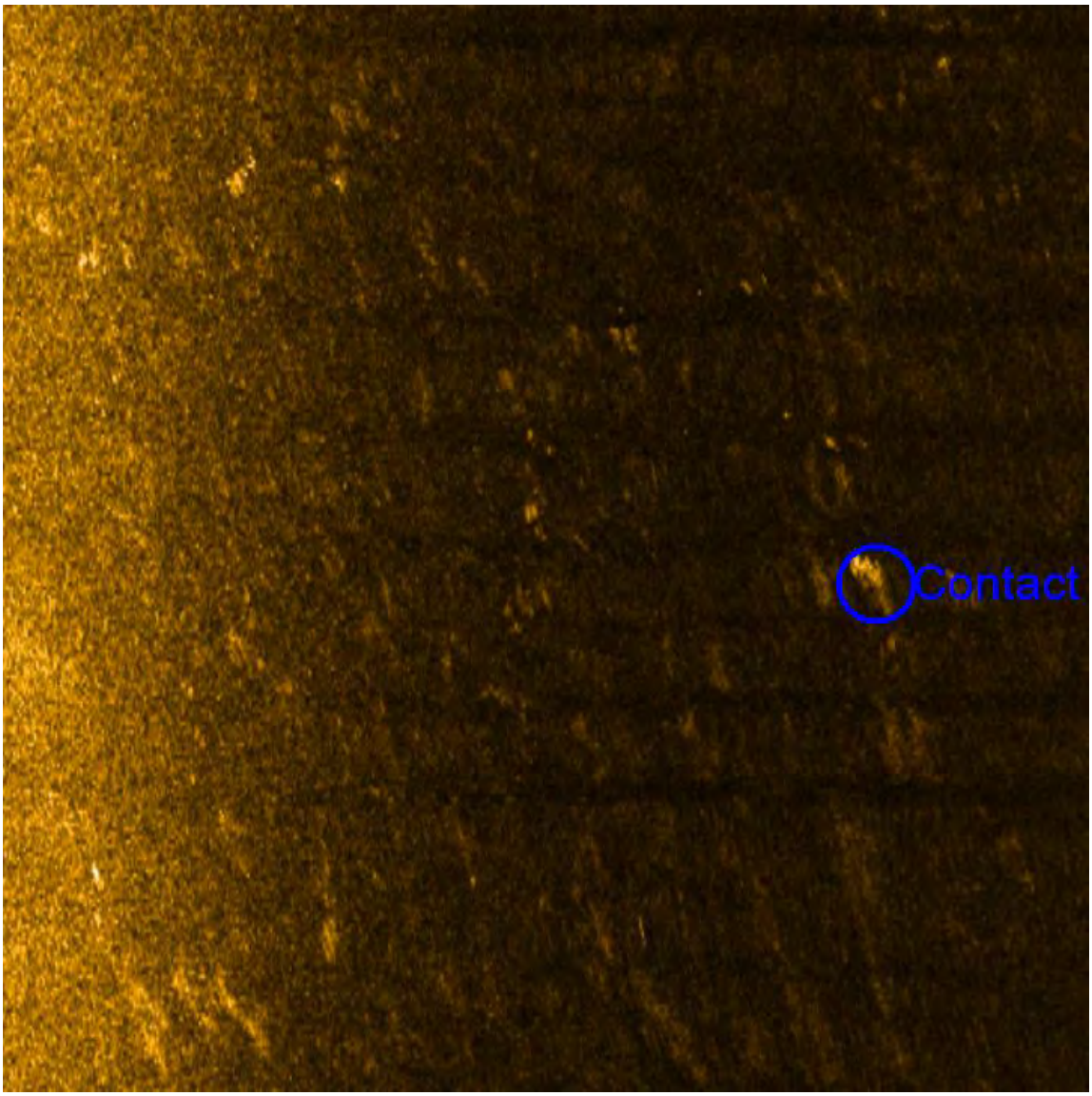


Contact 035

- Sonar Time at Target: 4/24/2015 2:37:16 PM
- Click Position
  28.9857925749 -80.7511221530 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_014.002.jsf
- Ping Number: 90214
- Range to target: 58.70 Meters
- Heading: 200.890 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_014.002

Dimensions and attributes

- Target Width: 5.12 Meters
- Target Height: 0.00 Meters
- Target Length: 10.47 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

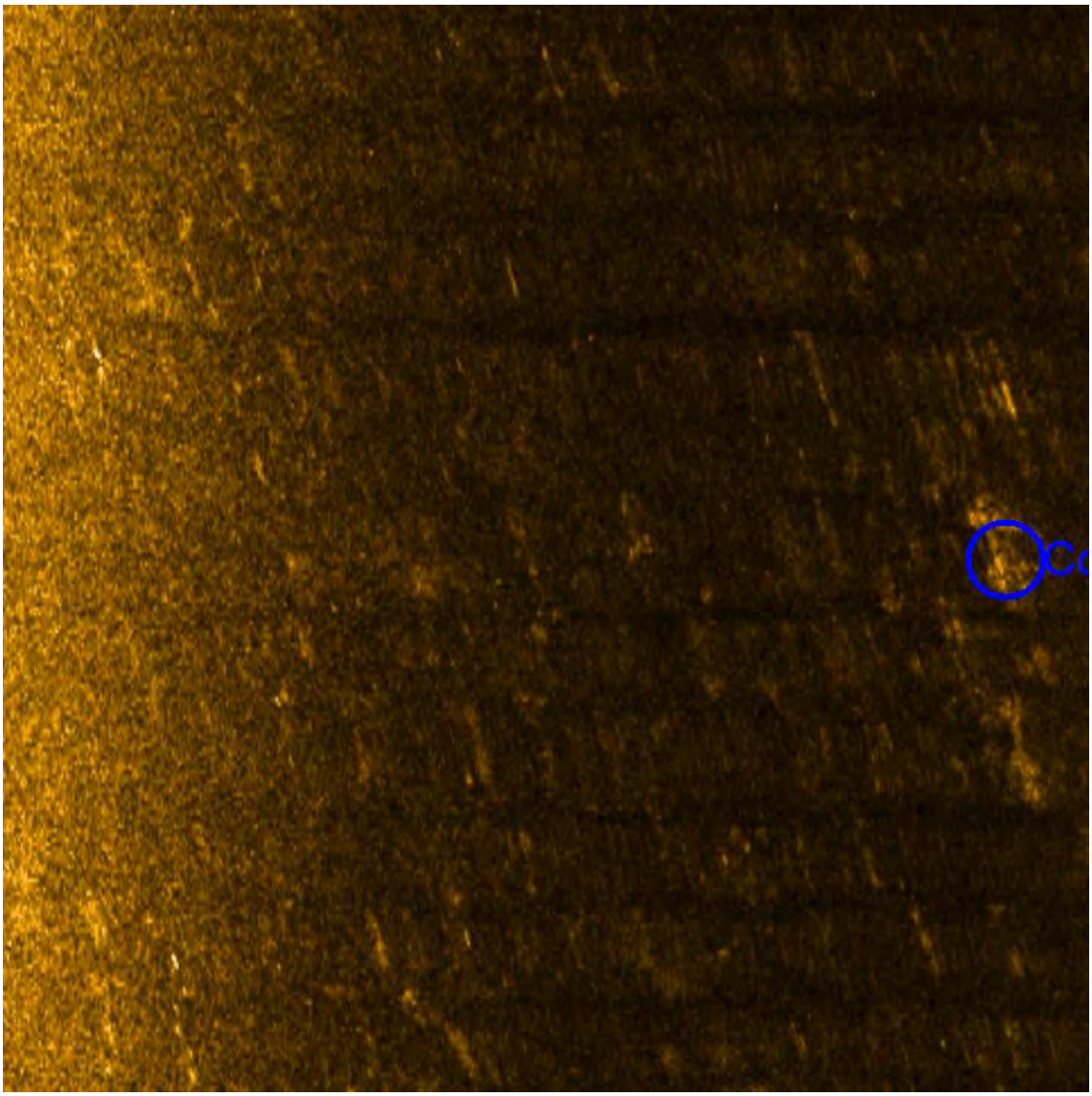


Contact 036

- Sonar Time at Target: 4/24/2015 2:31:07 PM
- Click Position
  28.9919585412 -80.7546889370 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_014.002.jsf
- Ping Number: 88495
- Range to target: 111.95 Meters
- Heading: 186.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_014.002

Dimensions and attributes

- Target Width: 2.88 Meters
- Target Height: 0.00 Meters
- Target Length: 8.05 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

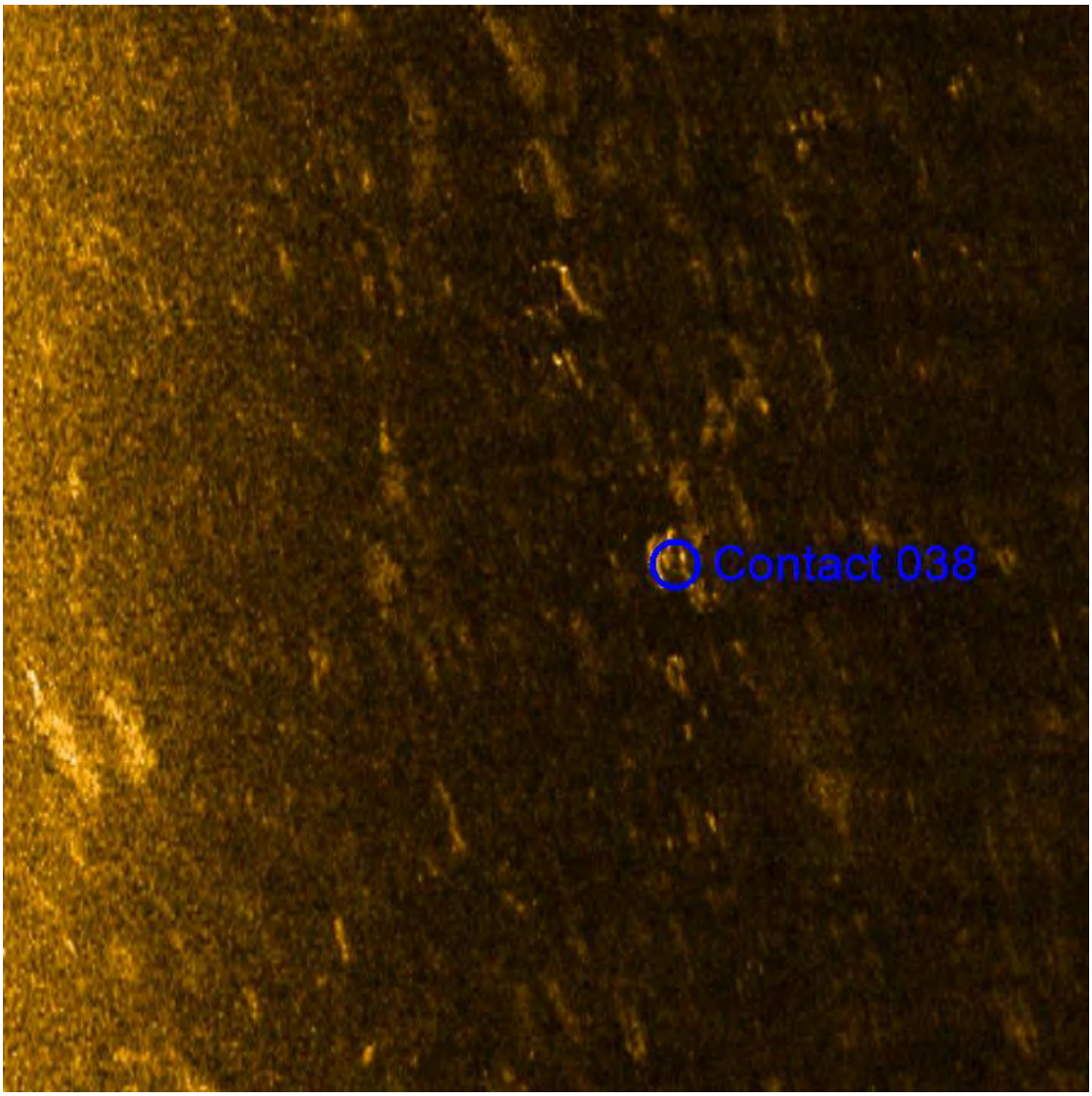


Contact 037

- Sonar Time at Target: 4/24/2015 2:27:23 PM
- Click Position
  28.9957807136 -80.7565767352 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_014.002.jsf
- Ping Number: 87454
- Range to target: 122.60 Meters
- Heading: 192.300 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_014.002

Dimensions and attributes

- Target Width: 5.32 Meters
- Target Height: 0.00 Meters
- Target Length: 12.25 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

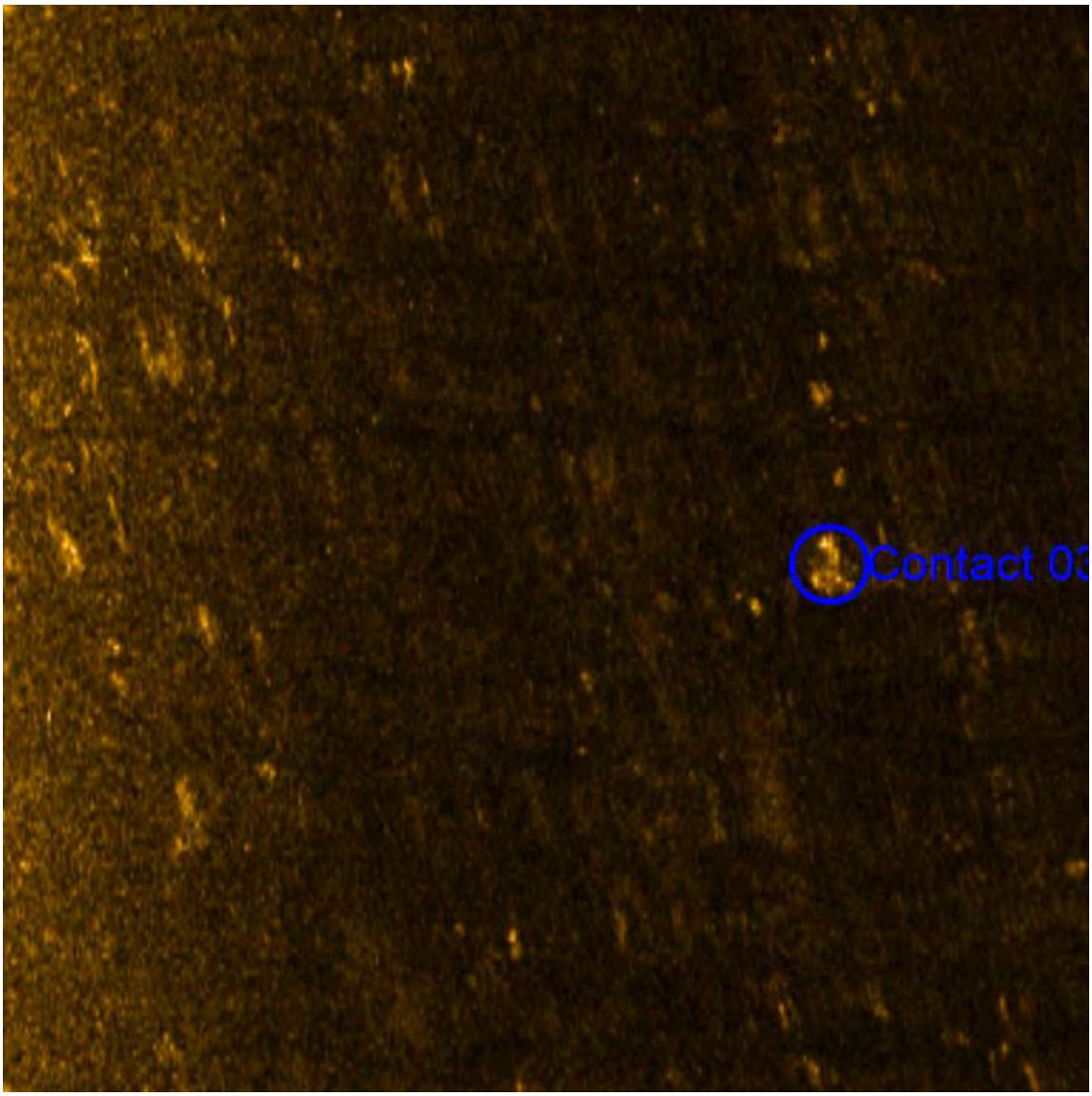


Contact 038

- Sonar Time at Target: 4/24/2015 2:25:24 PM
- Click Position
  28.9981151475 -80.7573238633 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_014.002.jsf
- Ping Number: 86897
- Range to target: 89.47 Meters
- Heading: 200.290 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_014.002

Dimensions and attributes

- Target Width: 3.67 Meters
- Target Height: 0.00 Meters
- Target Length: 8.57 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

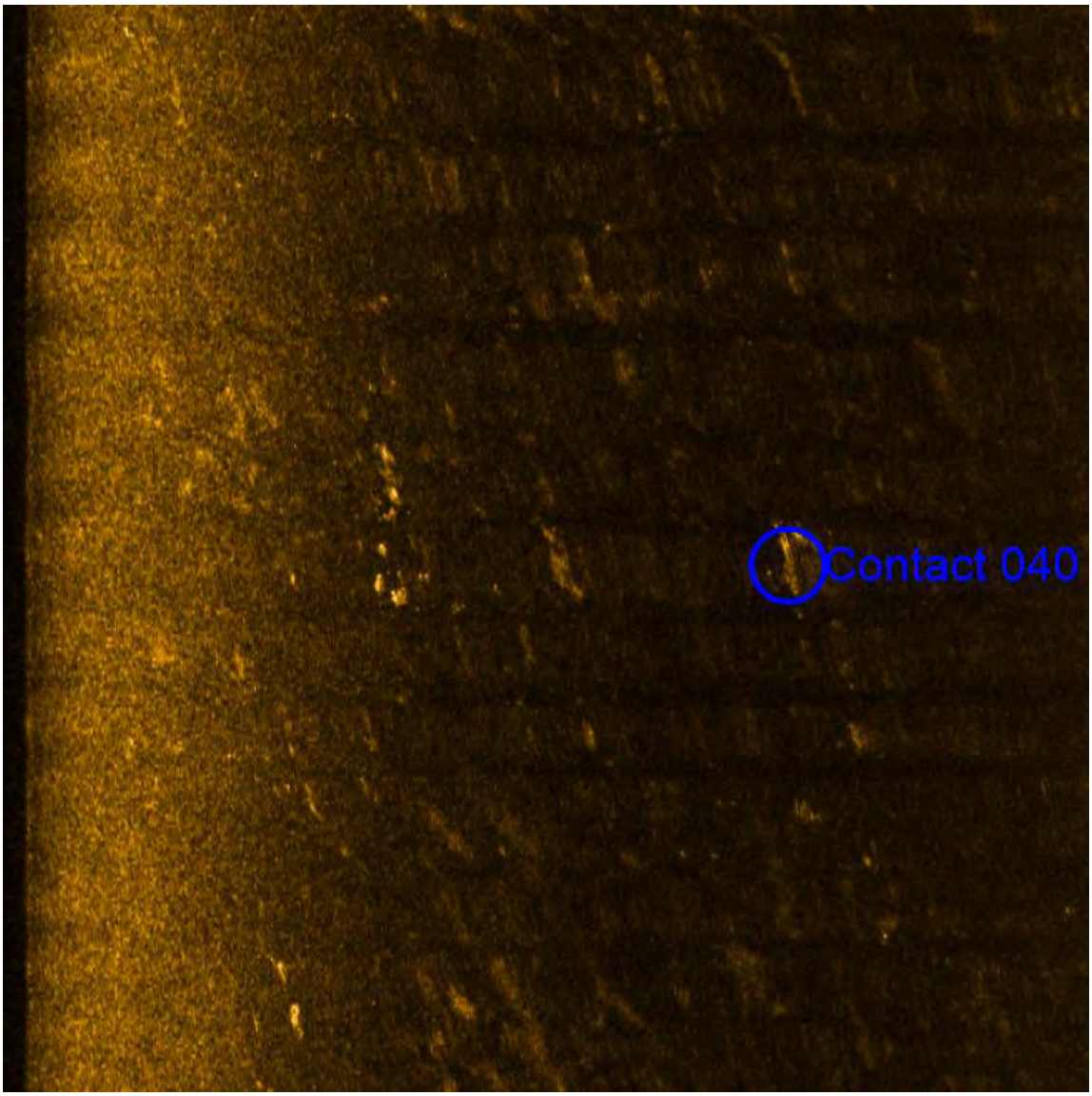


Contact 039

- Sonar Time at Target: 4/24/2015 2:15:53 PM
- Click Position
  29.0079009785 -80.7621615791 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_014.002.jsf
- Ping Number: 84242
- Range to target: 100.07 Meters
- Heading: 190.890 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_014.002

Dimensions and attributes

- Target Width: 3.13 Meters
- Target Height: 0.00 Meters
- Target Length: 5.02 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

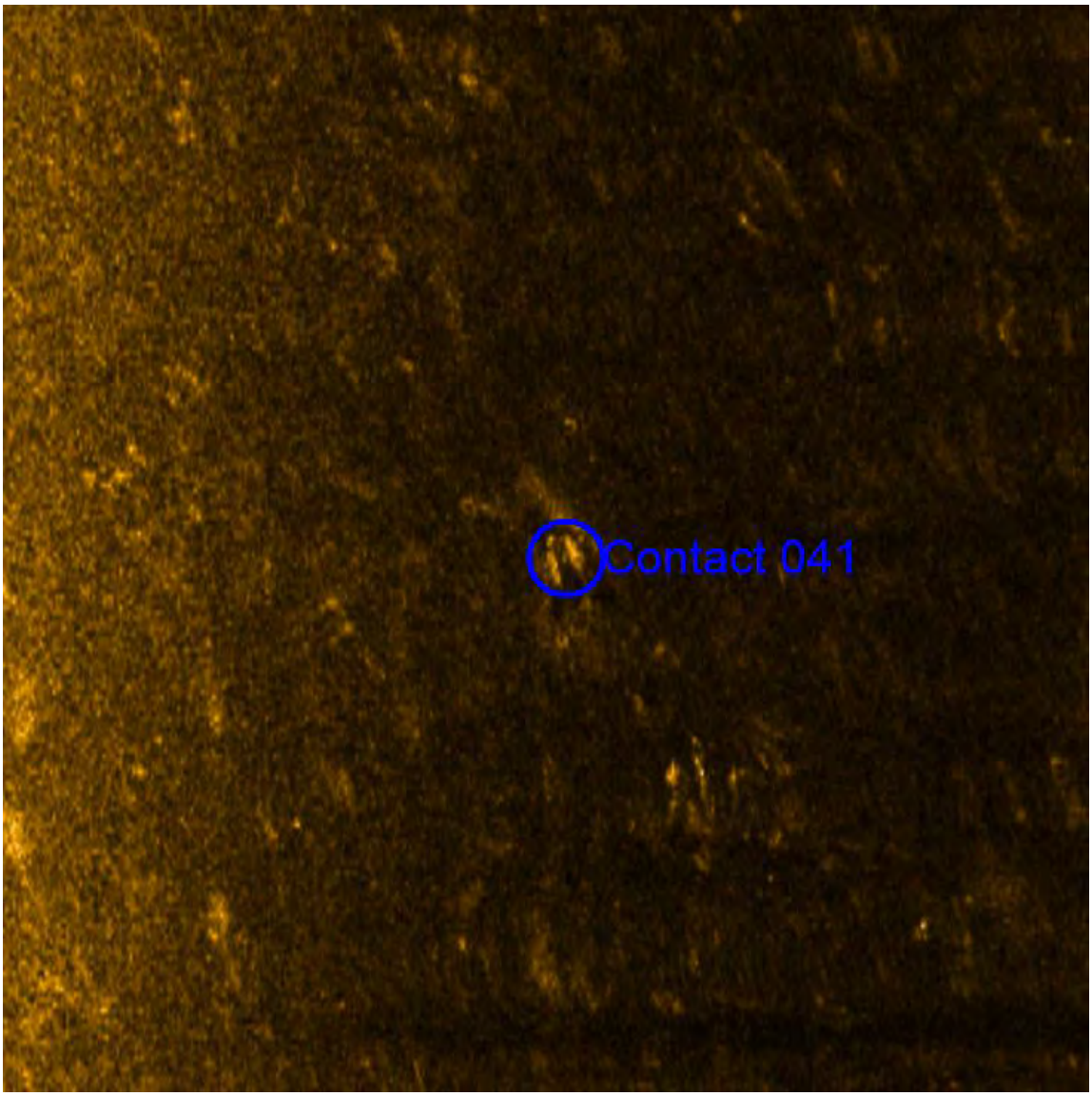


Contact 040

- Sonar Time at Target: 4/24/2015 2:06:34 PM
- Click Position
  29.0170067686 -80.7666846774 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_014.002.jsf
- Ping Number: 81637
- Range to target: 108.64 Meters
- Heading: 187.300 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_014.002

Dimensions and attributes

- Target Width: 5.42 Meters
- Target Height: 0.00 Meters
- Target Length: 10.83 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

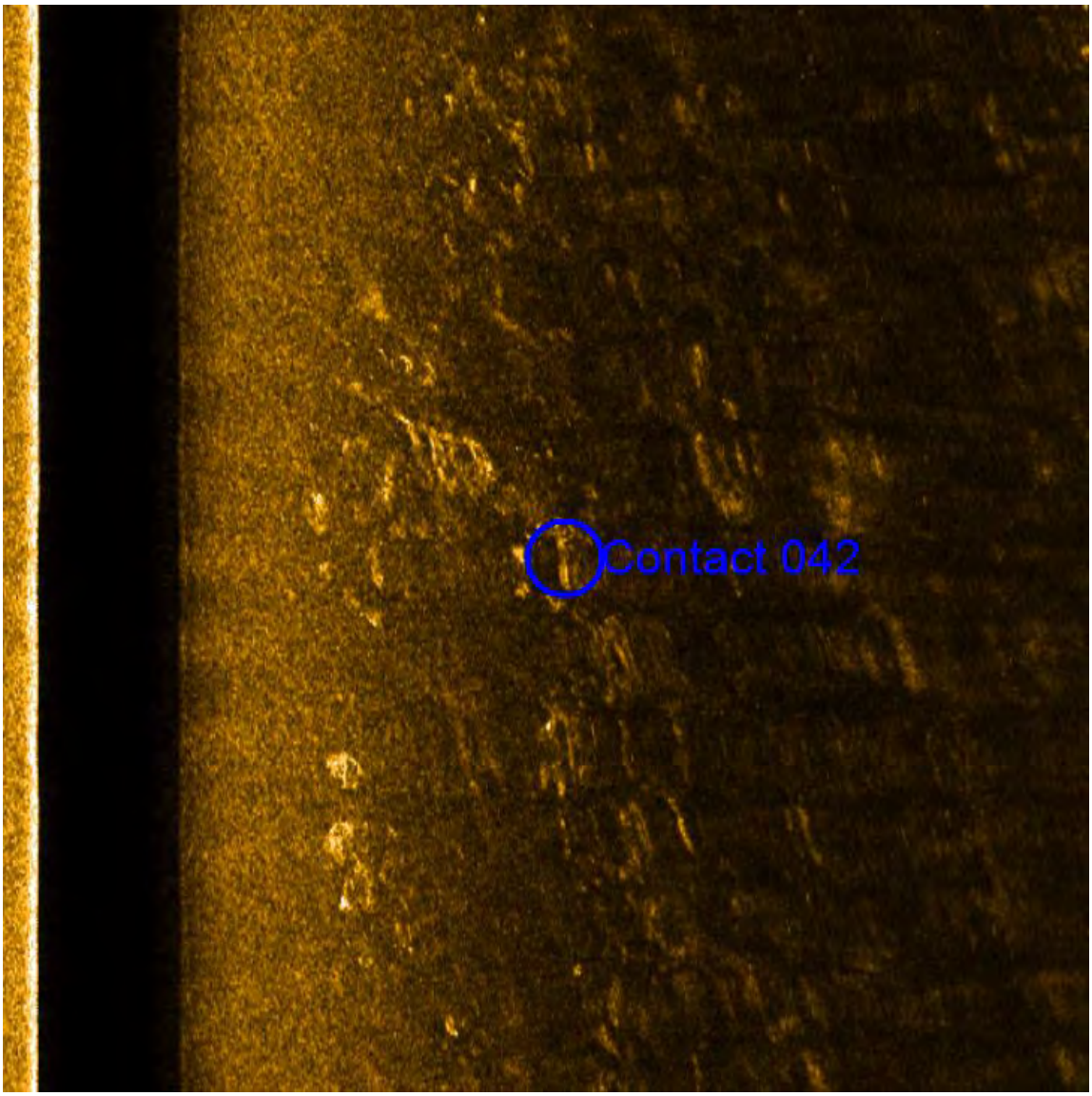


Contact 041

- Sonar Time at Target: 4/24/2015 2:04:55 PM
- Click Position
  29.0188973284 -80.7672483652 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_014.002.jsf
- Ping Number: 81181
- Range to target: 72.43 Meters
- Heading: 199.290 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_014.002

Dimensions and attributes

- Target Width: 4.64 Meters
- Target Height: 0.00 Meters
- Target Length: 13.82 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

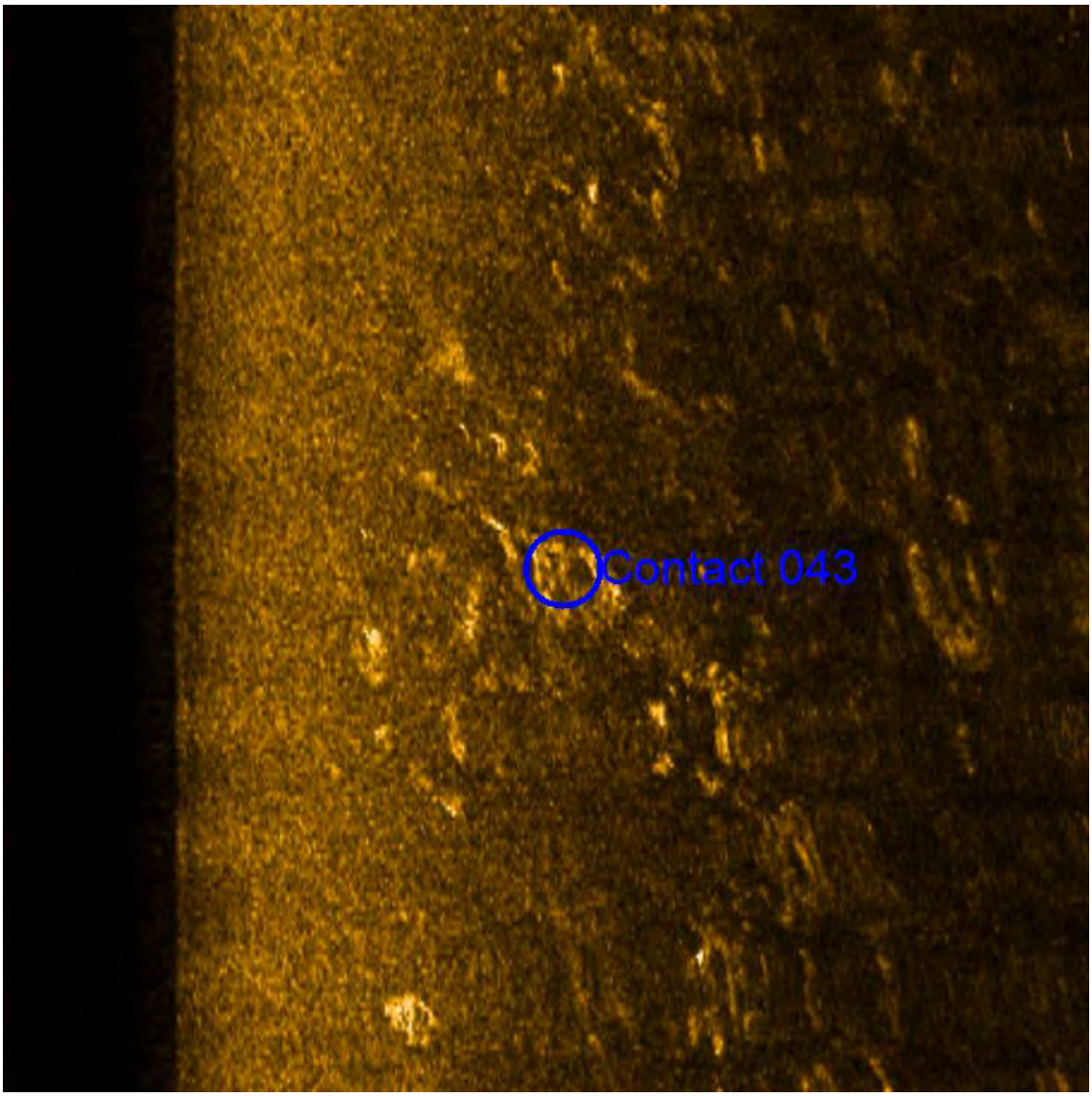


Contact 042

- Sonar Time at Target: 4/24/2015 1:54:18 PM
- Click Position
  29.0296716259 -80.7722533636 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_014.002.jsf
- Ping Number: 78209
- Range to target: 58.93 Meters
- Heading: 190.100 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_014.002

Dimensions and attributes

- Target Width: 9.13 Meters
- Target Height: 0.00 Meters
- Target Length: 34.46 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

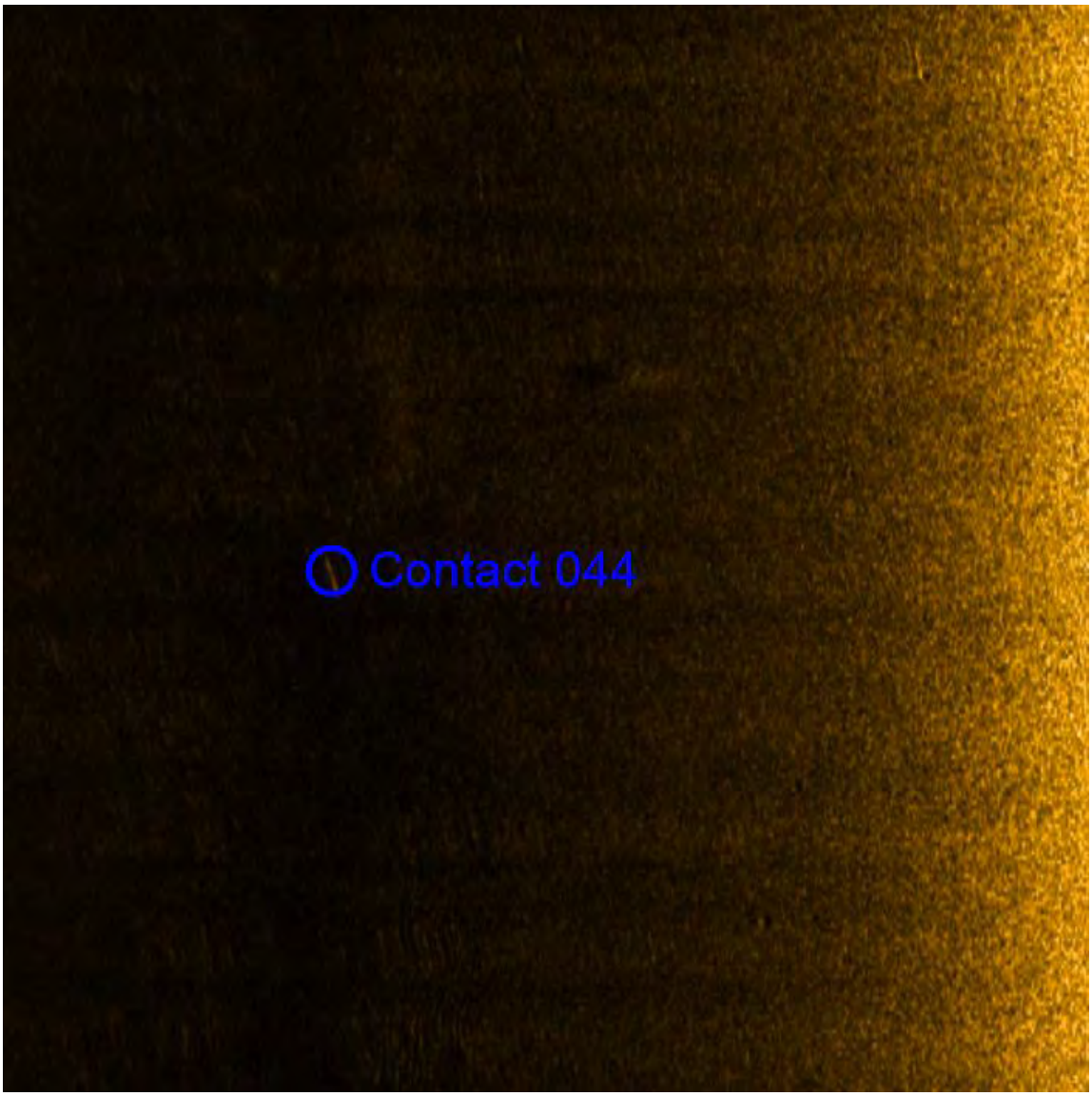


Contact 043

- Sonar Time at Target: 4/24/2015 1:54:11 PM
- Click Position
  29.0298697084 -80.7721823933 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_014.002.jsf
- Ping Number: 78176
- Range to target: 44.02 Meters
- Heading: 190.500 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_014.002

Dimensions and attributes

- Target Width: 6.87 Meters
- Target Height: 0.00 Meters
- Target Length: 25.14 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

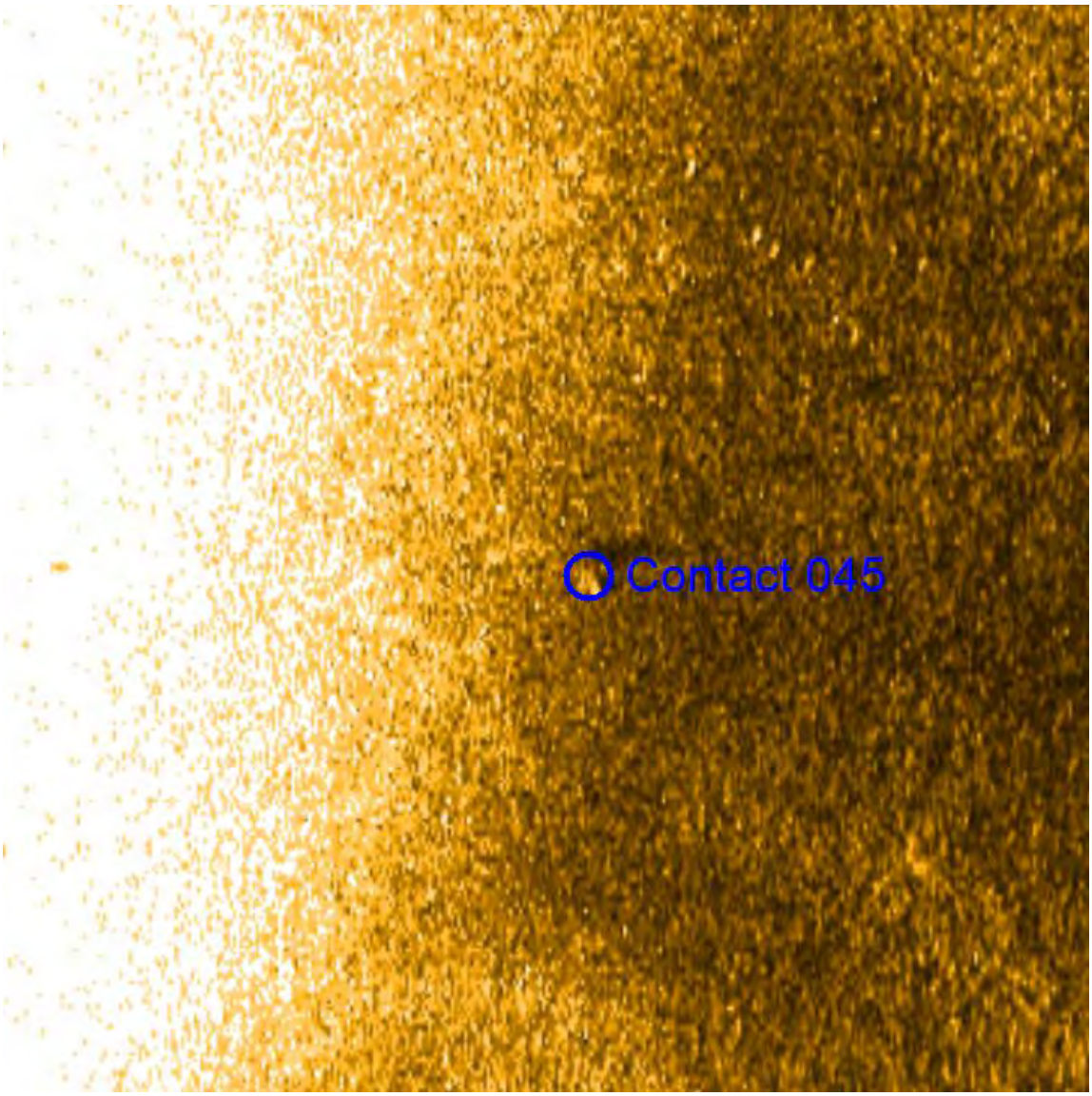


Contact 044

- Sonar Time at Target: 4/24/2015 3:10:51 PM
- Click Position
  28.9515974318 -80.7326535339 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_014.003.jsf
- Ping Number: 99600
- Range to target: 102.88 Meters
- Heading: 188.500 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_014.003

Dimensions and attributes

- Target Width: 0.94 Meters
- Target Height: 0.00 Meters
- Target Length: 4.03 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

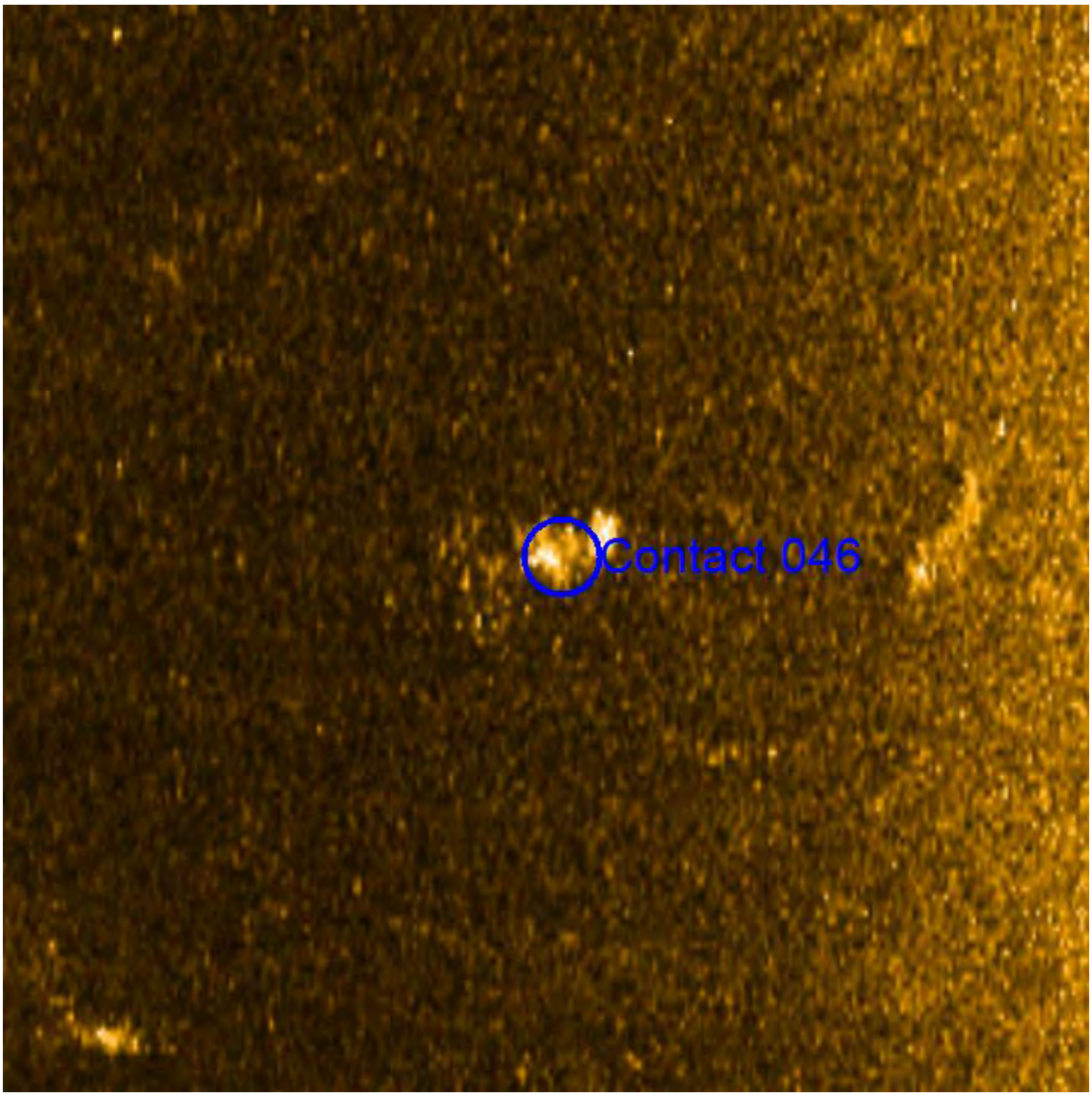


Contact 045

- Sonar Time at Target: 4/25/2015 1:08:54 PM
- Click Position
  28.9909742201 -80.7471425219 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_018.jsf
- Ping Number: 87641
- Range to target: 54.61 Meters
- Heading: 279.590 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_018

Dimensions and attributes

- Target Width: 1.33 Meters
- Target Height: 0.00 Meters
- Target Length: 2.27 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

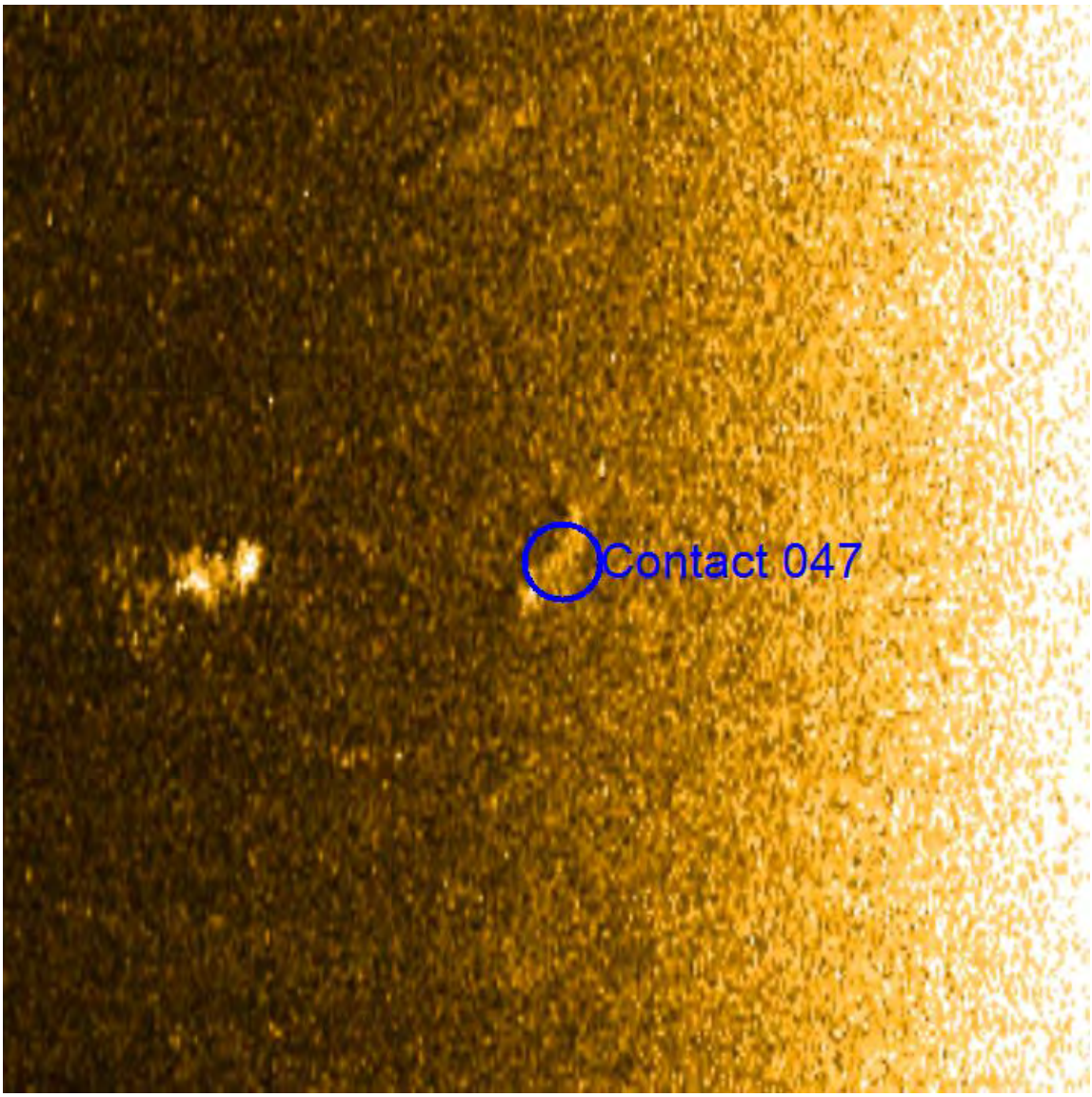


Contact 046

- Sonar Time at Target: 4/25/2015 1:11:57 PM
- Click Position
  28.9898390812 -80.7509376980 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_018.jsf
- Ping Number: 88493
- Range to target: 71.01 Meters
- Heading: 283.800 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_018

Dimensions and attributes

- Target Width: 3.24 Meters
- Target Height: 0.00 Meters
- Target Length: 9.03 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

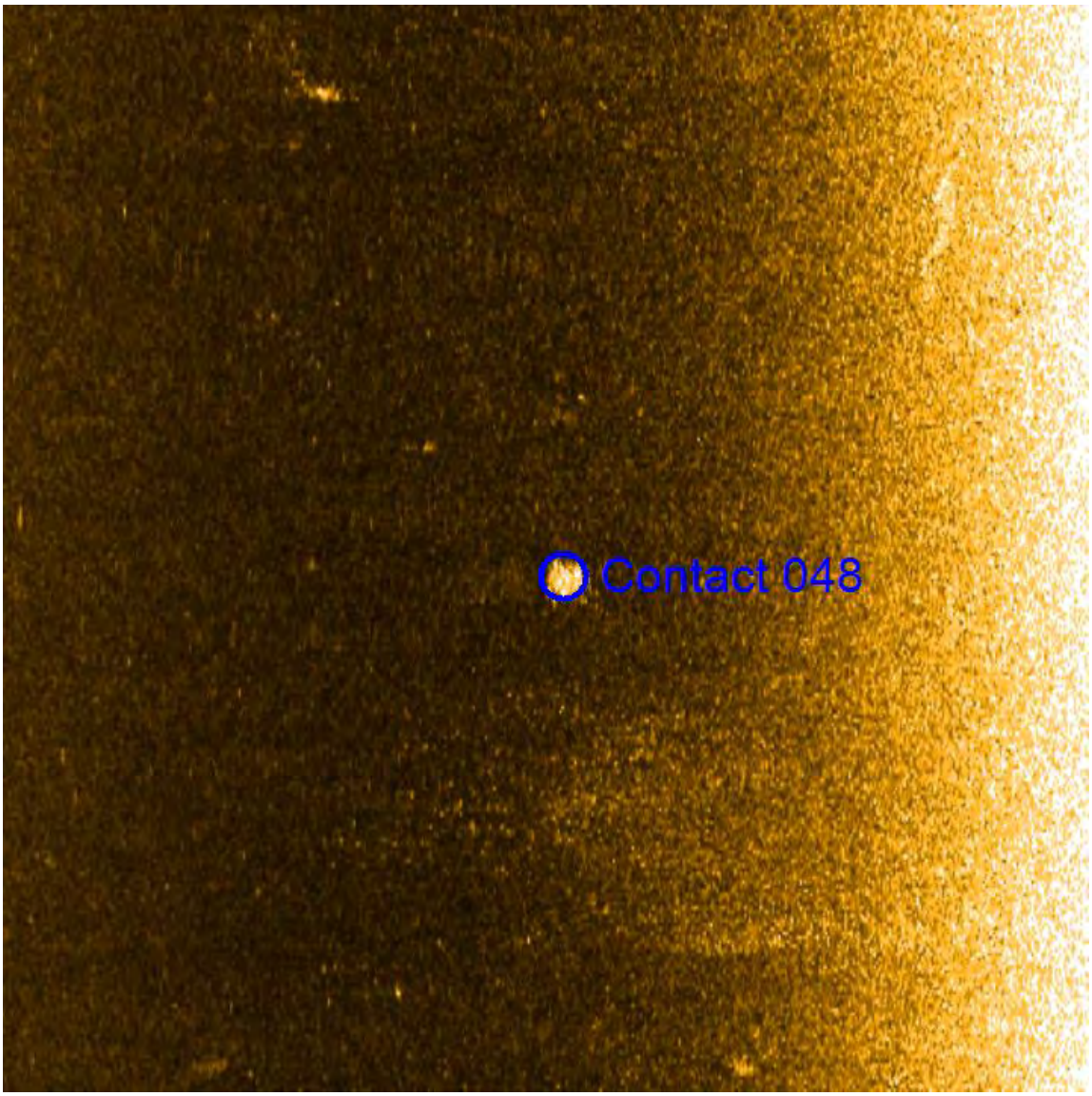


Contact 047

- Sonar Time at Target: 4/25/2015 1:11:56 PM
- Click Position
  28.9900399135 -80.7509220509 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_018.jsf
- Ping Number: 88490
- Range to target: 48.76 Meters
- Heading: 284.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_018

Dimensions and attributes

- Target Width: 2.06 Meters
- Target Height: 0.00 Meters
- Target Length: 7.08 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

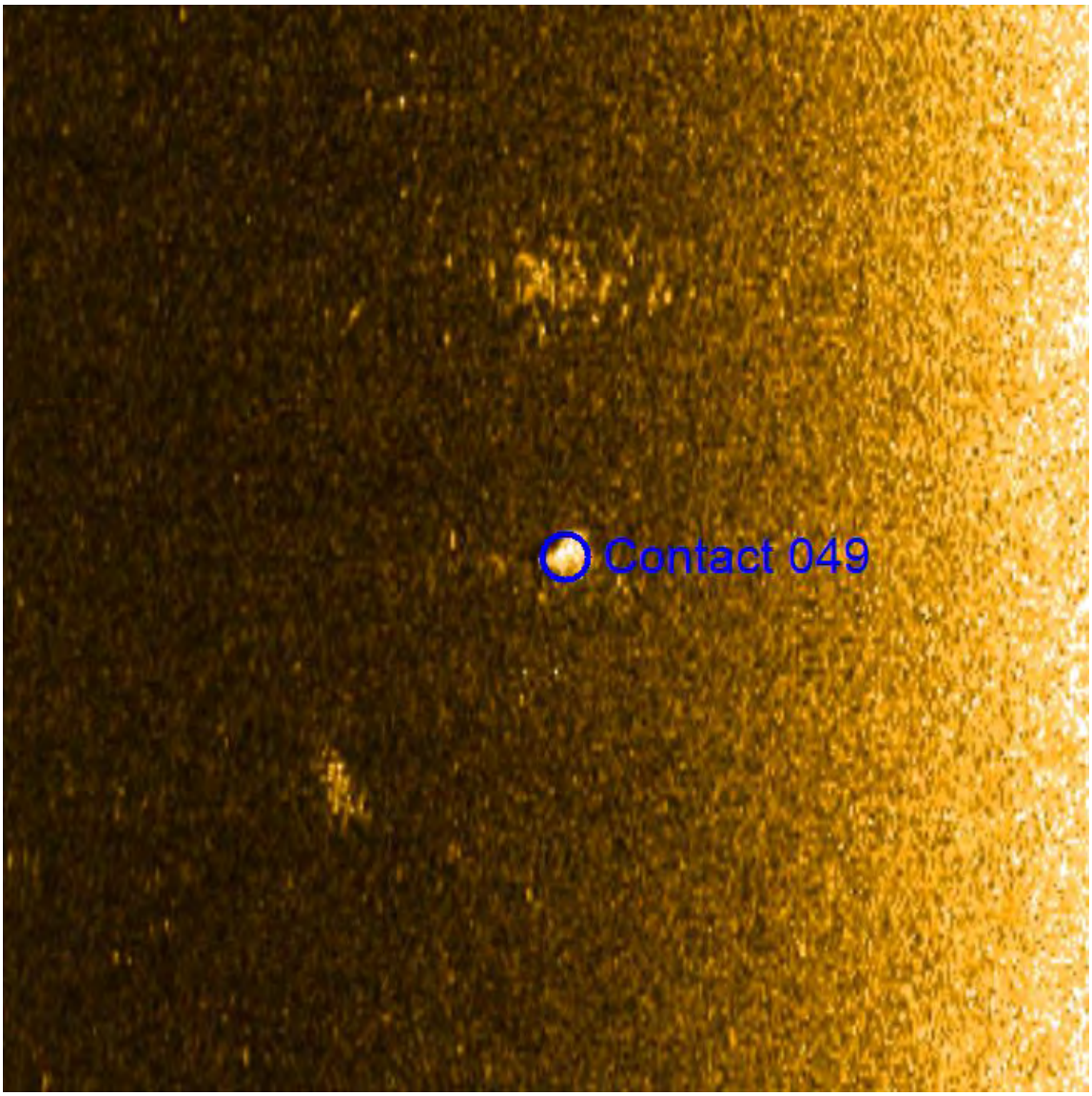


Contact 048

- Sonar Time at Target: 4/25/2015 1:12:34 PM
- Click Position
  28.9898440631 -80.7517315709 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_018.jsf
- Ping Number: 88668
- Range to target: 71.20 Meters
- Heading: 285.400 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_018

Dimensions and attributes

- Target Width: 4.90 Meters
- Target Height: 0.00 Meters
- Target Length: 4.23 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

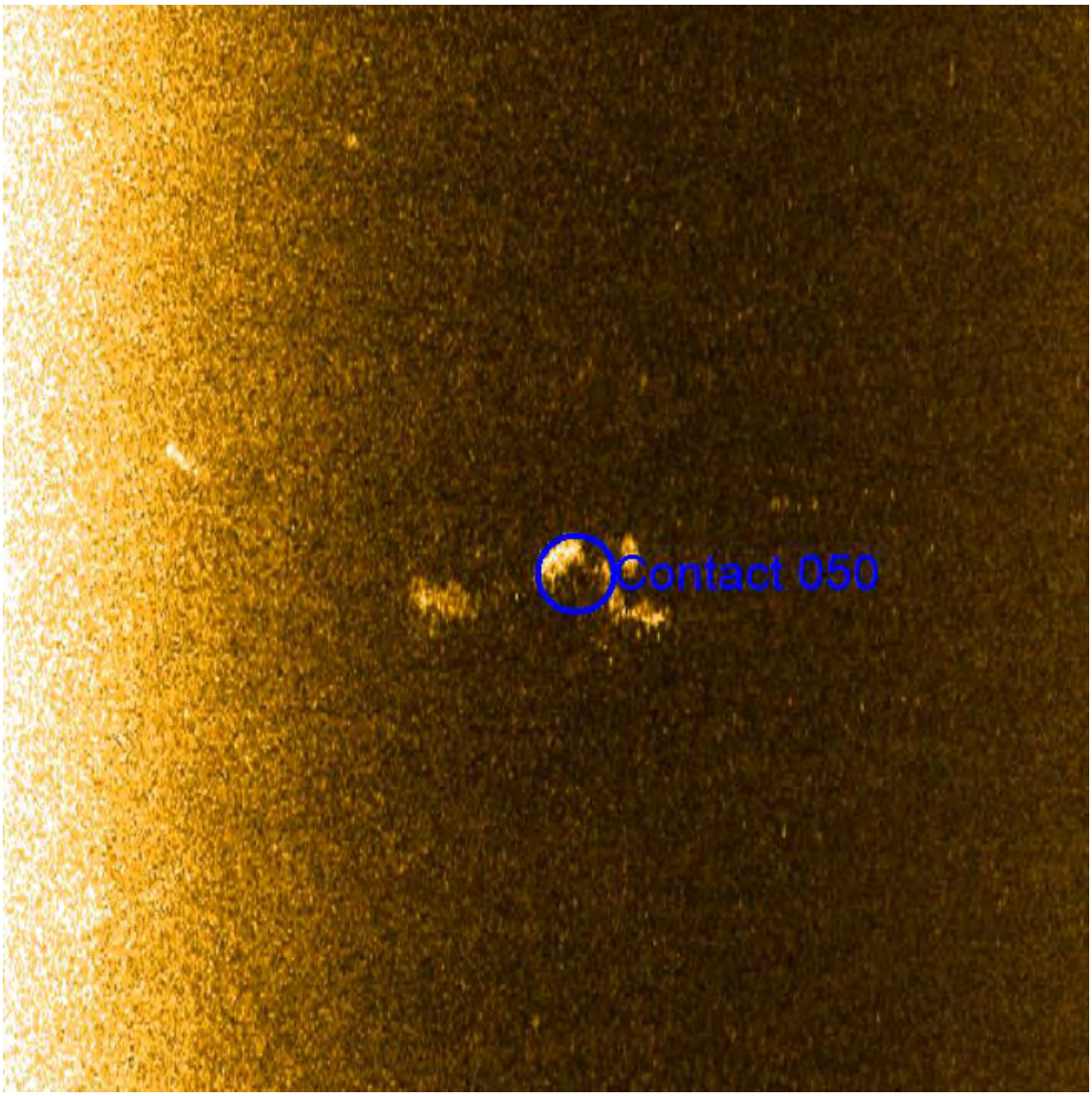


Contact 049

- Sonar Time at Target: 4/25/2015 1:17:59 PM
- Click Position
  28.9898676733 -80.7587071148 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_018.jsf
- Ping Number: 90180
- Range to target: 61.78 Meters
- Heading: 287.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_018

Dimensions and attributes

- Target Width: 2.77 Meters
- Target Height: 0.00 Meters
- Target Length: 3.90 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

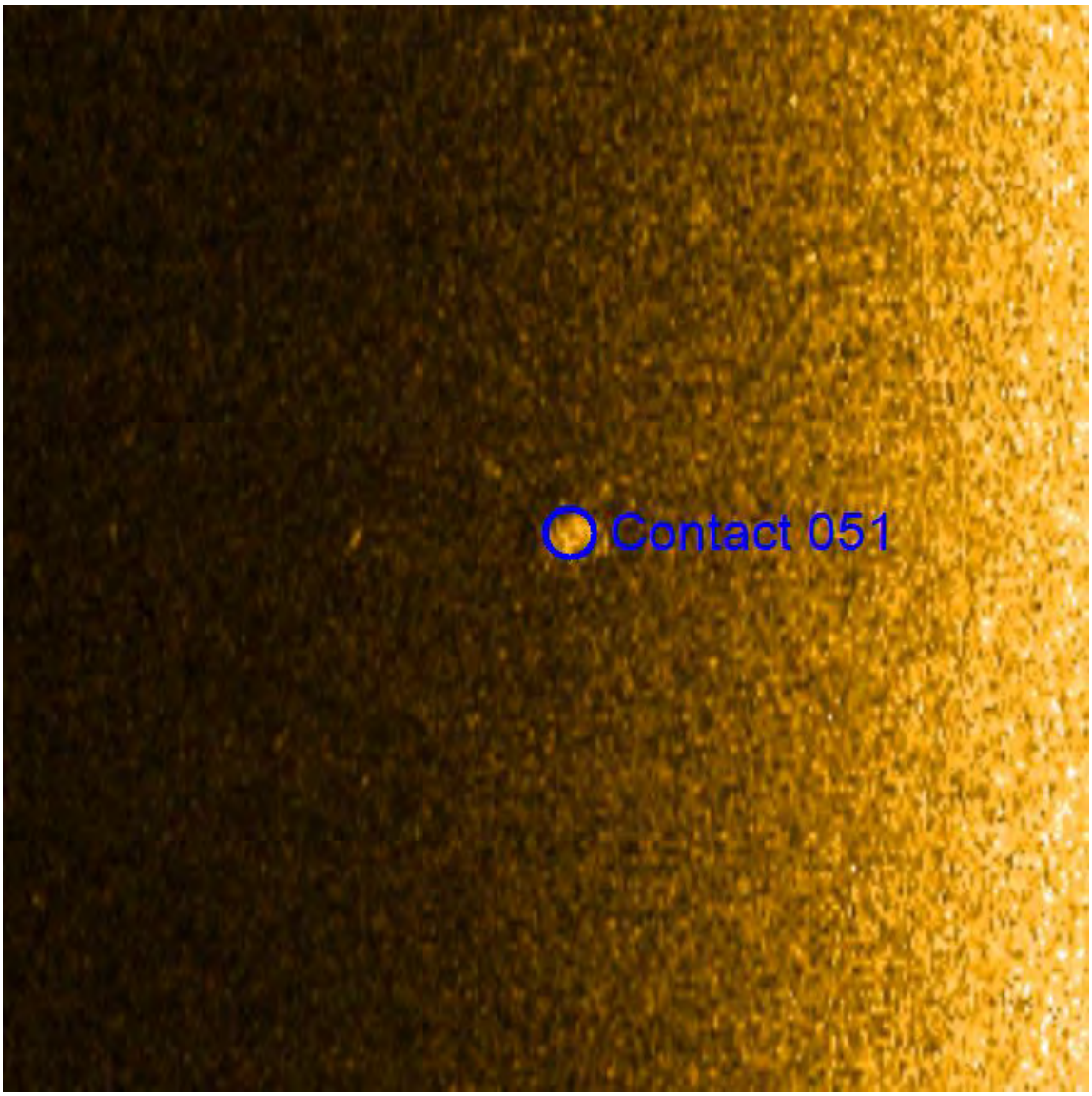


Contact 050

- Sonar Time at Target: 4/25/2015 1:17:56 PM
- Click Position
  28.9911505644 -80.7585482961 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_018.jsf
- Ping Number: 90166
- Range to target: 80.95 Meters
- Heading: 287.190 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_018

Dimensions and attributes

- Target Width: 5.76 Meters
- Target Height: 0.00 Meters
- Target Length: 15.92 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

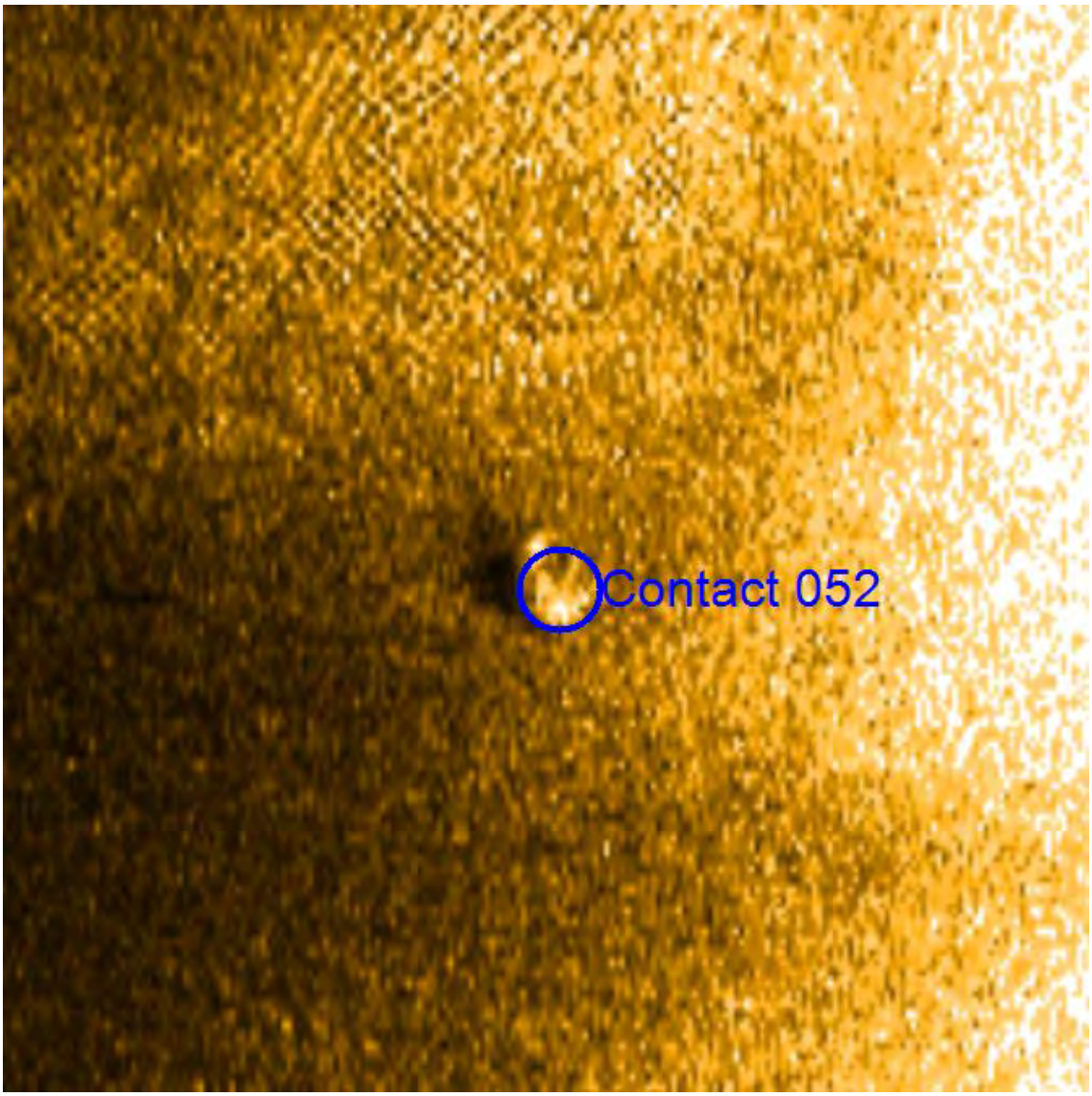


Contact 051

- Sonar Time at Target: 4/25/2015 2:58:43 PM
- Click Position
  29.0231172900 -80.7595873404 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_019.jsf
- Ping Number: 118334
- Range to target: 47.34 Meters
- Heading: 90.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_019

Dimensions and attributes

- Target Width: 2.91 Meters
- Target Height: 0.00 Meters
- Target Length: 4.12 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

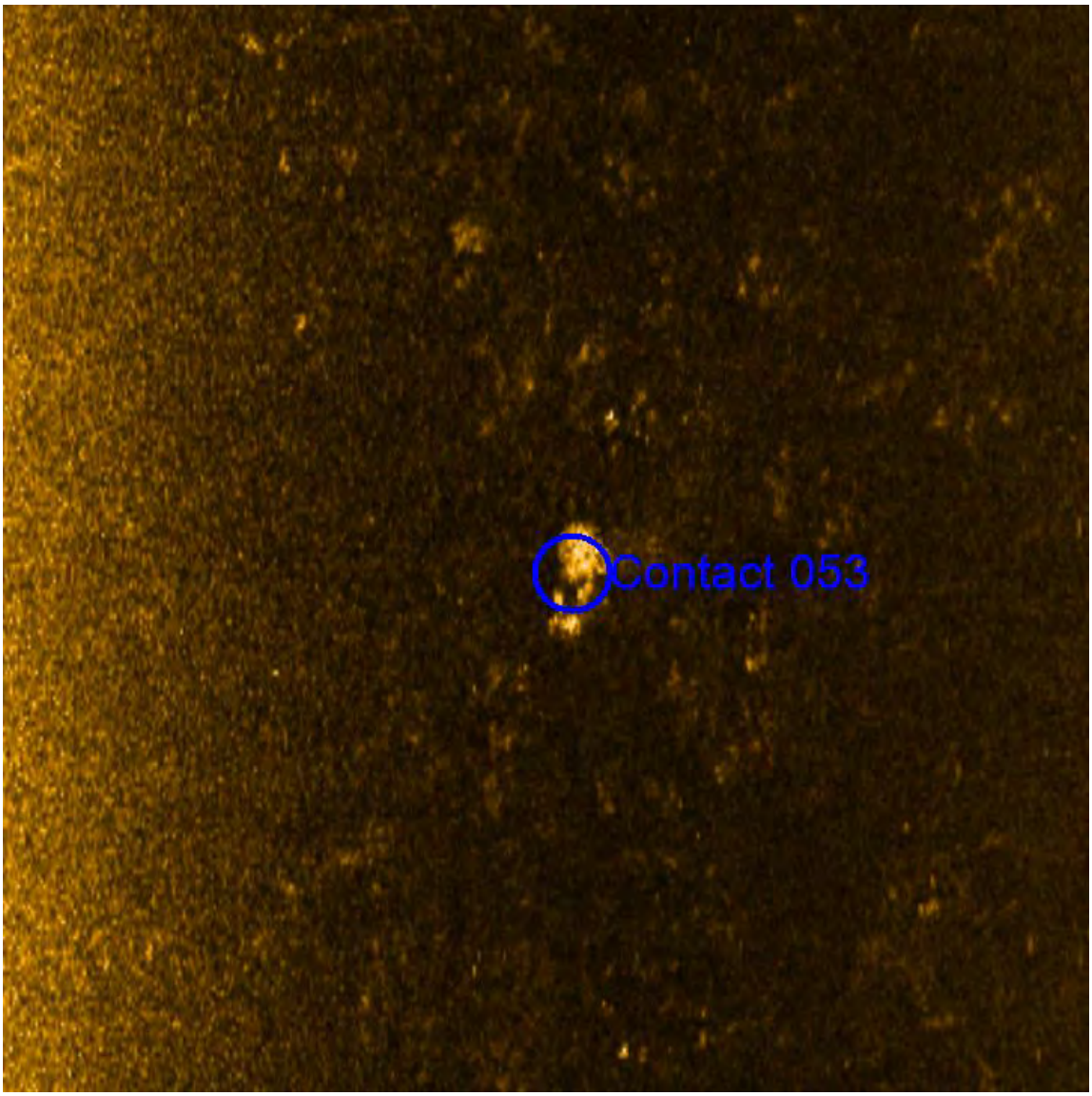


Contact 052

- Sonar Time at Target: 4/25/2015 3:02:21 PM
- Click Position
  29.0231646814 -80.7547041240 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_019.jsf
- Ping Number: 119346
- Range to target: 43.31 Meters
- Heading: 84.100 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_019

Dimensions and attributes

- Target Width: 2.20 Meters
- Target Height: 0.54 Meters
- Target Length: 4.52 Meters
- Target Shadow: 2.87 Meters
- Classification1: debris
- Description: Potential Debris

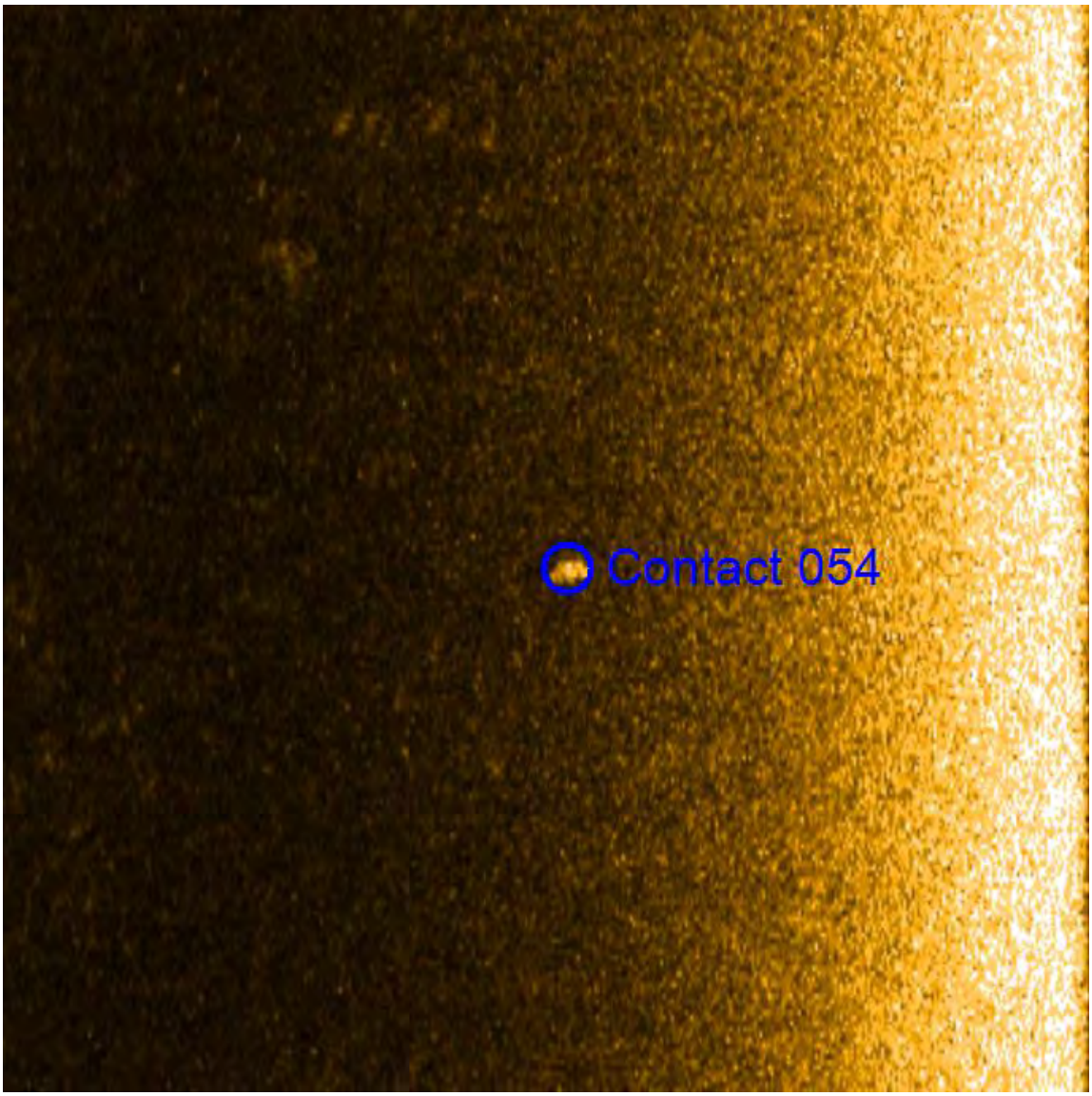


Contact 053

- Sonar Time at Target: 4/25/2015 7:10:00 PM
- Click Position
  29.0864532616 -80.7856857671 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_027.jsf
- Ping Number: 188560
- Range to target: 80.47 Meters
- Heading: 84.390 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_027

Dimensions and attributes

- Target Width: 4.70 Meters
- Target Height: 0.00 Meters
- Target Length: 9.52 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

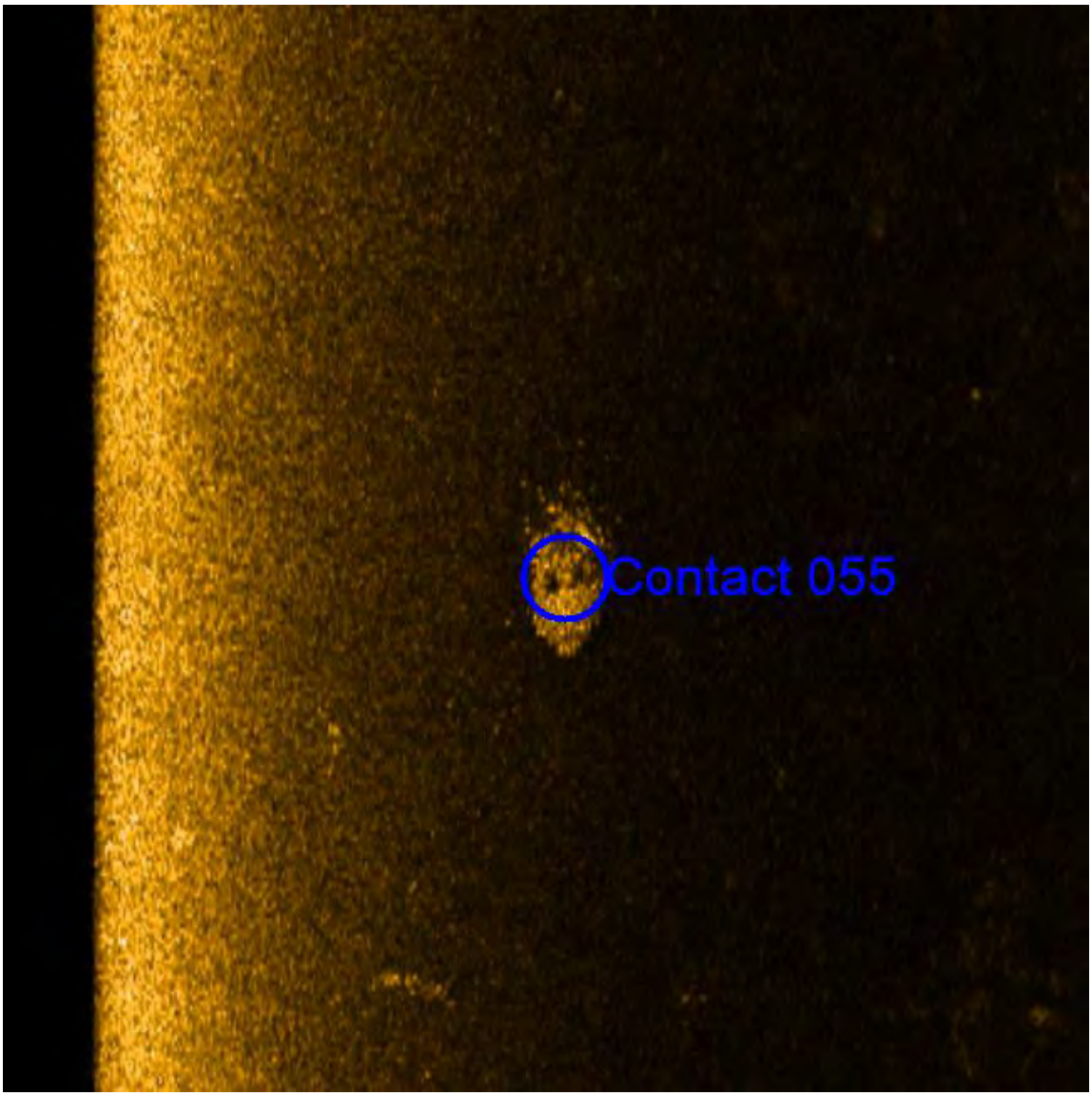


Contact 054

- Sonar Time at Target: 4/26/2015 7:56:31 AM
- Click Position
  29.1194671096 -80.8426342202 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_022.jsf
- Ping Number: 15105
- Range to target: 50.64 Meters
- Heading: 82.200 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_022

Dimensions and attributes

- Target Width: 2.22 Meters
- Target Height: 0.00 Meters
- Target Length: 4.24 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

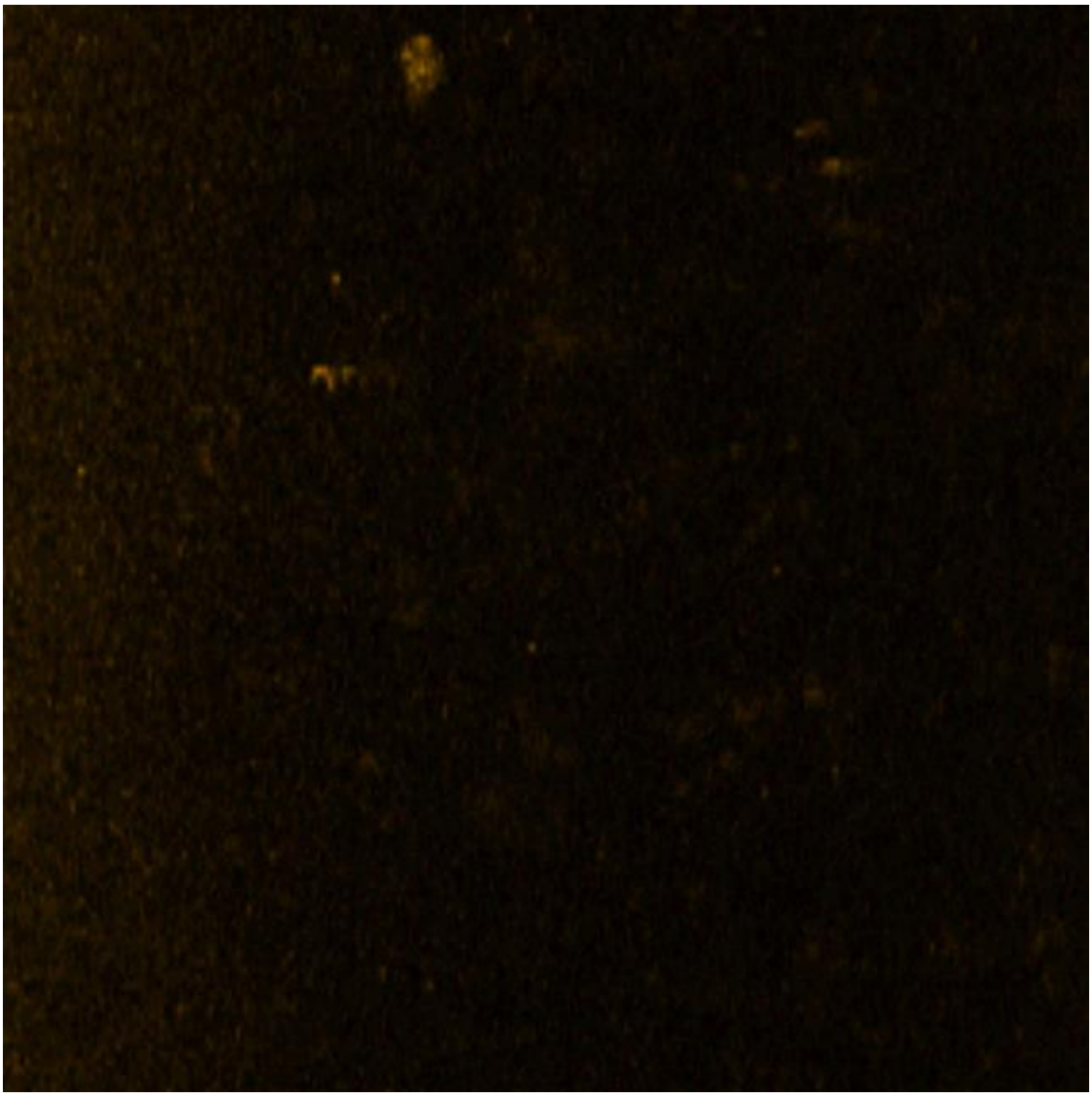


Contact 055

- Sonar Time at Target: 4/26/2015 10:18:44 AM
- Click Position
  29.1514437378 -80.8956049752 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_023.jsf
- Ping Number: 54855
- Range to target: 51.59 Meters
- Heading: 286.900 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_023

Dimensions and attributes

- Target Width: 7.41 Meters
- Target Height: 0.00 Meters
- Target Length: 16.31 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

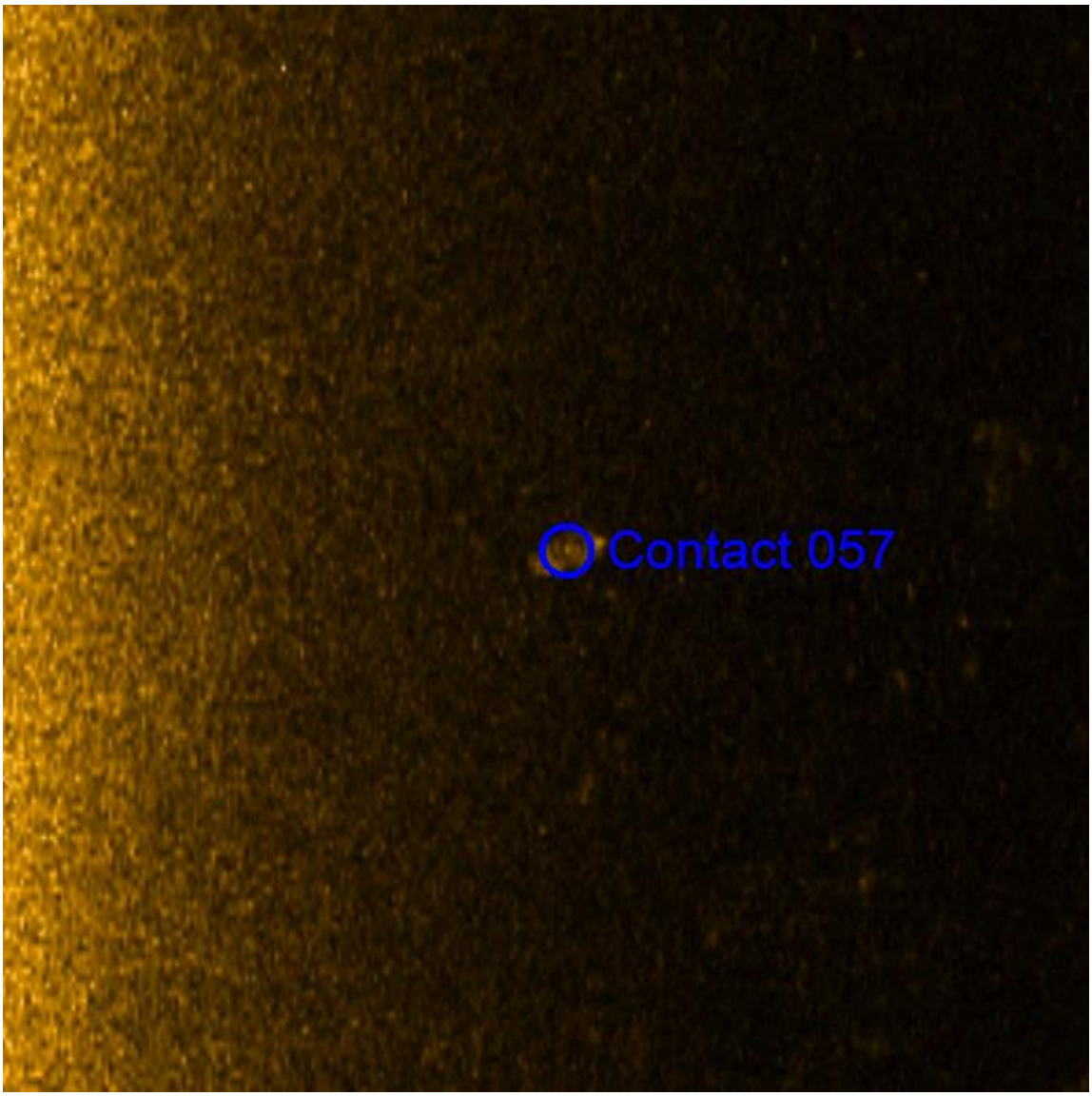


Contact 056

- Sonar Time at Target: 4/26/2015 10:19:33 AM
- Click Position
  29.1522466335 -80.8967680141 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_023.jsf
- Ping Number: 55080
- Range to target: 134.44 Meters
- Heading: 284.500 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_023

Dimensions and attributes

- Target Width: 3.01 Meters
- Target Height: 0.00 Meters
- Target Length: 16.01 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

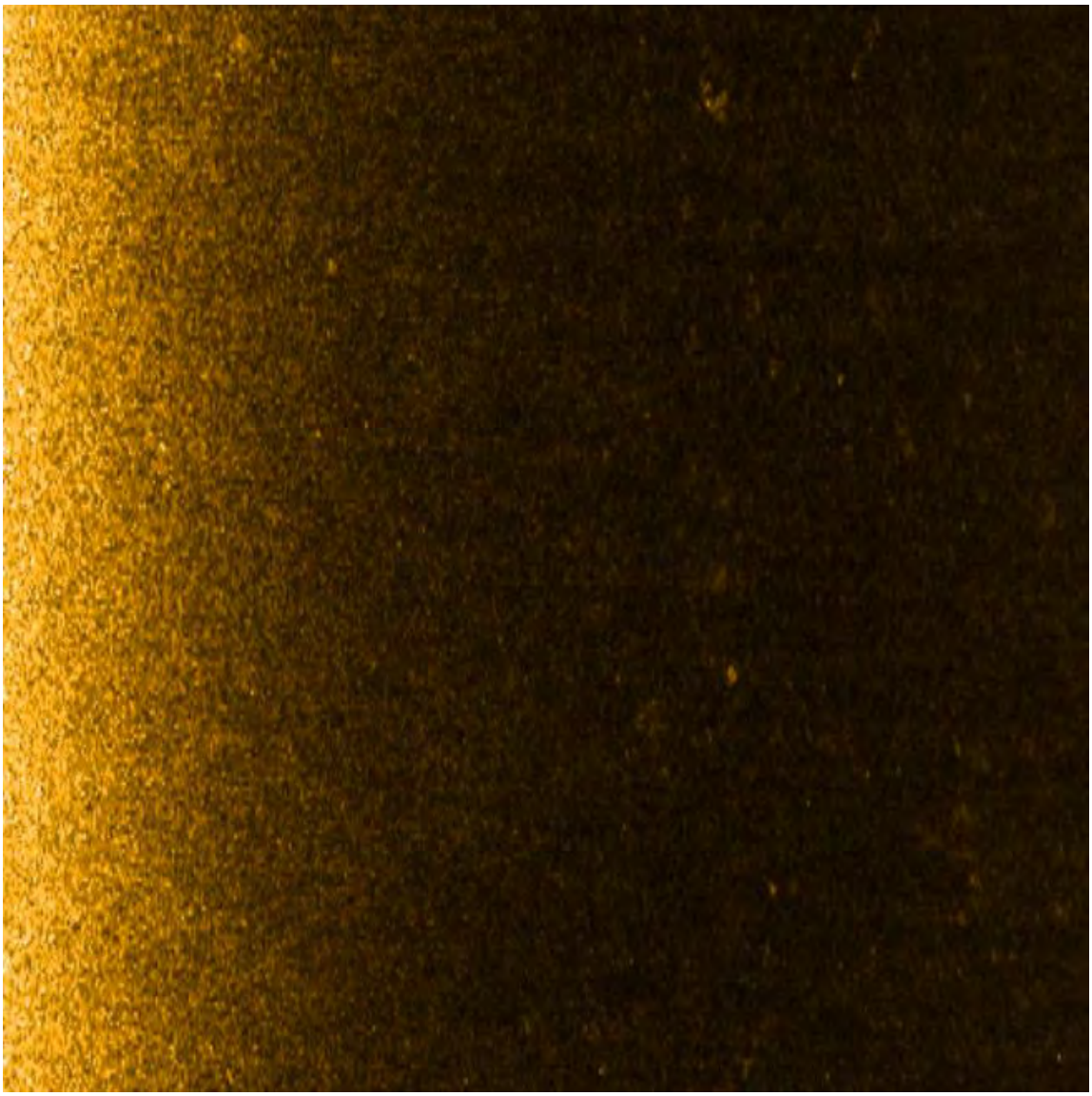


Contact 057

- Sonar Time at Target: 4/26/2015 10:19:59 AM
- Click Position
  29.1515035834 -80.8973901583 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_023.jsf
- Ping Number: 55199
- Range to target: 51.36 Meters
- Heading: 285.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_023

Dimensions and attributes

- Target Width: 1.98 Meters
- Target Height: 0.00 Meters
- Target Length: 5.97 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

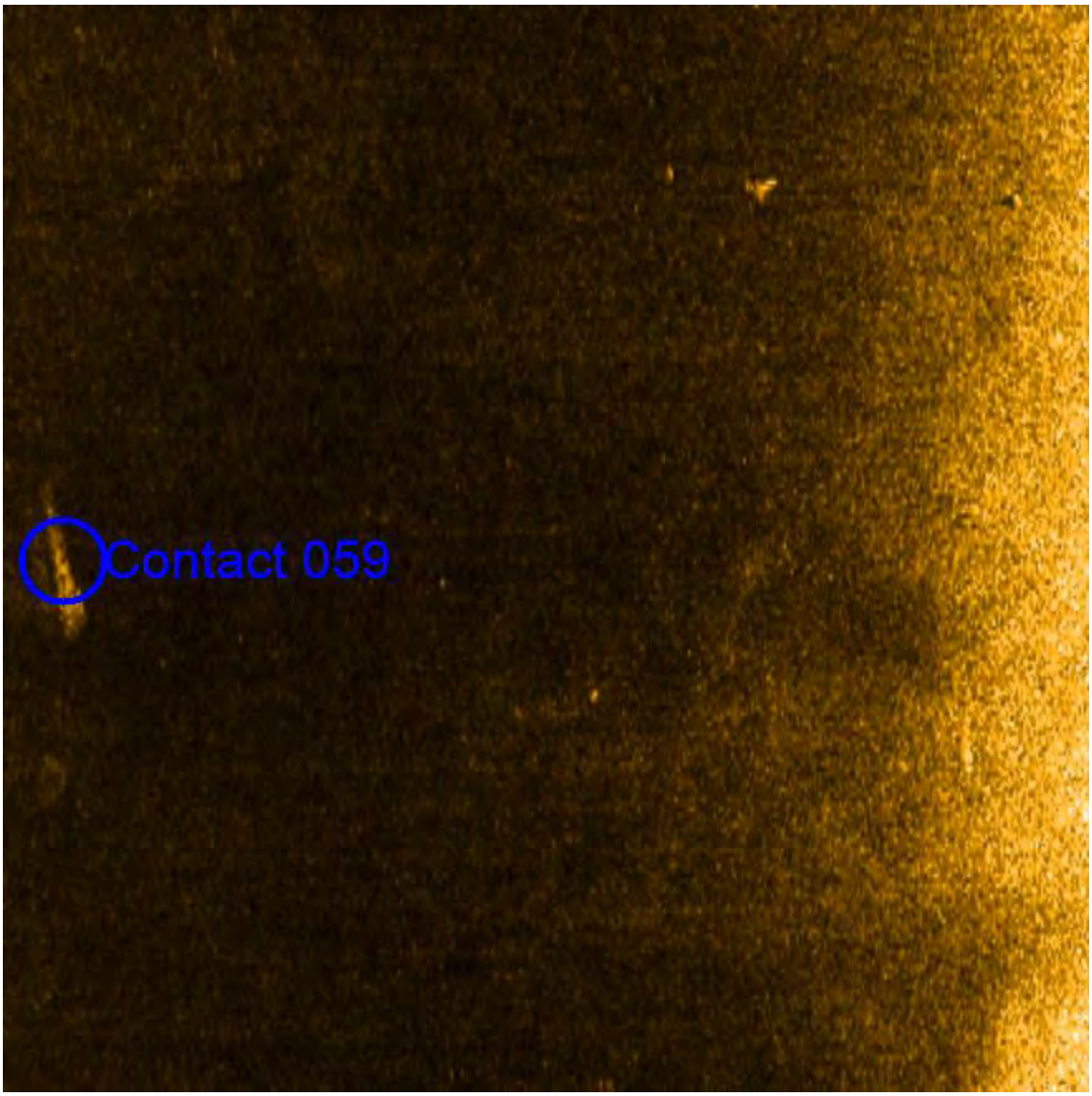


Contact 058

- Sonar Time at Target: 4/26/2015 1:20:04 PM
- Click Position
  29.2912504859 -80.9735096514 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_031.jsf
- Ping Number: 92446
- Range to target: 145.09 Meters
- Heading: 90.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_031

Dimensions and attributes

- Target Width: 2.45 Meters
- Target Height: 0.00 Meters
- Target Length: 11.32 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

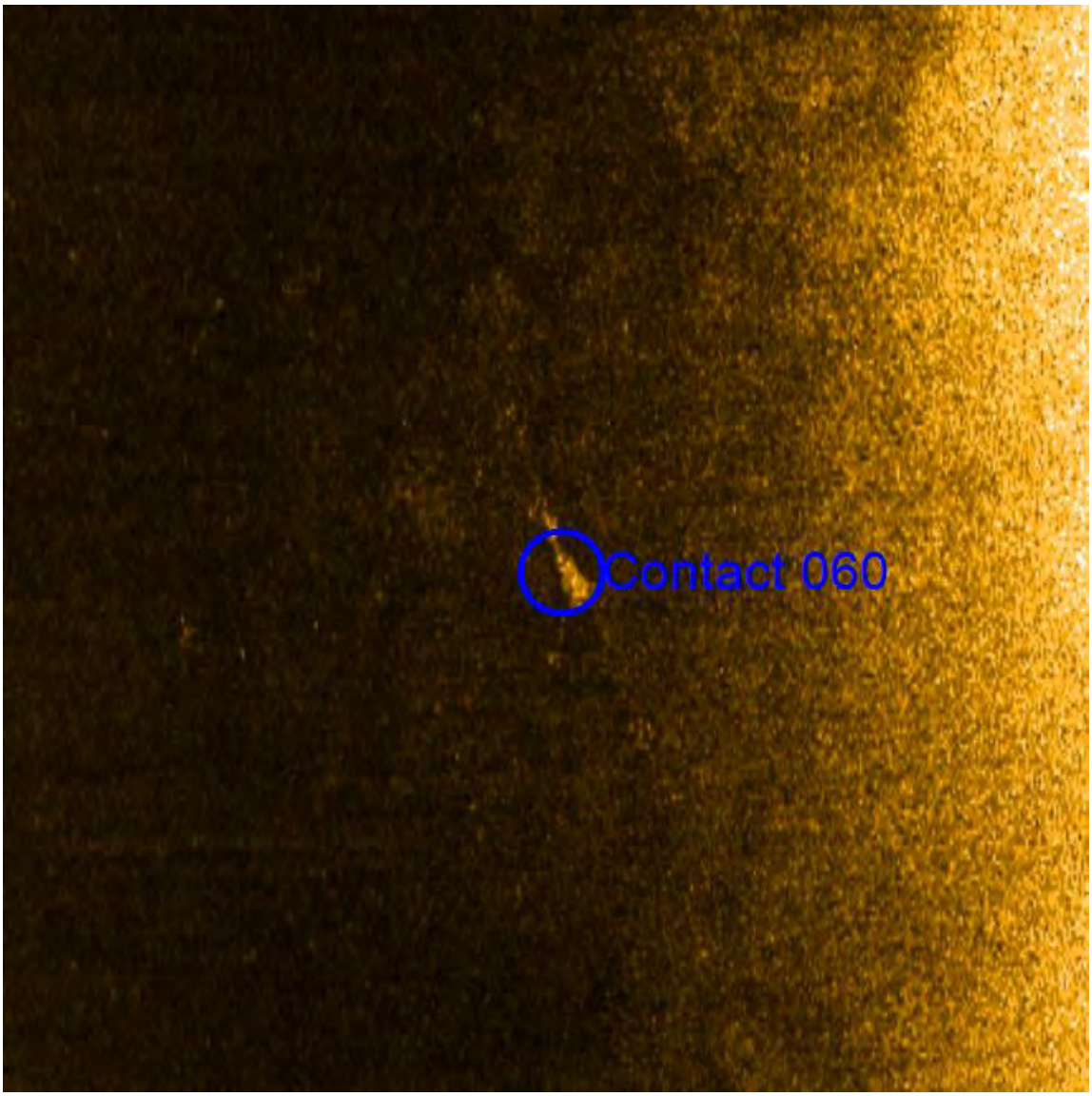


Contact 059

- Sonar Time at Target: 4/26/2015 1:31:25 PM
- Click Position
  29.2939625217 -80.9576970862 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_031.jsf
- Ping Number: 95618
- Range to target: 128.05 Meters
- Heading: 86.700 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_031

Dimensions and attributes

- Target Width: 2.20 Meters
- Target Height: 0.00 Meters
- Target Length: 13.95 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

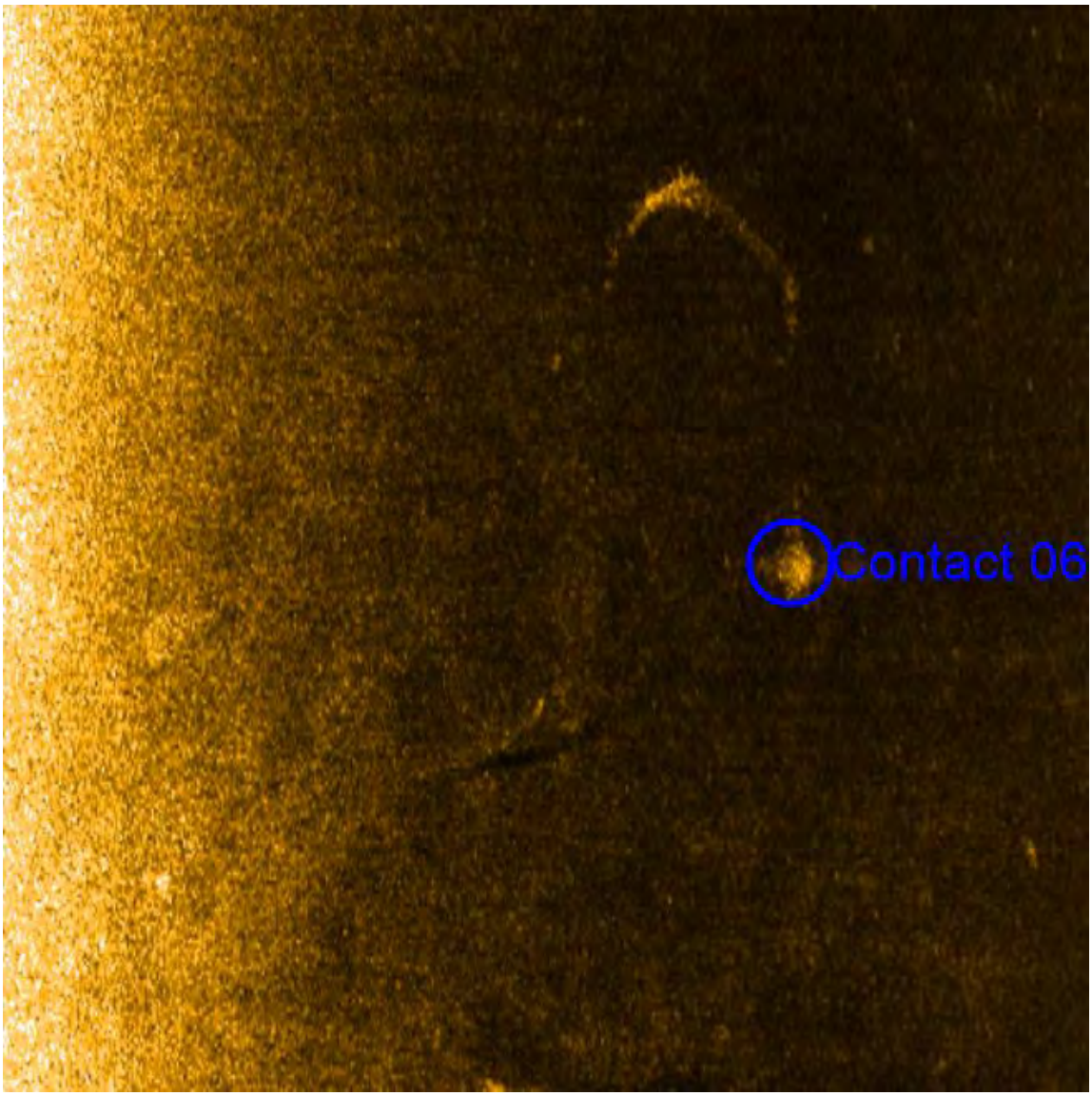


Contact 060

- Sonar Time at Target: 4/26/2015 1:32:16 PM
- Click Position
  29.2935127806 -80.9562583619 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_031.jsf
- Ping Number: 95858
- Range to target: 77.16 Meters
- Heading: 96.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_031

Dimensions and attributes

- Target Width: 3.08 Meters
- Target Height: 0.00 Meters
- Target Length: 11.15 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

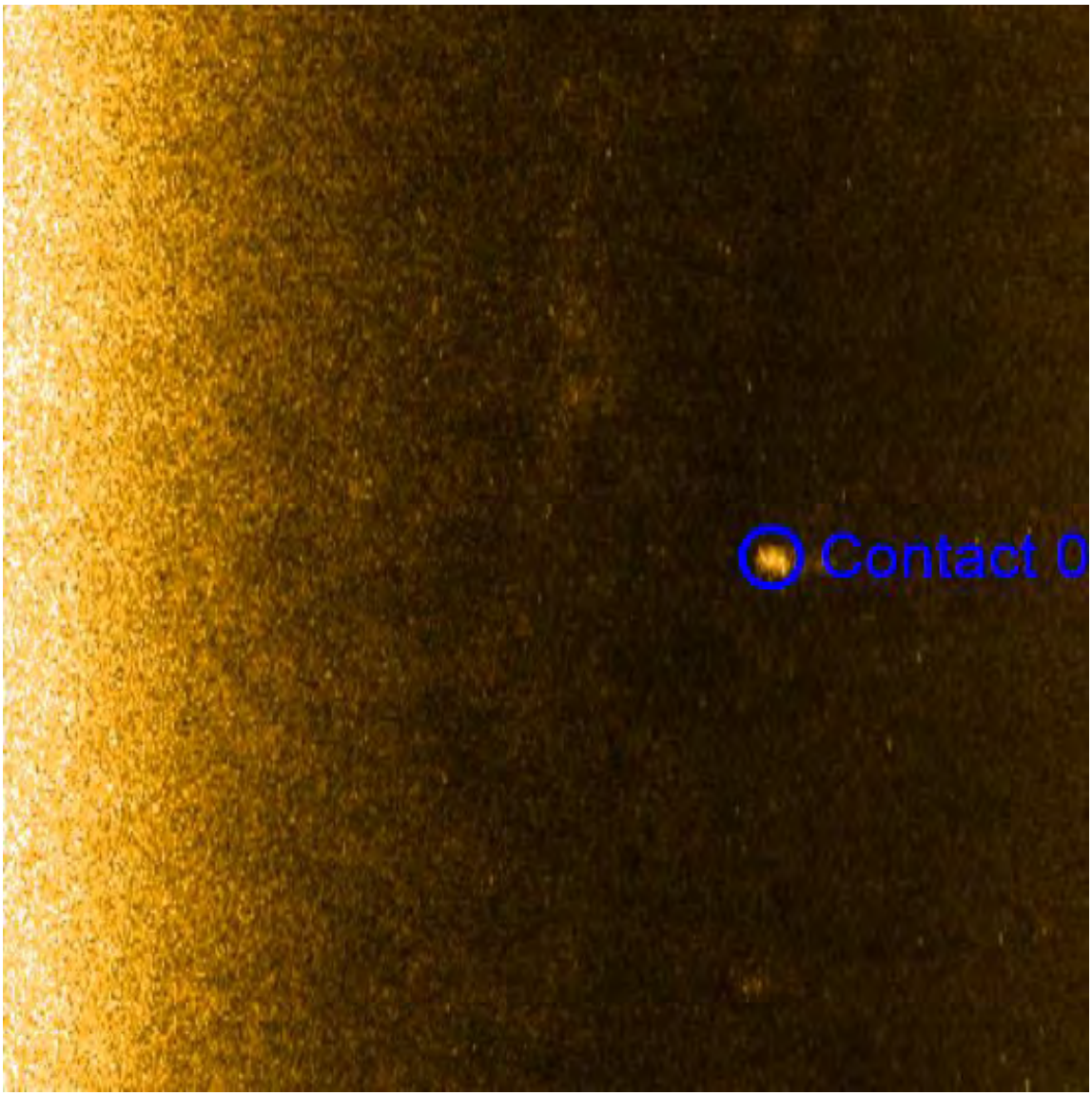


Contact 061

- Sonar Time at Target: 4/26/2015 1:32:06 PM
- Click Position
  29.2918907817 -80.9566006838 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_031.jsf
- Ping Number: 95812
- Range to target: 104.14 Meters
- Heading: 94.500 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_031

Dimensions and attributes

- Target Width: 4.63 Meters
- Target Height: 0.00 Meters
- Target Length: 10.49 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

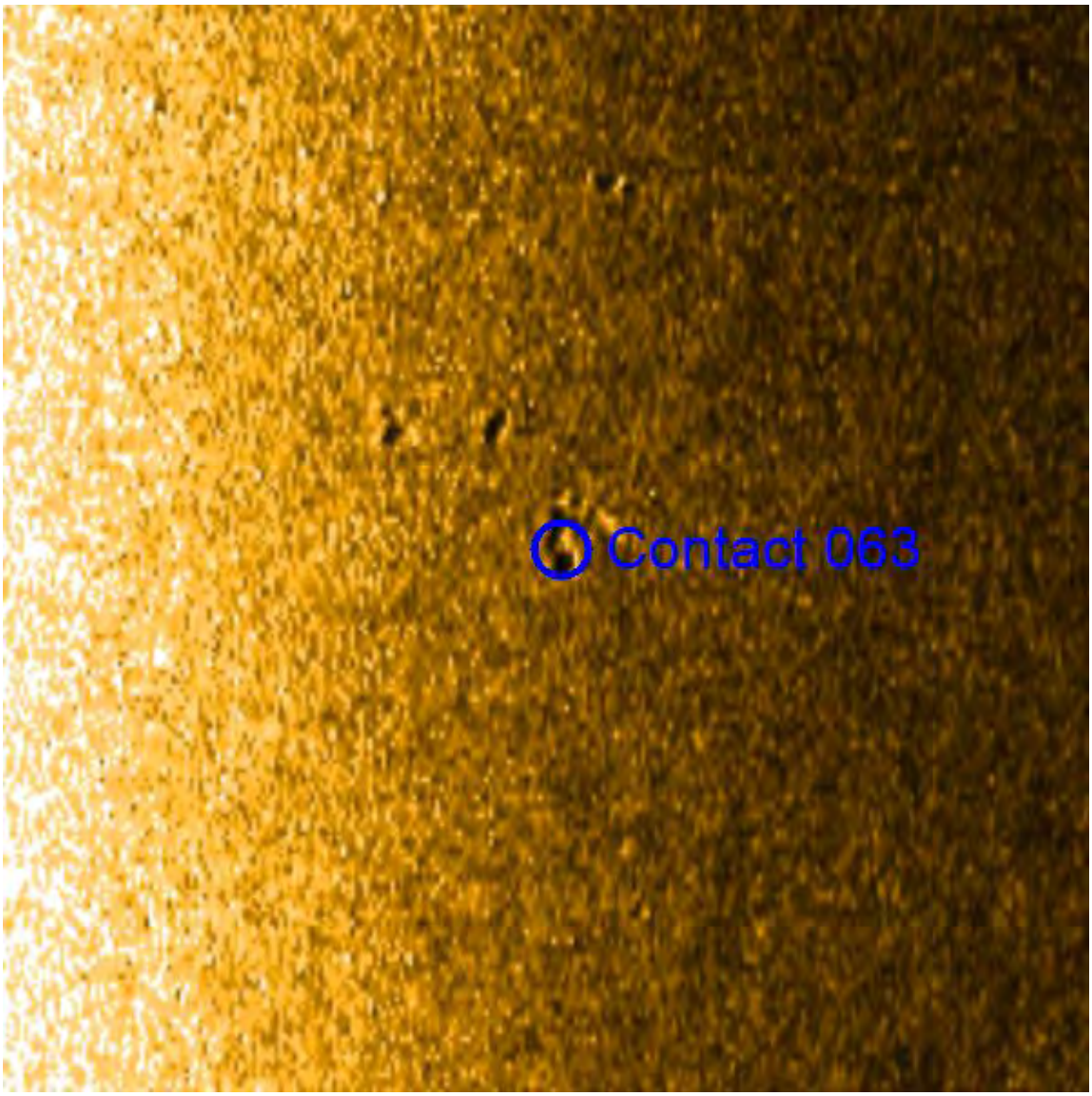


Contact 062

- Sonar Time at Target: 4/26/2015 2:32:37 PM
- Click Position
  29.2919745953 -80.9441685675 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_031_B.jsf
- Ping Number: 112443
- Range to target: 104.38 Meters
- Heading: 85.700 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_031_B

Dimensions and attributes

- Target Width: 6.38 Meters
- Target Height: 0.00 Meters
- Target Length: 4.04 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

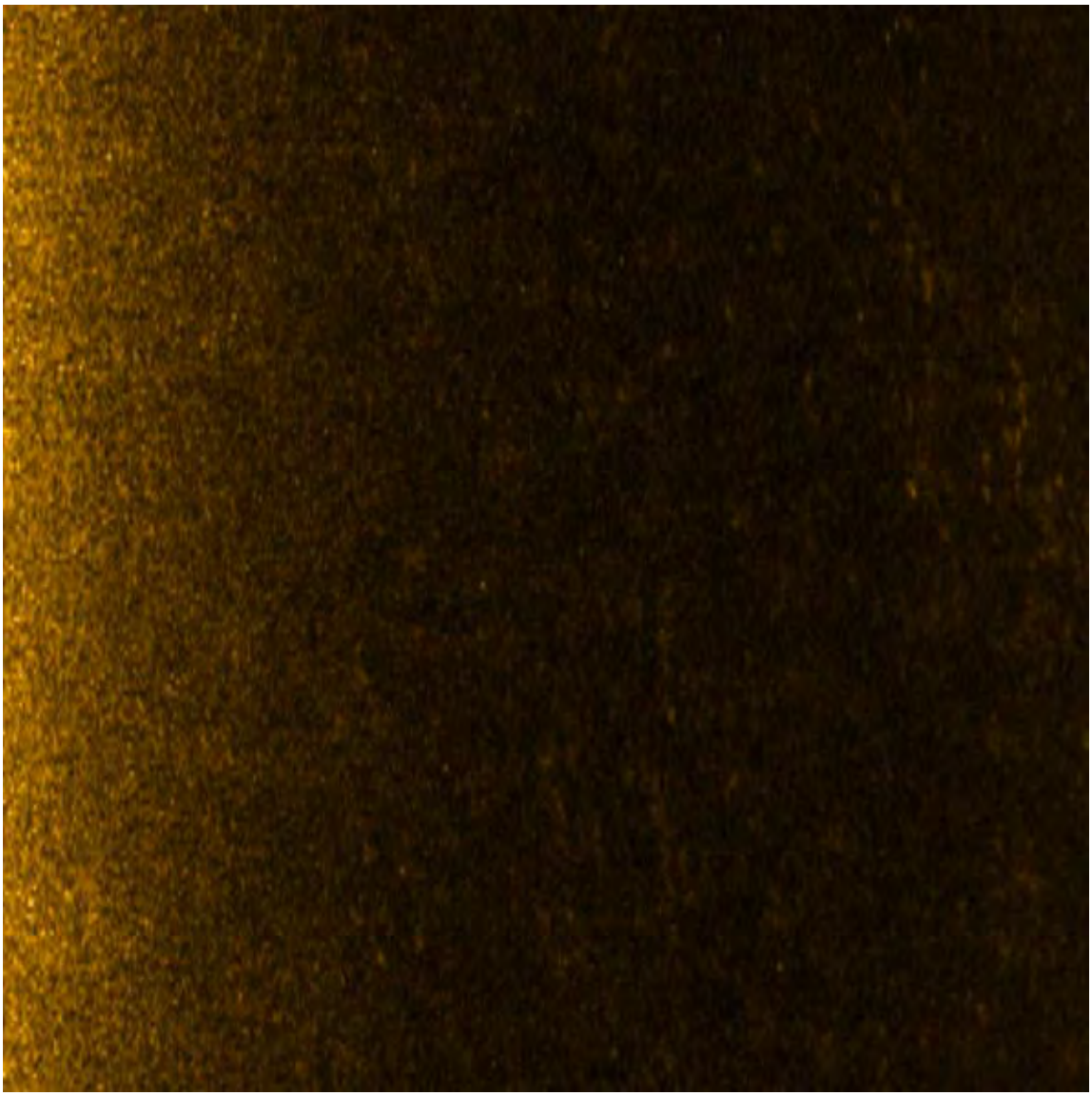


Contact 063

- Sonar Time at Target: 4/26/2015 3:16:16 PM
- Click Position
  29.3260252654 -80.9370744790 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_032.jsf
- Ping Number: 119255
- Range to target: 55.15 Meters
- Heading: 279.500 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_032

Dimensions and attributes

- Target Width: 1.34 Meters
- Target Height: 0.00 Meters
- Target Length: 4.02 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

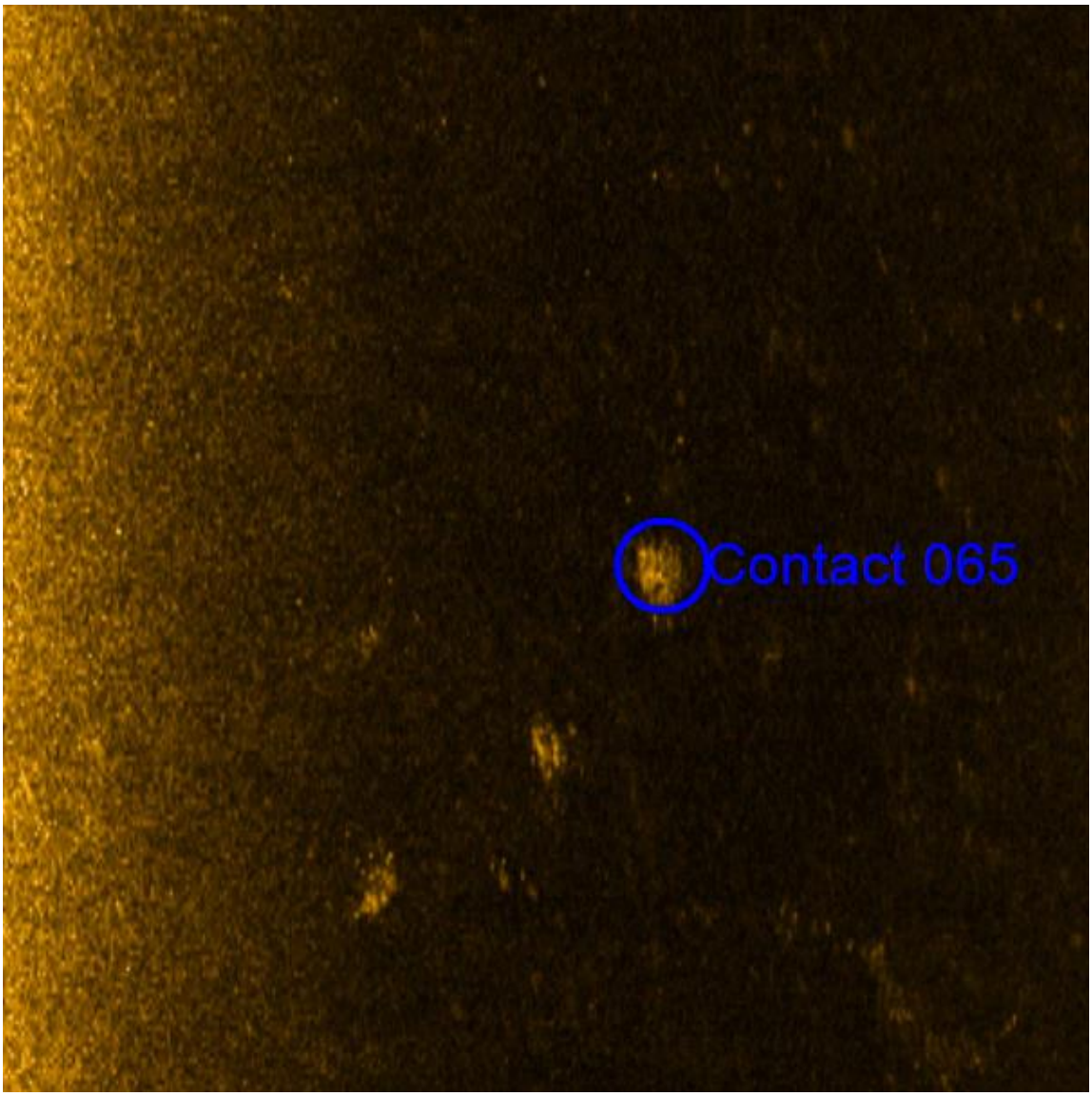


Contact 064

- Sonar Time at Target: 4/26/2015 4:30:03 PM
- Click Position
  29.3557159503 -80.9880990656 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_033.jsf
- Ping Number: 139698
- Range to target: 149.35 Meters
- Heading: 87.890 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_033

Dimensions and attributes

- Target Width: 4.05 Meters
- Target Height: 0.00 Meters
- Target Length: 8.45 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

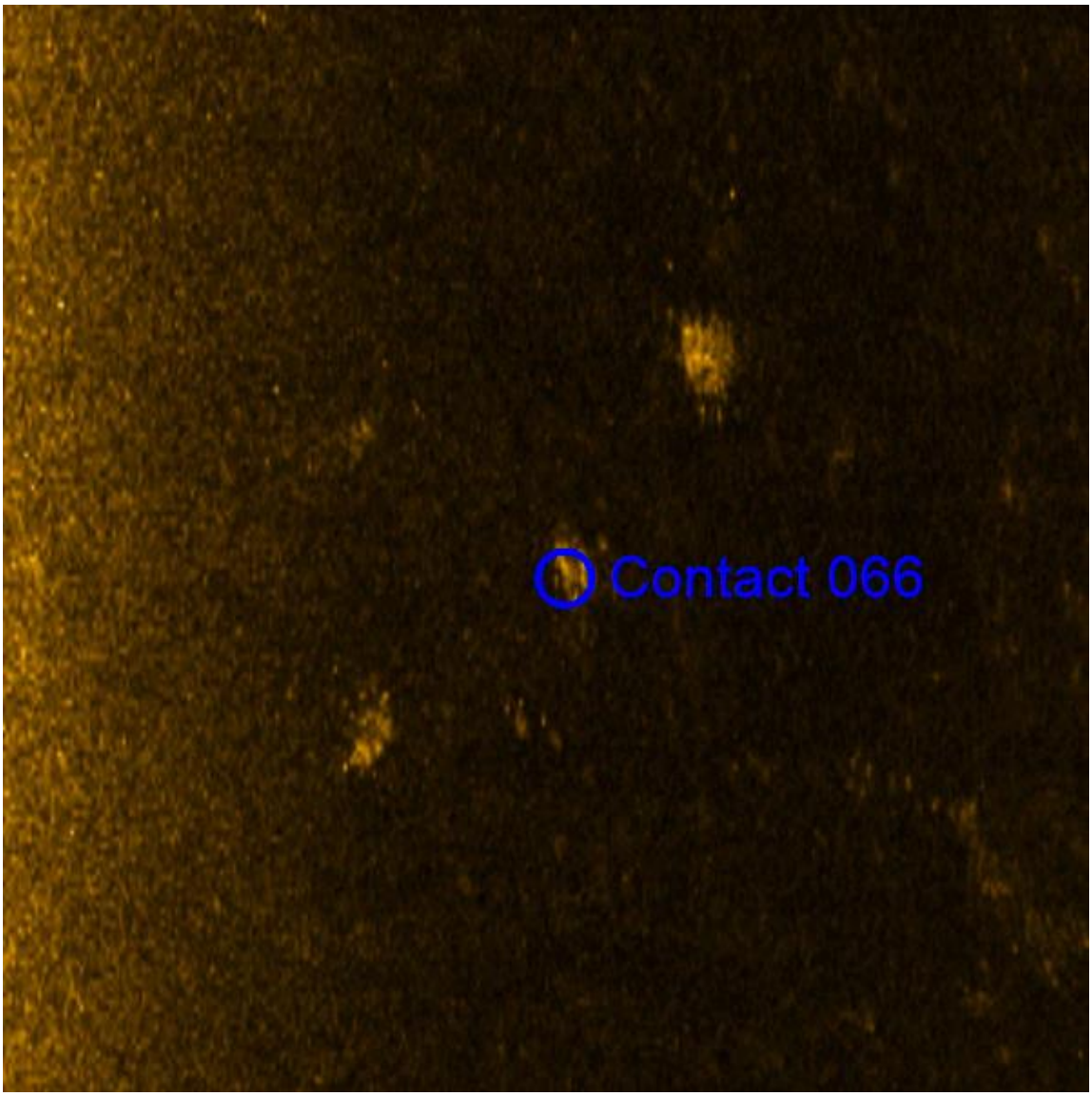


Contact 065

- Sonar Time at Target: 4/26/2015 4:34:48 PM
- Click Position
  29.3563614063 -80.9807810286 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_033.jsf
- Ping Number: 141024
- Range to target: 89.23 Meters
- Heading: 82.700 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_033

Dimensions and attributes

- Target Width: 4.78 Meters
- Target Height: 0.00 Meters
- Target Length: 6.94 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

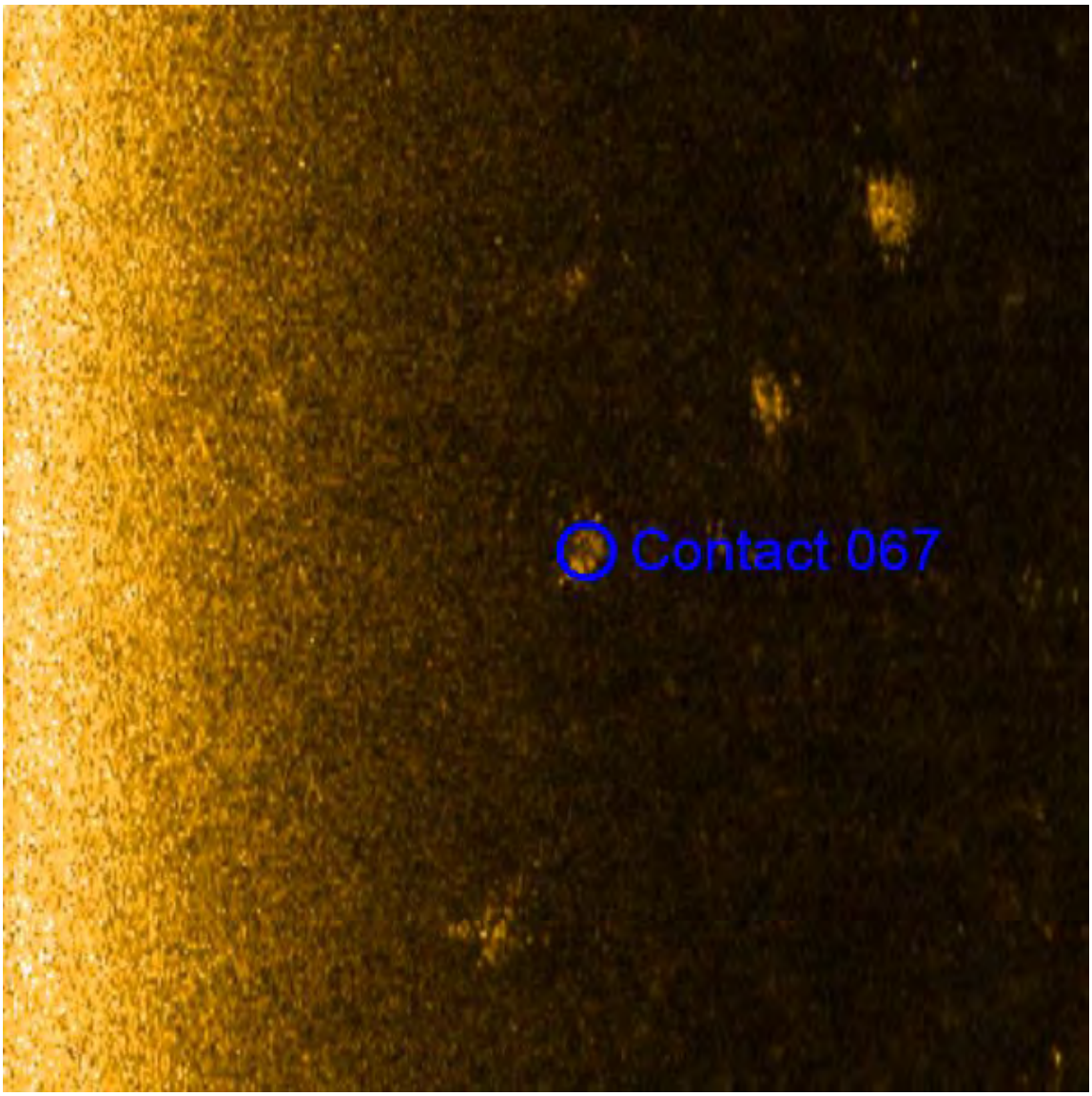


Contact 066

- Sonar Time at Target: 4/26/2015 4:34:55 PM
- Click Position
  29.3564772455 -80.9805325706 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_033.jsf
- Ping Number: 141059
- Range to target: 77.16 Meters
- Heading: 83.890 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_033

Dimensions and attributes

- Target Width: 3.21 Meters
- Target Height: 0.00 Meters
- Target Length: 5.98 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

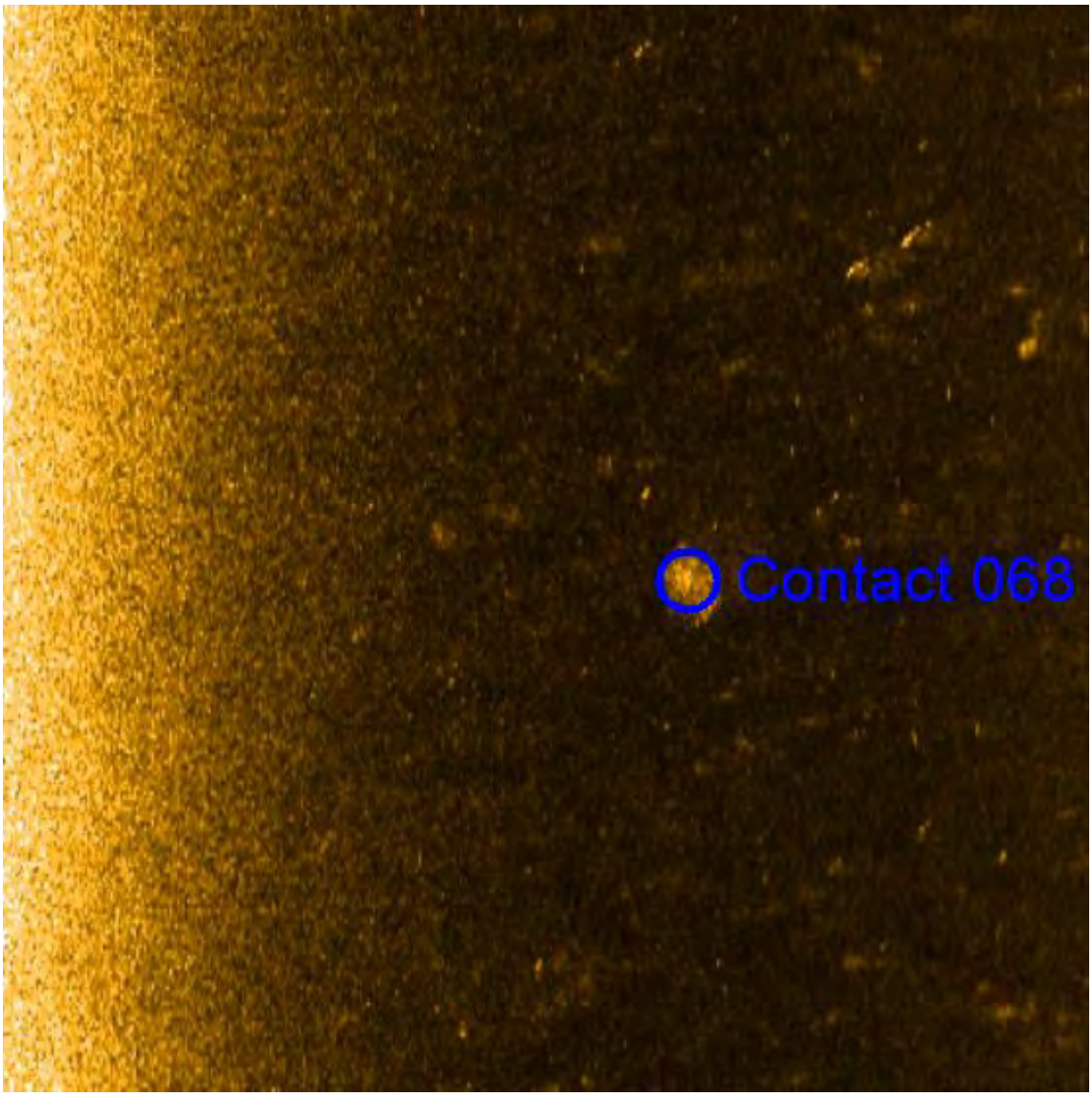


Contact 067

- Sonar Time at Target: 4/26/2015 4:35:01 PM
- Click Position
  29.3566242544 -80.9804226388 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_033.jsf
- Ping Number: 141084
- Range to target: 61.25 Meters
- Heading: 86.700 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_033

Dimensions and attributes

- Target Width: 2.73 Meters
- Target Height: 0.00 Meters
- Target Length: 6.87 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

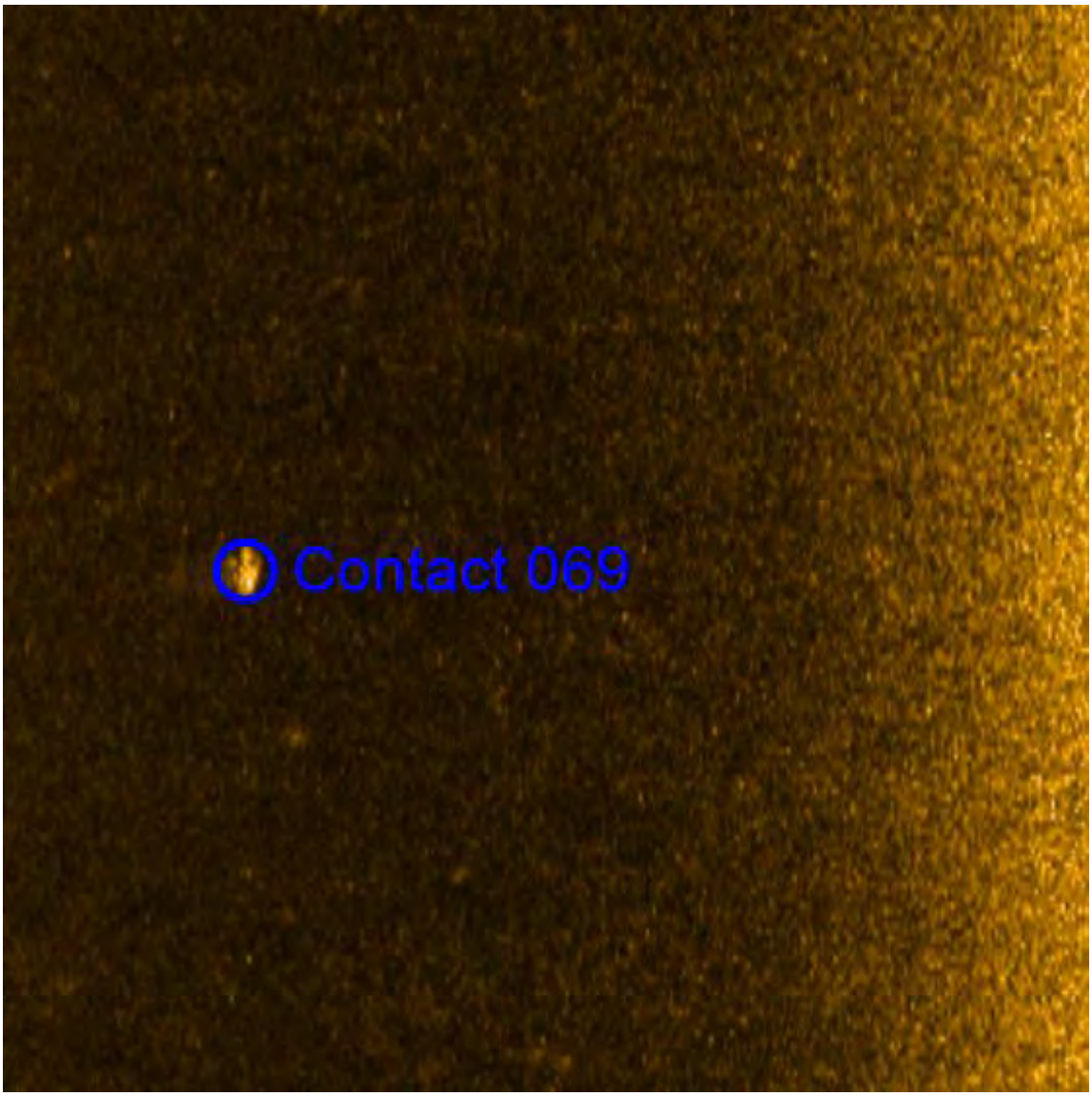


Contact 068

- Sonar Time at Target: 4/26/2015 6:56:49 PM
- Click Position
  29.3659873860 -80.9830398128 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_029.jsf
- Ping Number: 180480
- Range to target: 93.73 Meters
- Heading: 180.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_029

Dimensions and attributes

- Target Width: 5.75 Meters
- Target Height: 0.00 Meters
- Target Length: 9.31 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

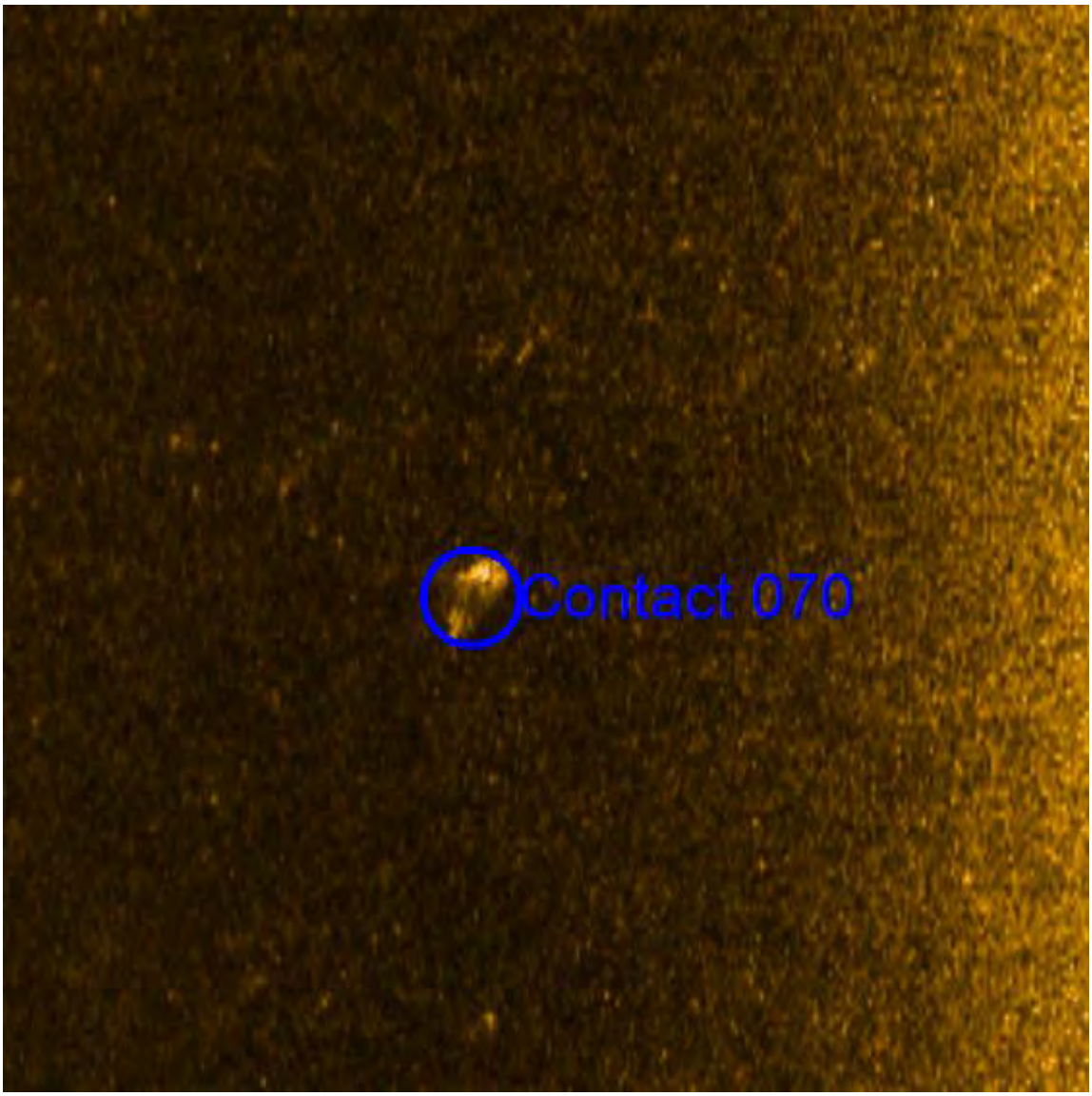


Contact 069

- Sonar Time at Target: 4/26/2015 7:02:25 PM
- Click Position
  29.3589273757 -80.9780714510 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_029.jsf
- Ping Number: 182045
- Range to target: 107.19 Meters
- Heading: 180.600 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_029

Dimensions and attributes

- Target Width: 2.01 Meters
- Target Height: 0.00 Meters
- Target Length: 4.59 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

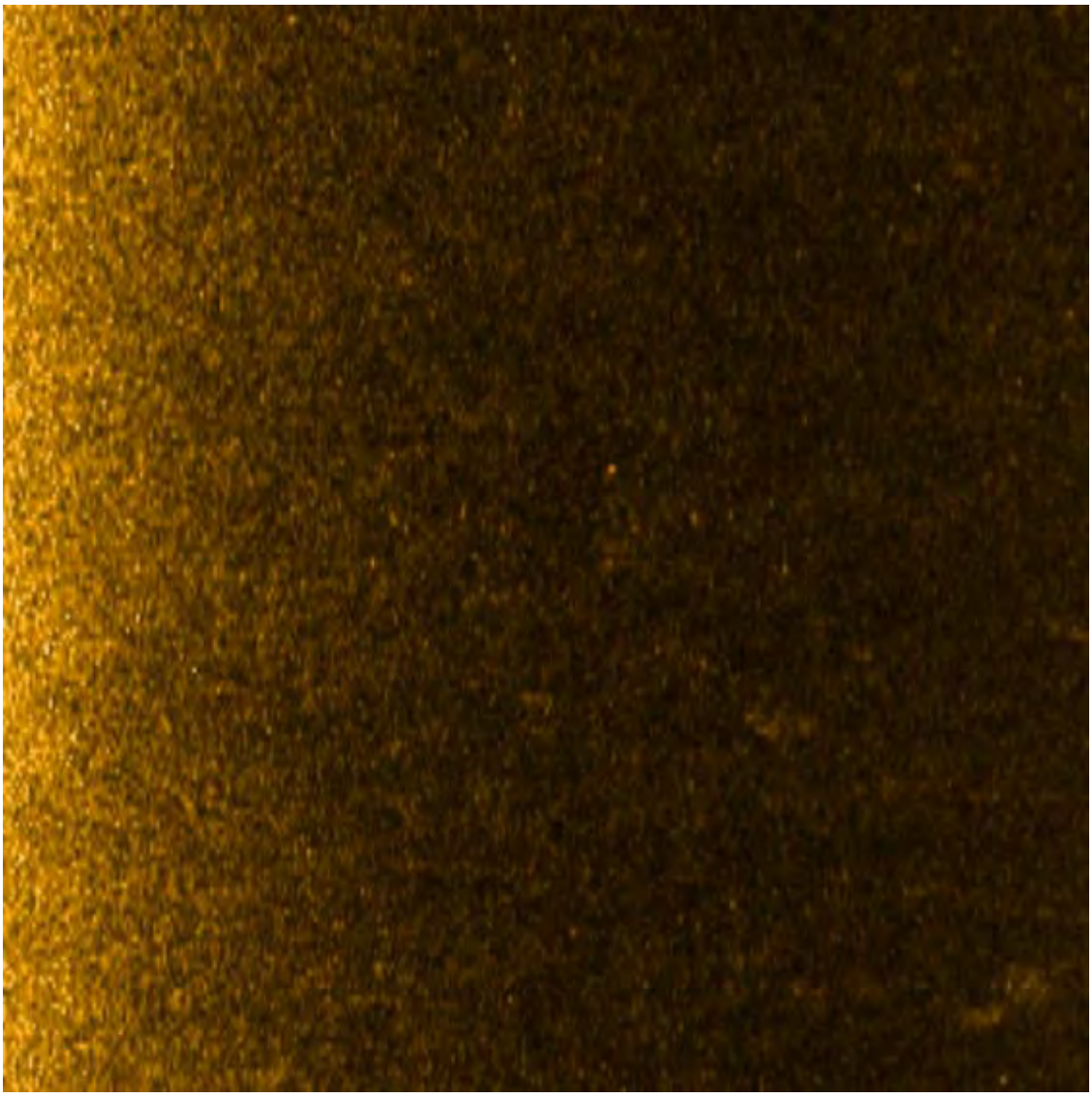


Contact 070

- Sonar Time at Target: 4/26/2015 7:03:27 PM
- Click Position
  29.3574554643 -80.9778090221 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_029.jsf
- Ping Number: 182330
- Range to target: 86.86 Meters
- Heading: 181.890 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_029

Dimensions and attributes

- Target Width: 3.64 Meters
- Target Height: 0.00 Meters
- Target Length: 8.52 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

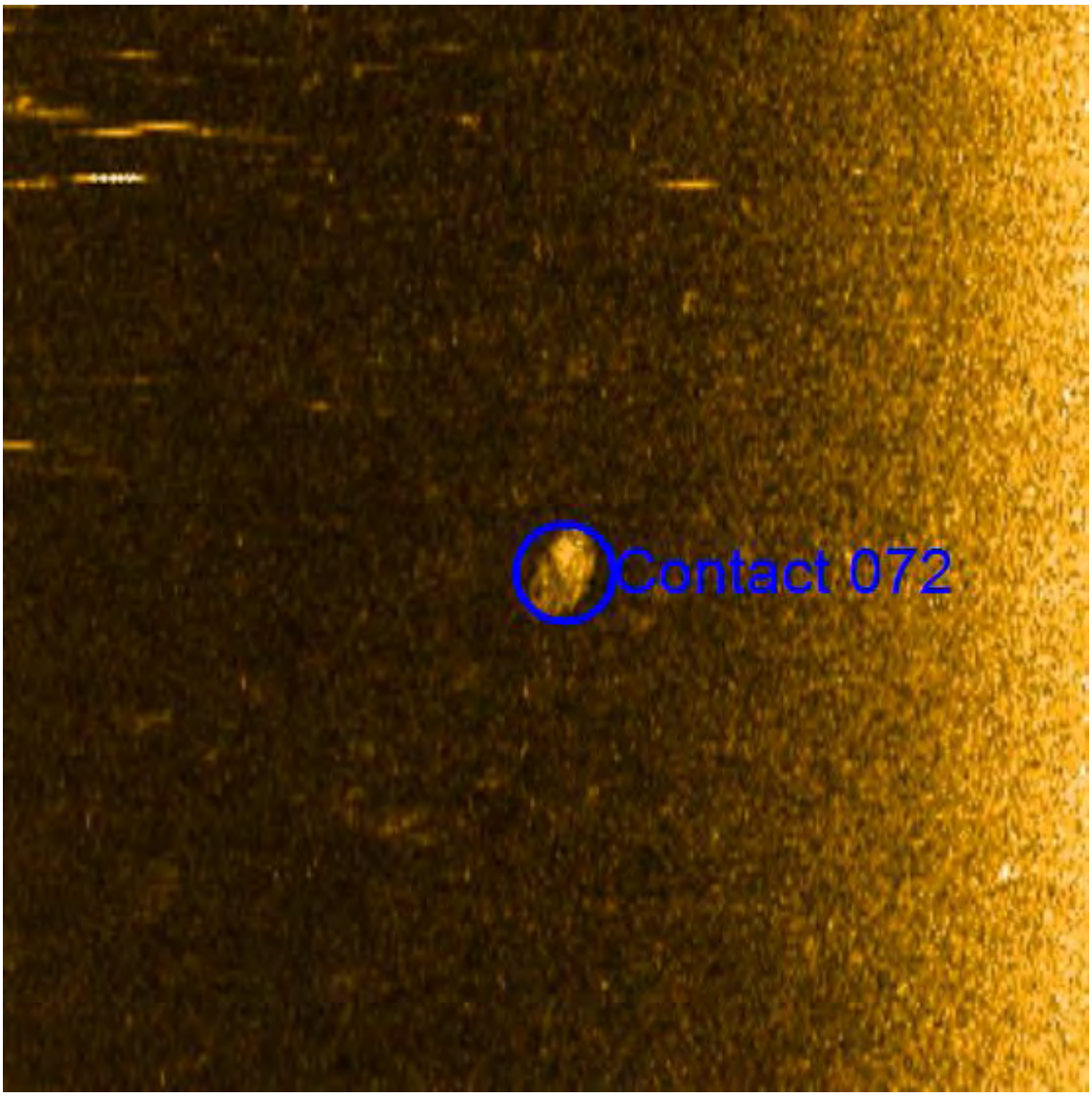


Contact 071

- Sonar Time at Target: 4/26/2015 7:03:27 PM
- Click Position
  29.3569593744 -80.9800929980 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_029.jsf
- Ping Number: 182330
- Range to target: 141.54 Meters
- Heading: 181.890 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_029

Dimensions and attributes

- Target Width: 3.02 Meters
- Target Height: 0.00 Meters
- Target Length: 3.56 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

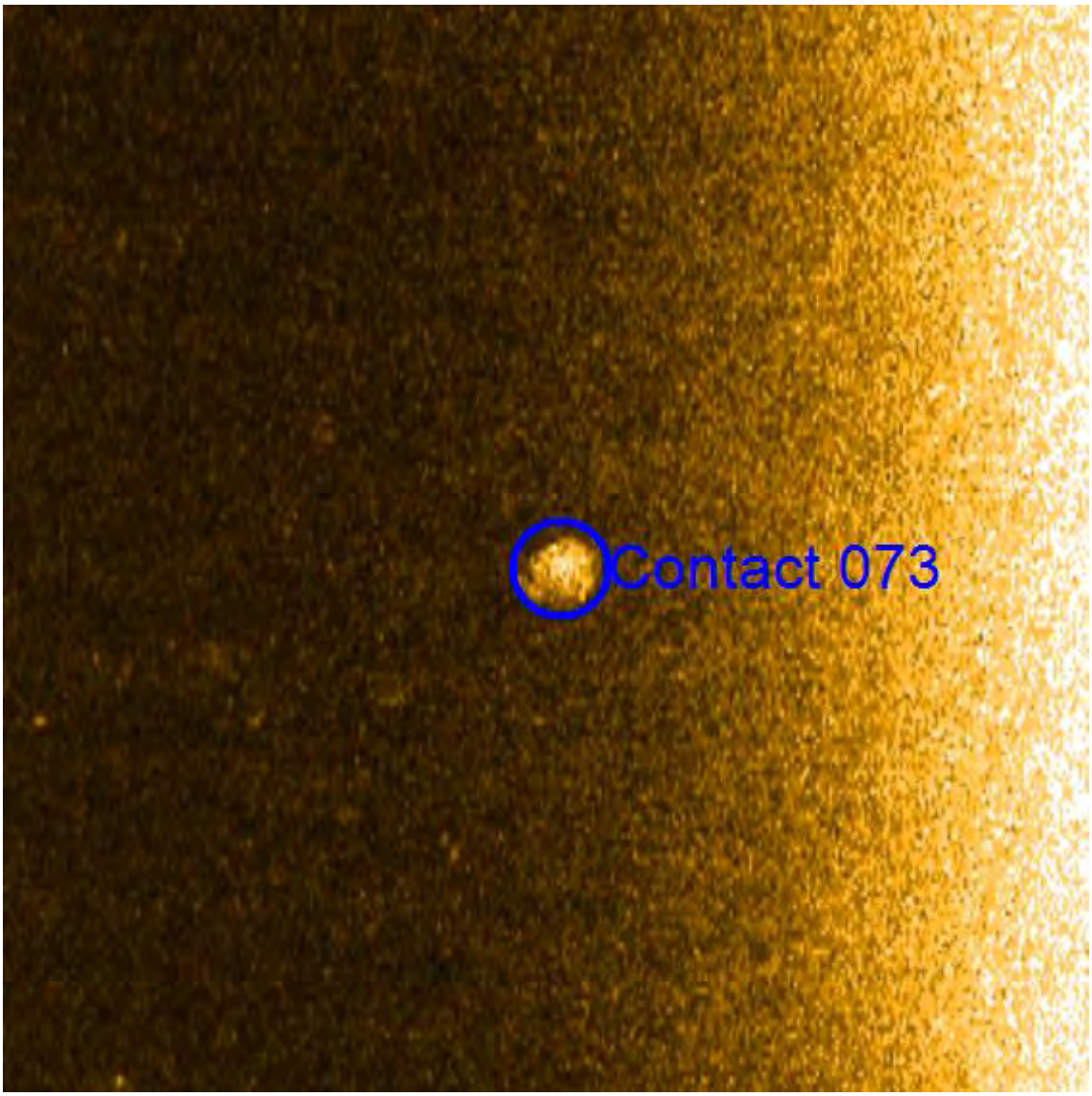


Contact 072

- Sonar Time at Target: 4/26/2015 7:06:25 PM
- Click Position
  29.3533582751 -80.9763404196 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_029.jsf
- Ping Number: 183165
- Range to target: 73.61 Meters
- Heading: 180.500 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_029

Dimensions and attributes

- Target Width: 5.37 Meters
- Target Height: 0.00 Meters
- Target Length: 8.81 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

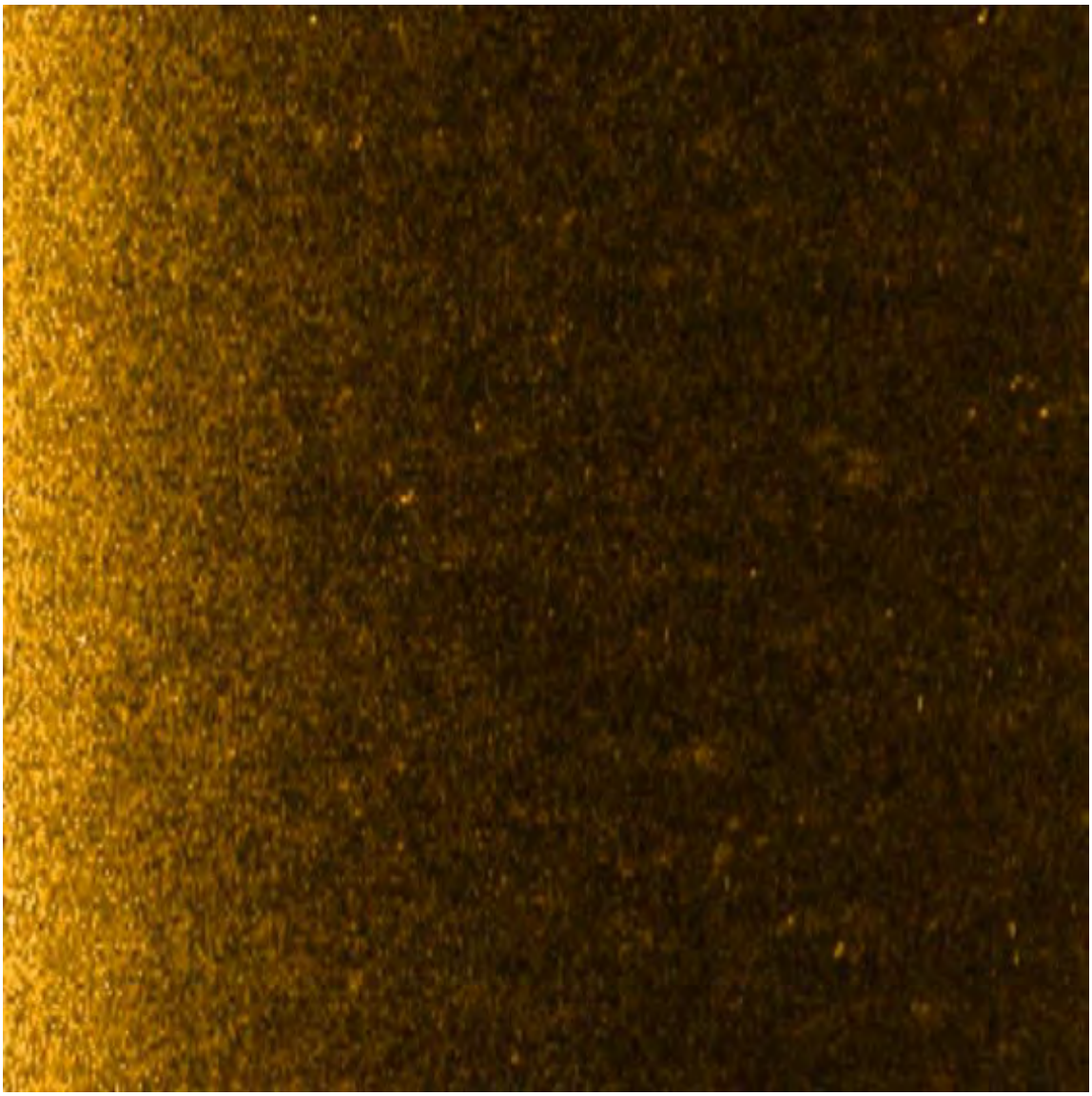


Contact 073

- Sonar Time at Target: 4/26/2015 7:07:30 PM
- Click Position
  29.3519279473 -80.9758128173 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_029.jsf
- Ping Number: 183466
- Range to target: 62.96 Meters
- Heading: 174.100 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_029

Dimensions and attributes

- Target Width: 6.50 Meters
- Target Height: 0.00 Meters
- Target Length: 5.93 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

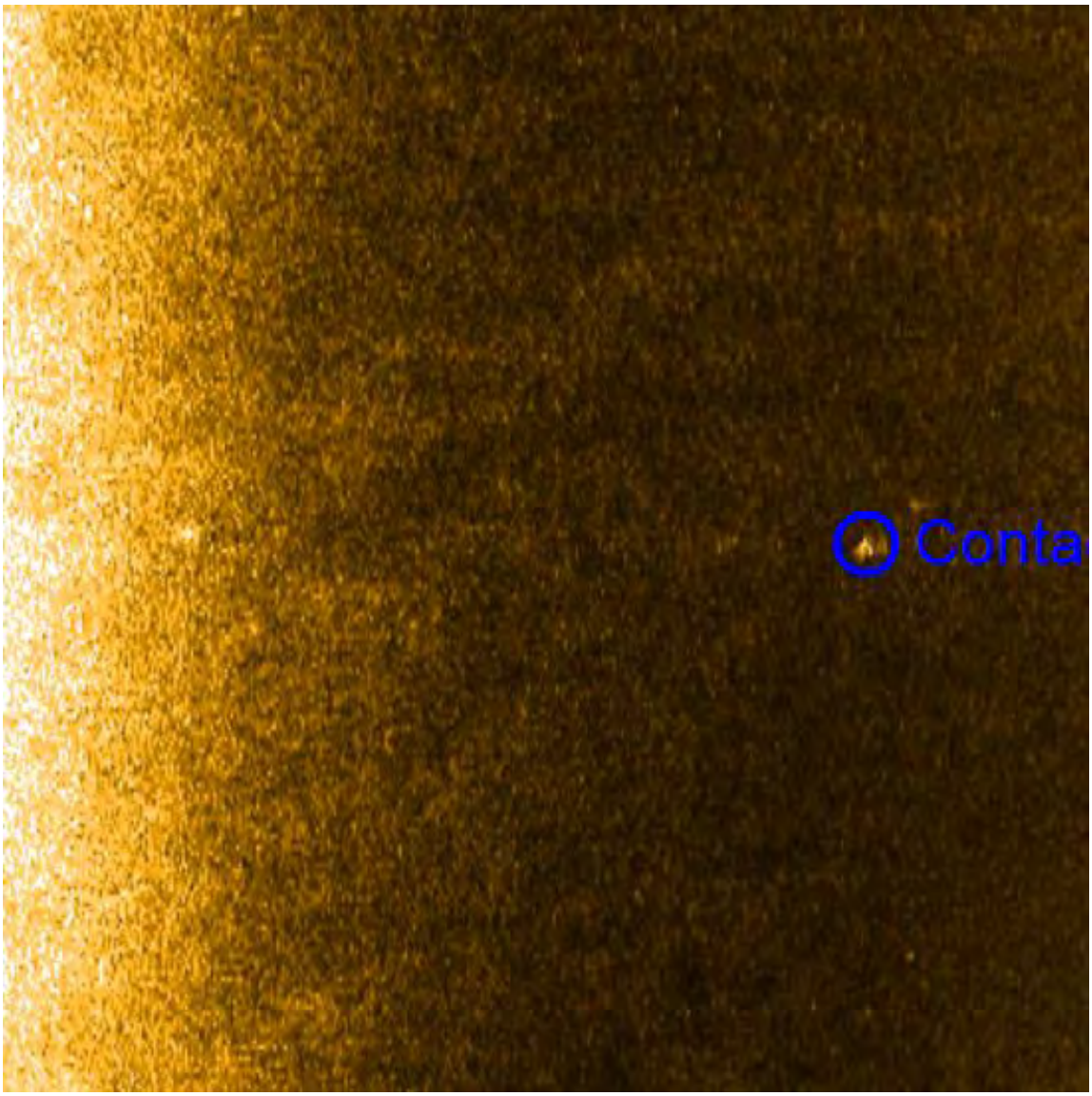


Contact 074

- Sonar Time at Target: 4/26/2015 7:09:13 PM
- Click Position
  29.3490954130 -80.9768947359 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_029.jsf
- Ping Number: 183947
- Range to target: 133.89 Meters
- Heading: 180.690 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_029

Dimensions and attributes

- Target Width: 5.33 Meters
- Target Height: 0.00 Meters
- Target Length: 5.73 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

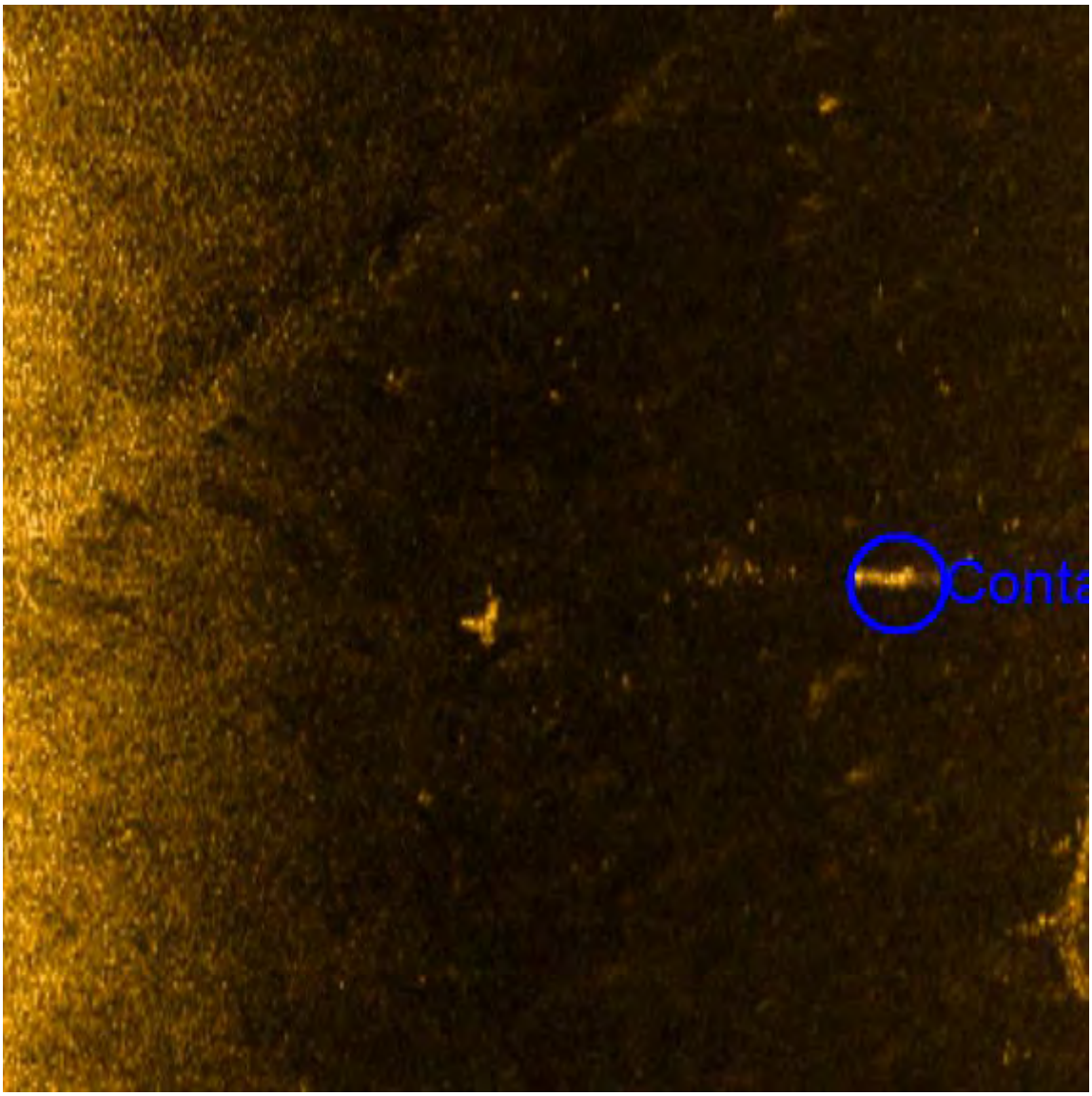


Contact 075

- Sonar Time at Target: 4/26/2015 7:39:26 PM
- Click Position
  29.3076748728 -80.9605784879 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_029.jsf
- Ping Number: 192388
- Range to target: 110.63 Meters
- Heading: 178.500 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_029

Dimensions and attributes

- Target Width: 2.92 Meters
- Target Height: 0.00 Meters
- Target Length: 2.06 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

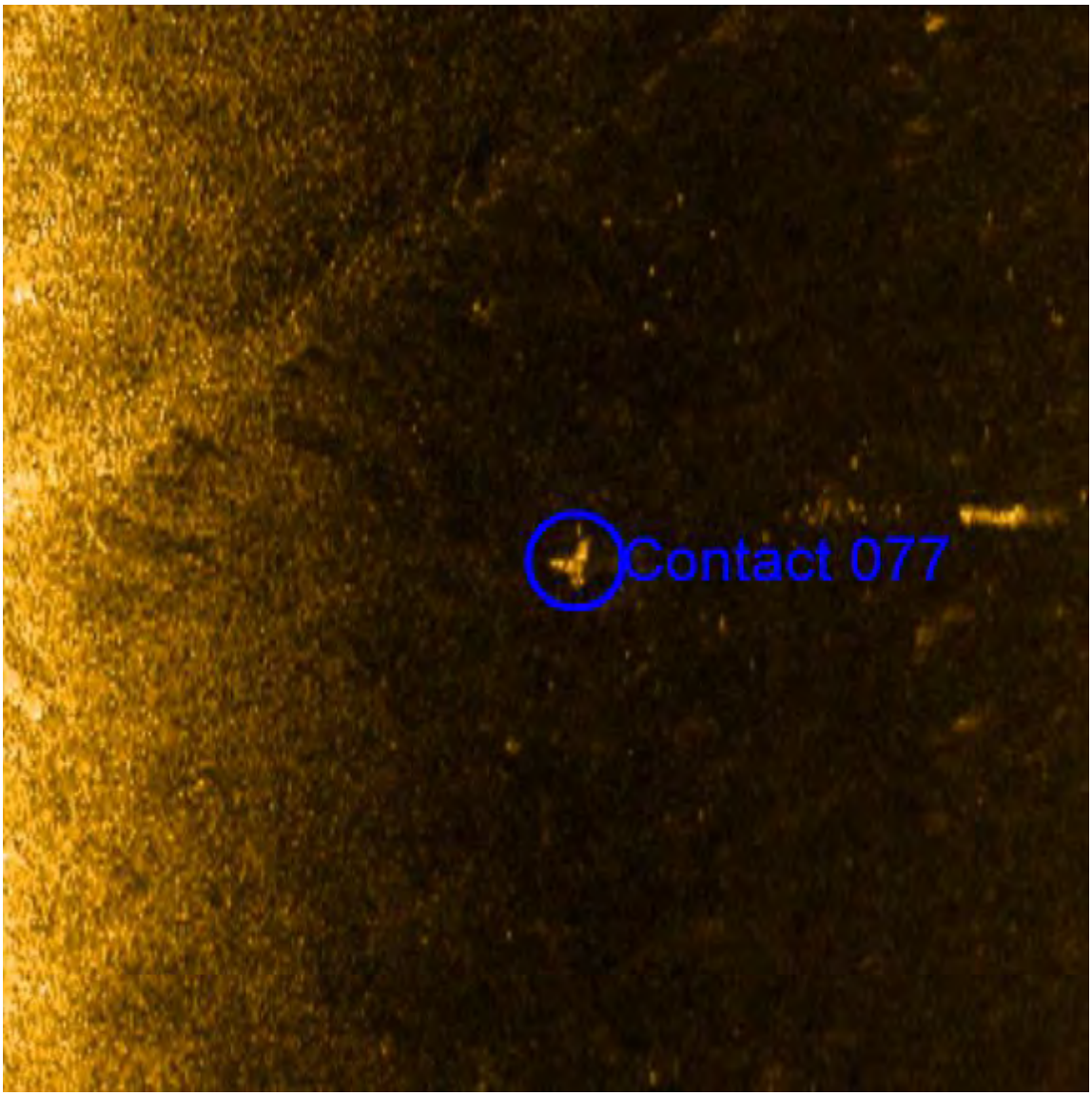


Contact 076

- Sonar Time at Target: 4/27/2015 12:36:28 PM
- Click Position
  30.0100529024 -81.2244189381 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_041.jsf
- Ping Number: 65634
- Range to target: 111.95 Meters
- Heading: 287.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_041

Dimensions and attributes

- Target Width: 1.40 Meters
- Target Height: 0.00 Meters
- Target Length: 9.56 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

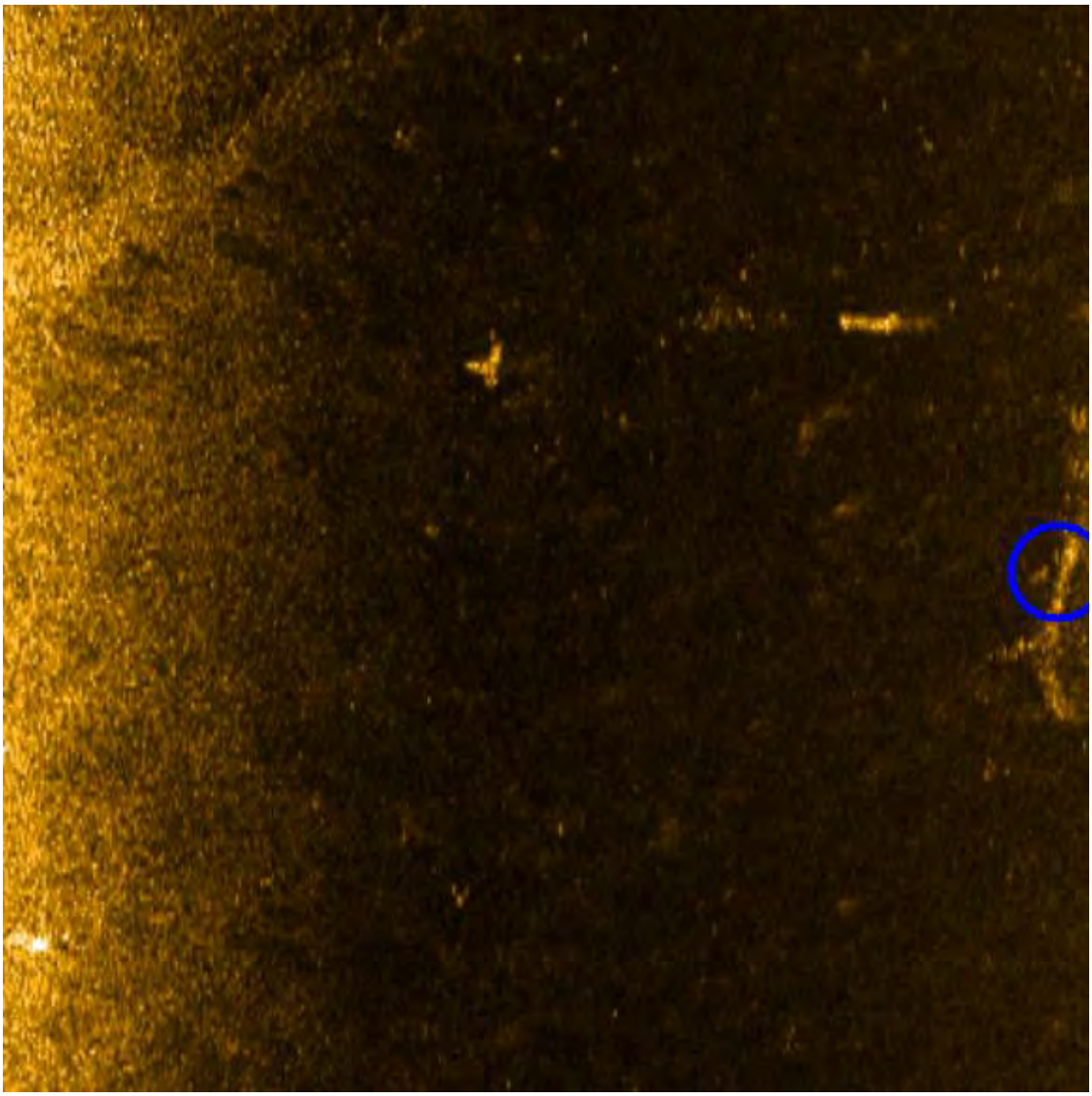


Contact 077

- Sonar Time at Target: 4/27/2015 12:36:29 PM
- Click Position
  30.0096901462 -81.2244712519 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_041.jsf
- Ping Number: 65641
- Range to target: 72.09 Meters
- Heading: 286.690 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_041

Dimensions and attributes

- Target Width: 3.37 Meters
- Target Height: 0.00 Meters
- Target Length: 4.34 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

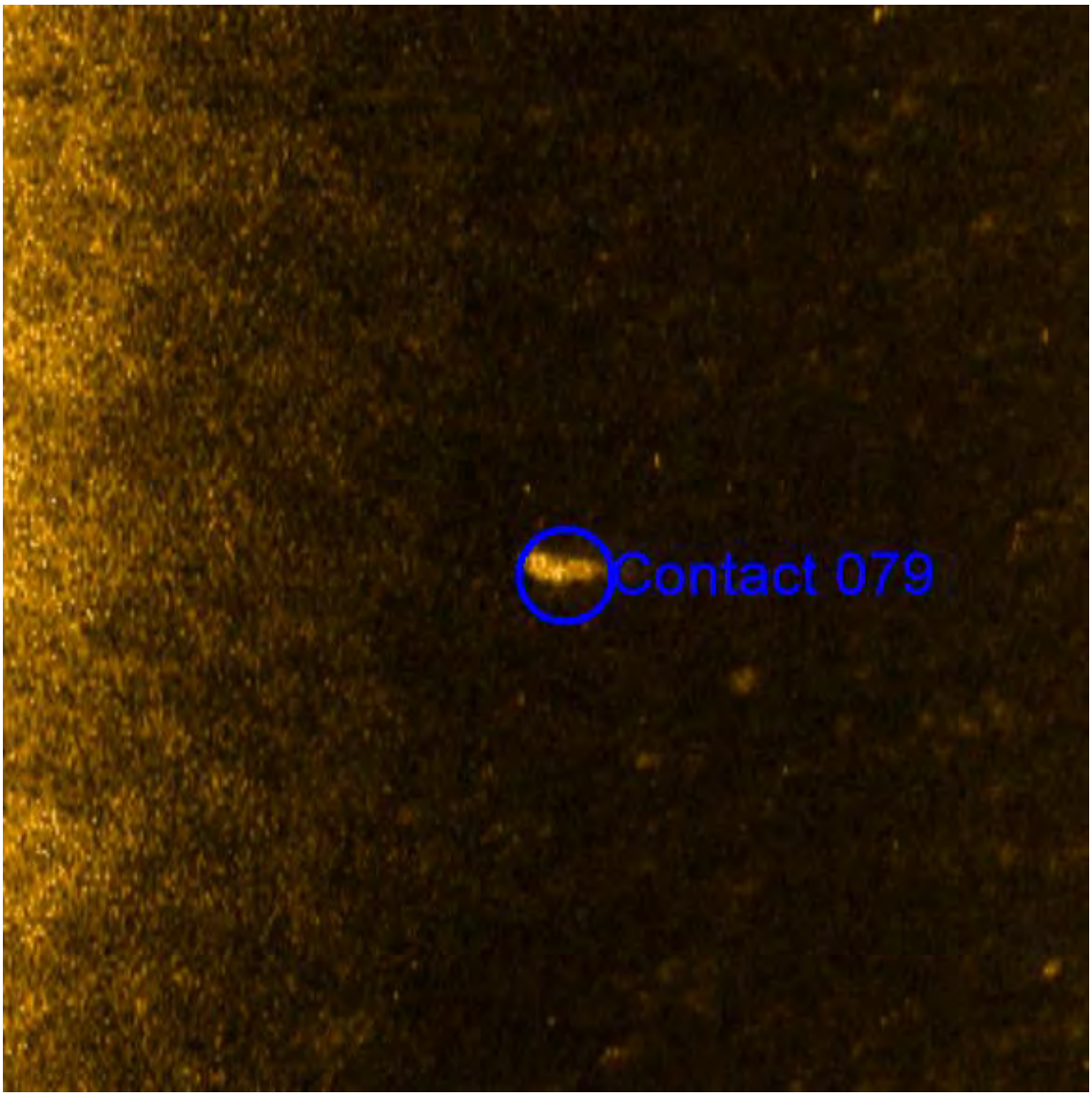


Contact 078

- Sonar Time at Target: 4/27/2015 12:36:37 PM
- Click Position
  30.0102126632 -81.2246221934 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_041.jsf
- Ping Number: 65678
- Range to target: 129.94 Meters
- Heading: 287.400 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_041

Dimensions and attributes

- Target Width: 4.78 Meters
- Target Height: 0.00 Meters
- Target Length: 30.96 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

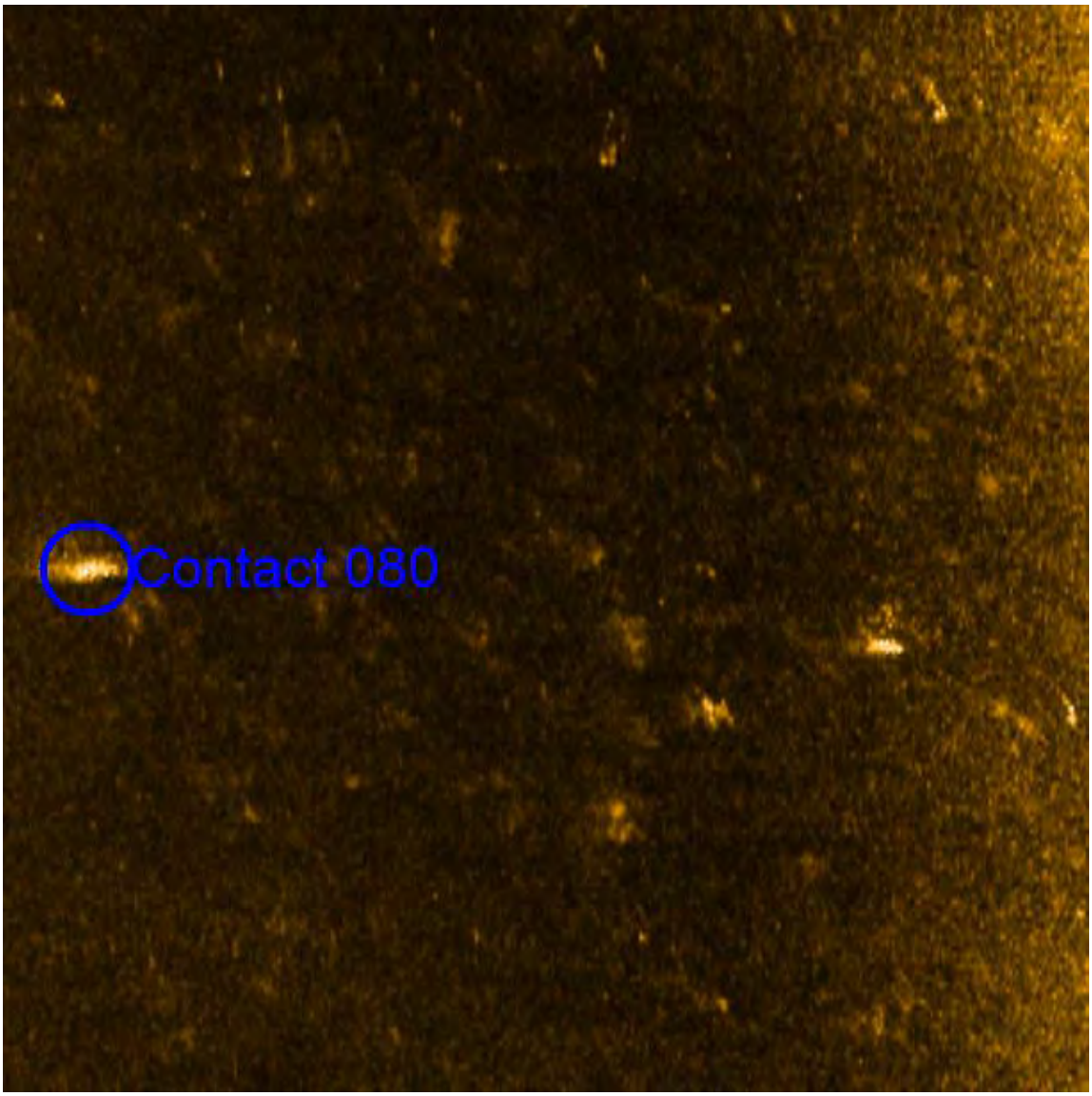


Contact 079

- Sonar Time at Target: 4/27/2015 12:38:32 PM
- Click Position
  30.0096880614 -81.2277056683 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_041.jsf
- Ping Number: 66211
- Range to target: 72.19 Meters
- Heading: 289.190 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_041

Dimensions and attributes

- Target Width: 2.21 Meters
- Target Height: 0.00 Meters
- Target Length: 7.78 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

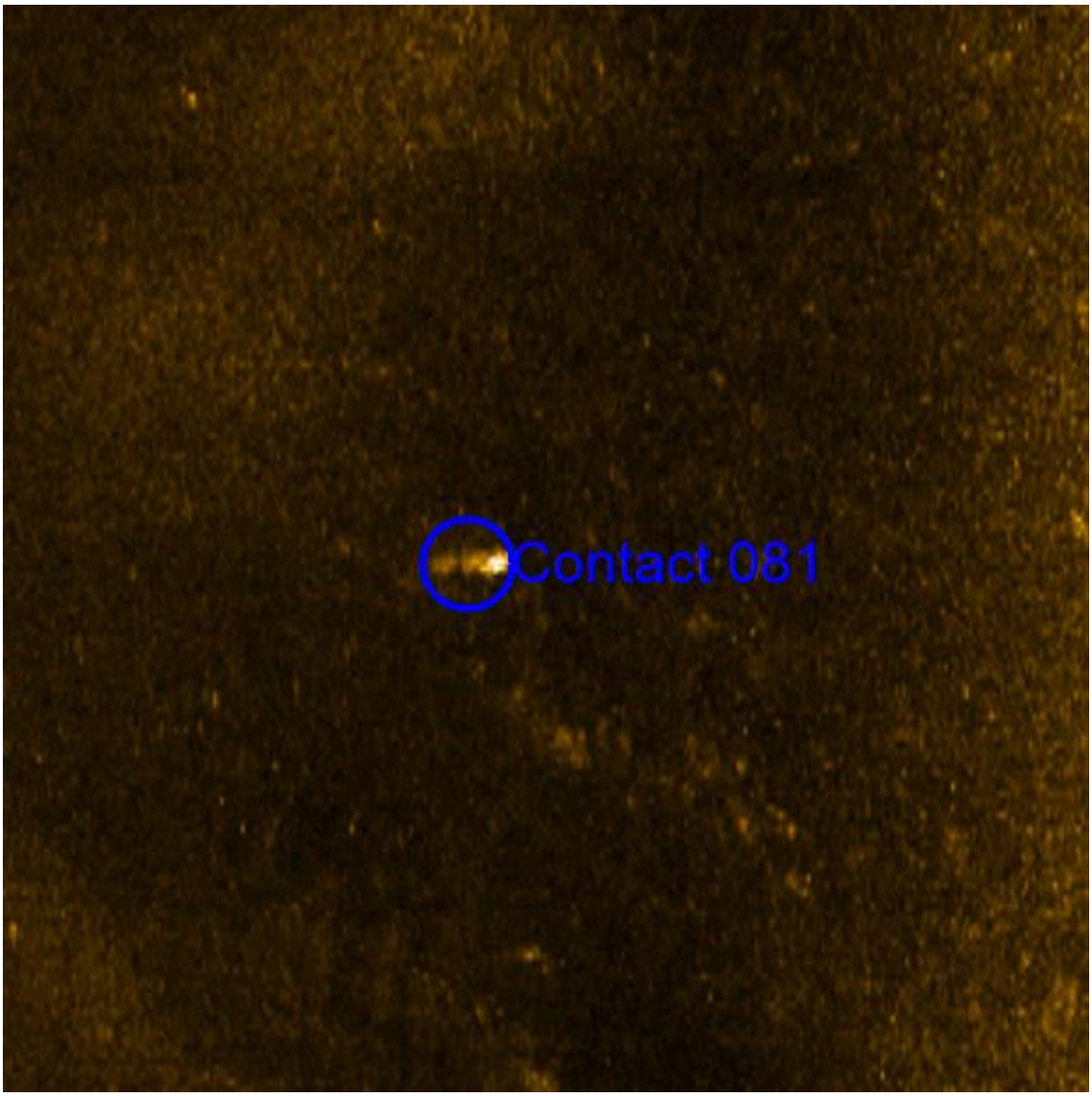


Contact 080

- Sonar Time at Target: 4/27/2015 6:07:45 PM
- Click Position
  30.0130373367 -81.2328020470 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_036.jsf
- Ping Number: 157640
- Range to target: 122.37 Meters
- Heading: 204.700 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_036

Dimensions and attributes

- Target Width: 2.37 Meters
- Target Height: 0.00 Meters
- Target Length: 9.18 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

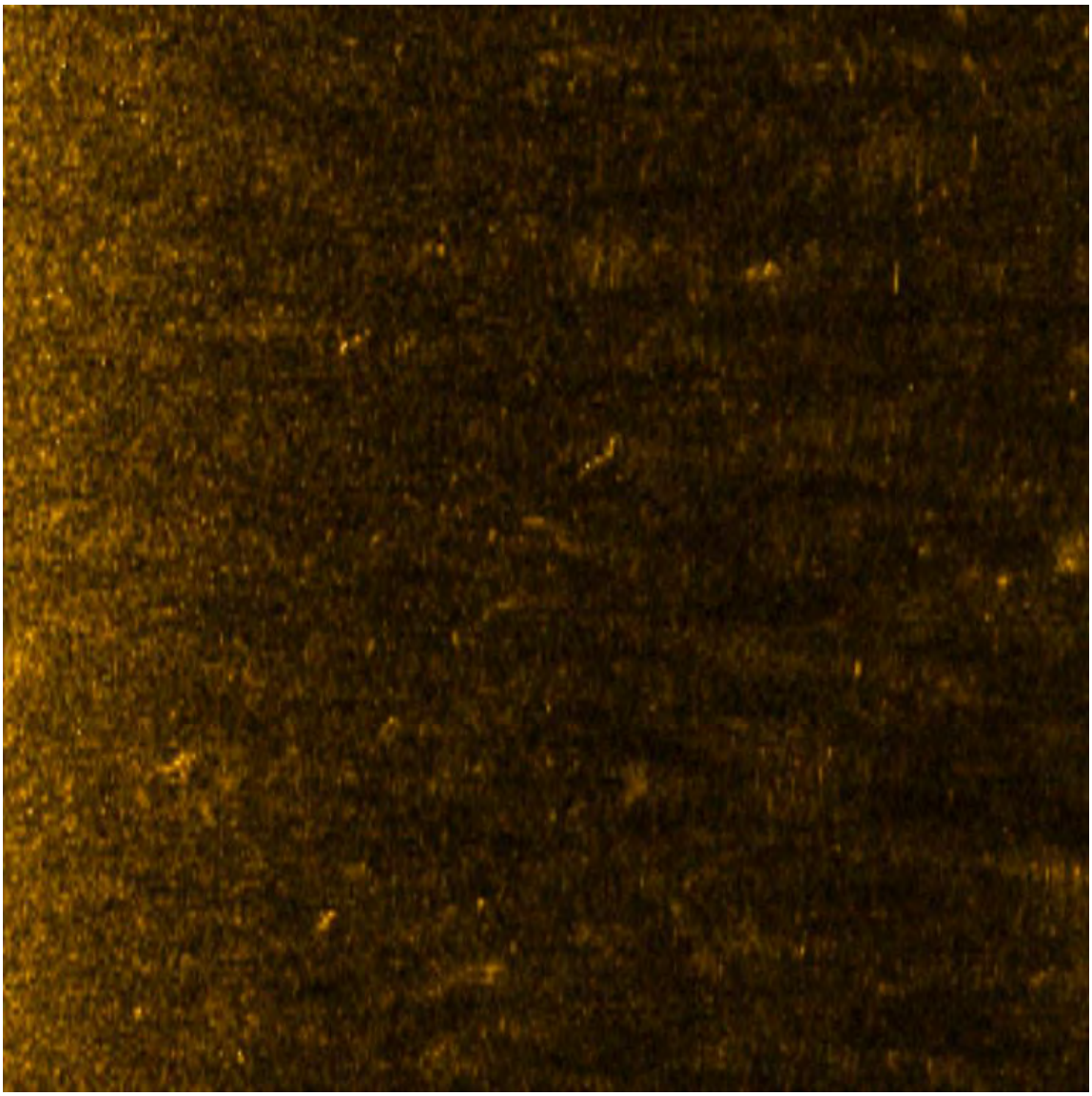


Contact 081

- Sonar Time at Target: 4/27/2015 6:36:10 PM
- Click Position
  29.9757664745 -81.2323405505 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_036.jsf
- Ping Number: 165583
- Range to target: 87.10 Meters
- Heading: 206.390 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_036

Dimensions and attributes

- Target Width: 1.61 Meters
- Target Height: 0.00 Meters
- Target Length: 6.11 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

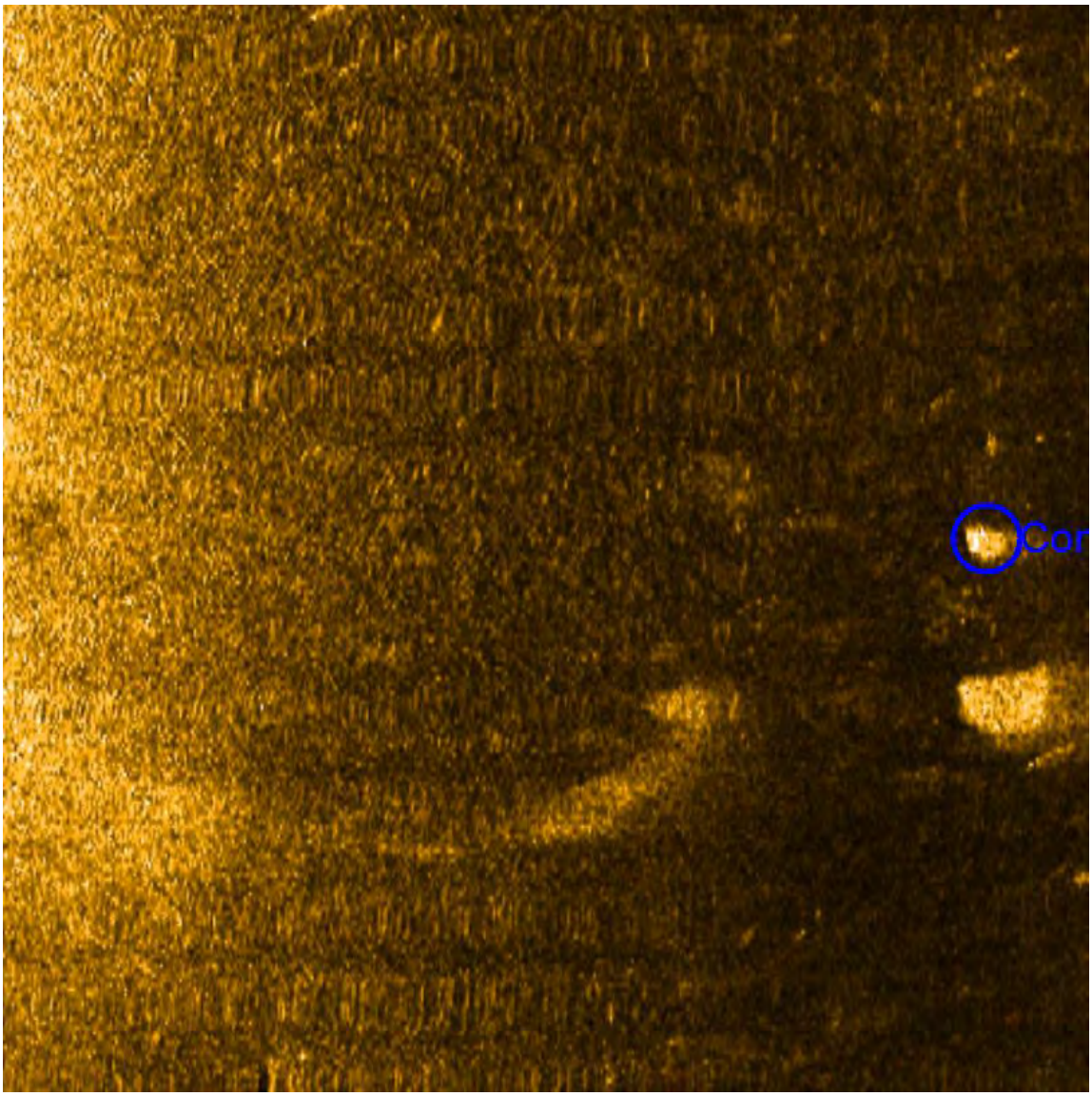


Contact 082

- Sonar Time at Target: 4/28/2015 7:27:27 AM
- Click Position
  29.9198727454 -81.1935572898 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_037.jsf
- Ping Number: 8663
- Range to target: 125.67 Meters
- Heading: 353.300 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_037

Dimensions and attributes

- Target Width: 1.86 Meters
- Target Height: 0.00 Meters
- Target Length: 8.78 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

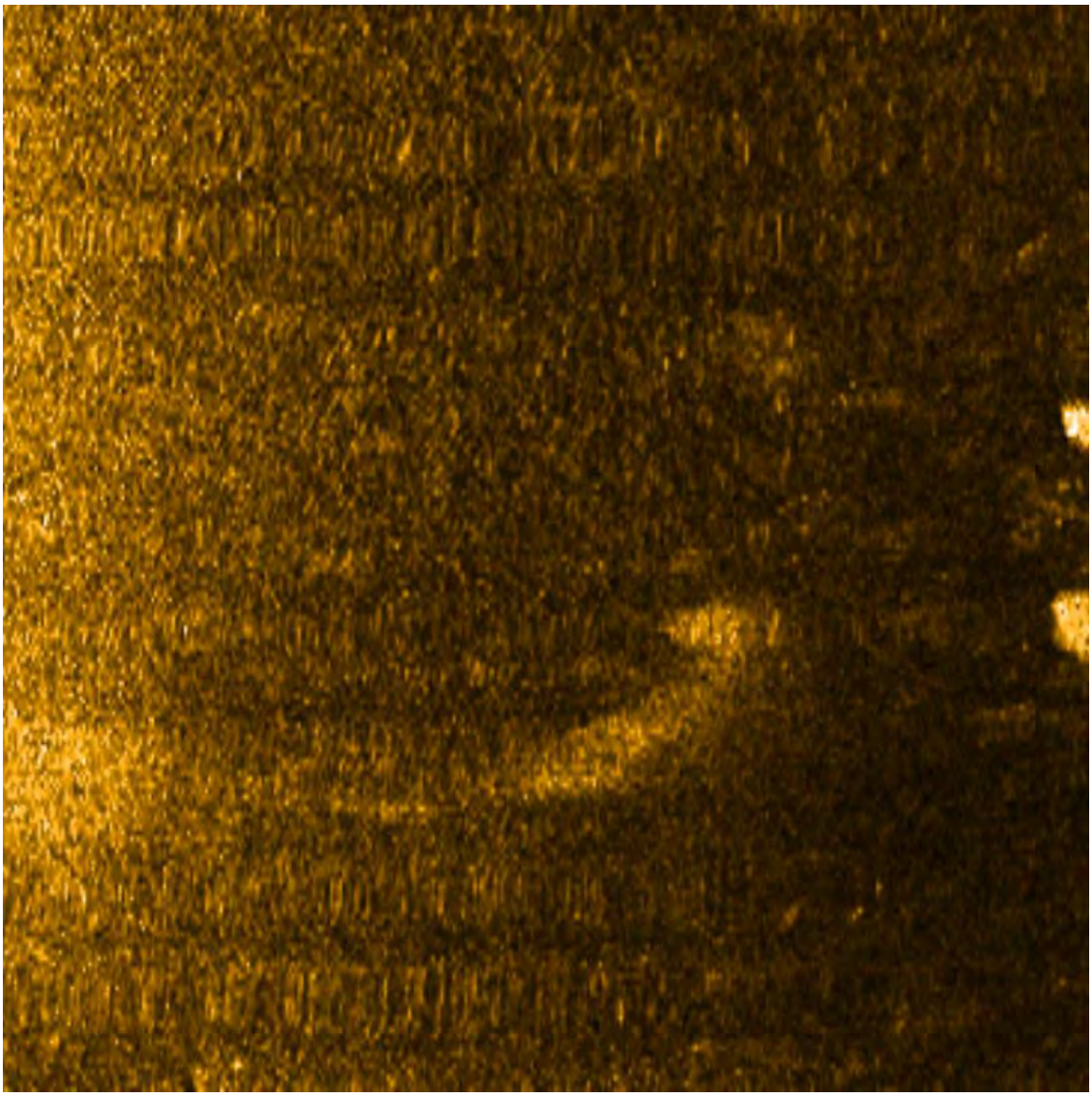


Contact 083

- Sonar Time at Target: 4/28/2015 8:48:58 AM
- Click Position
  30.0051931938 -81.1955213949 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_037.jsf
- Ping Number: 31448
- Range to target: 114.49 Meters
- Heading: 355.600 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_037

Dimensions and attributes

- Target Width: 5.14 Meters
- Target Height: 0.00 Meters
- Target Length: 2.96 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

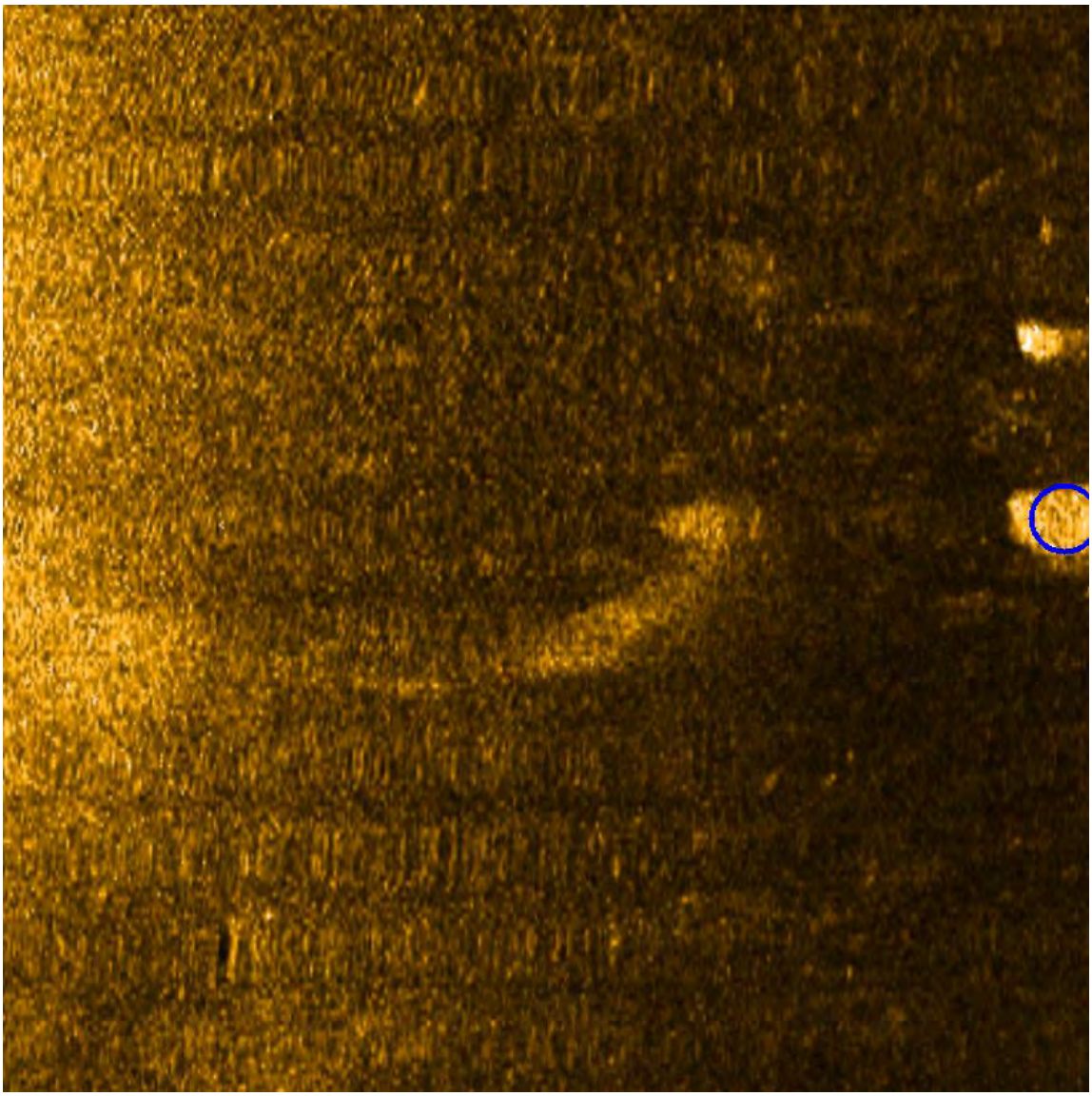


Contact 084

- Sonar Time at Target: 4/28/2015 8:49:01 AM
- Click Position
  30.0049336884 -81.1953964907 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_037.jsf
- Ping Number: 31460
- Range to target: 128.99 Meters
- Heading: 355.690 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_037

Dimensions and attributes

- Target Width: 1.33 Meters
- Target Height: 0.00 Meters
- Target Length: 5.23 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

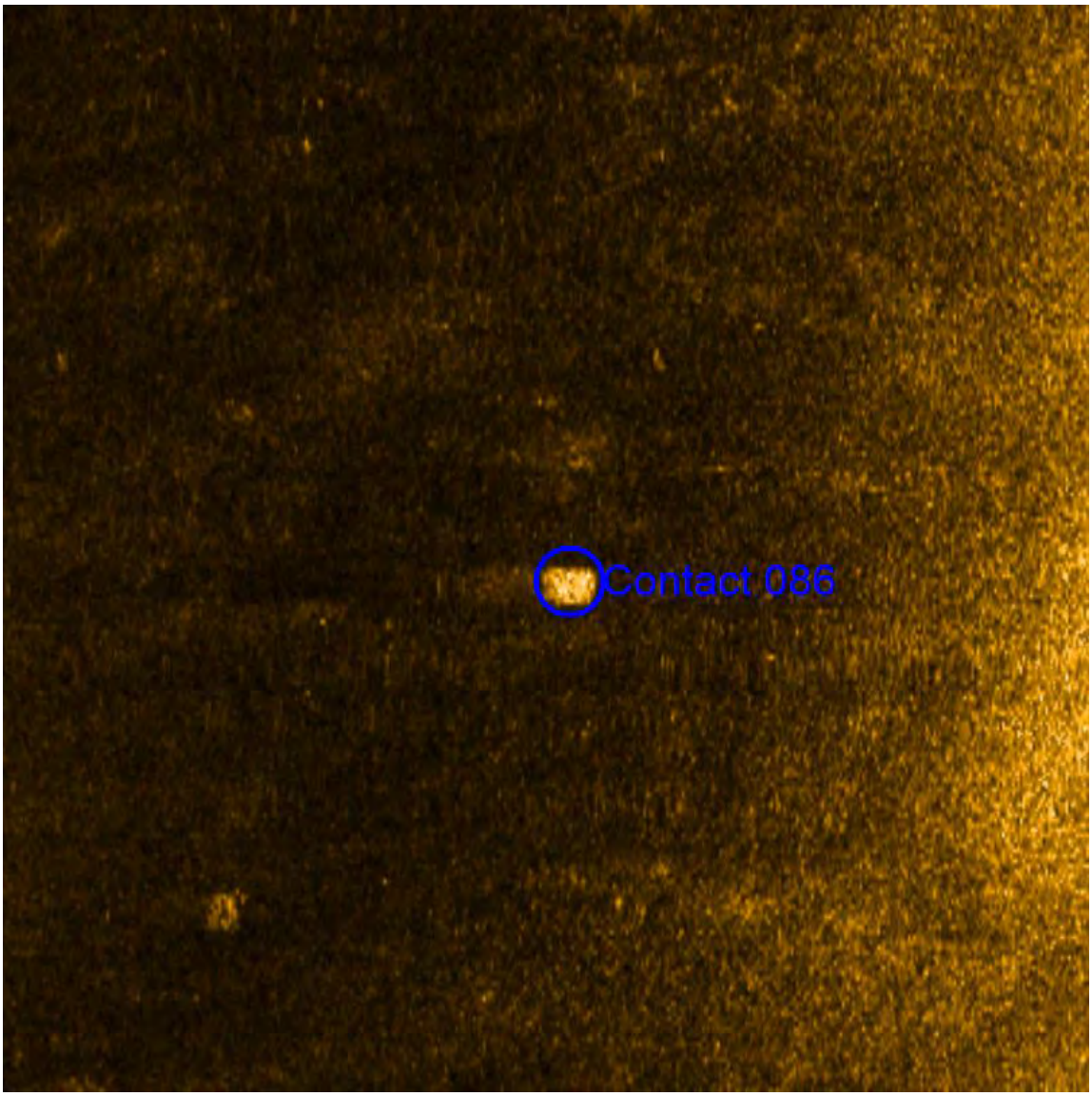


Contact 085

- Sonar Time at Target: 4/28/2015 8:49:05 AM
- Click Position
  30.0052608448 -81.1954877403 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_037.jsf
- Ping Number: 31482
- Range to target: 116.31 Meters
- Heading: 353.690 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_037

Dimensions and attributes

- Target Width: 5.67 Meters
- Target Height: 0.00 Meters
- Target Length: 7.63 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

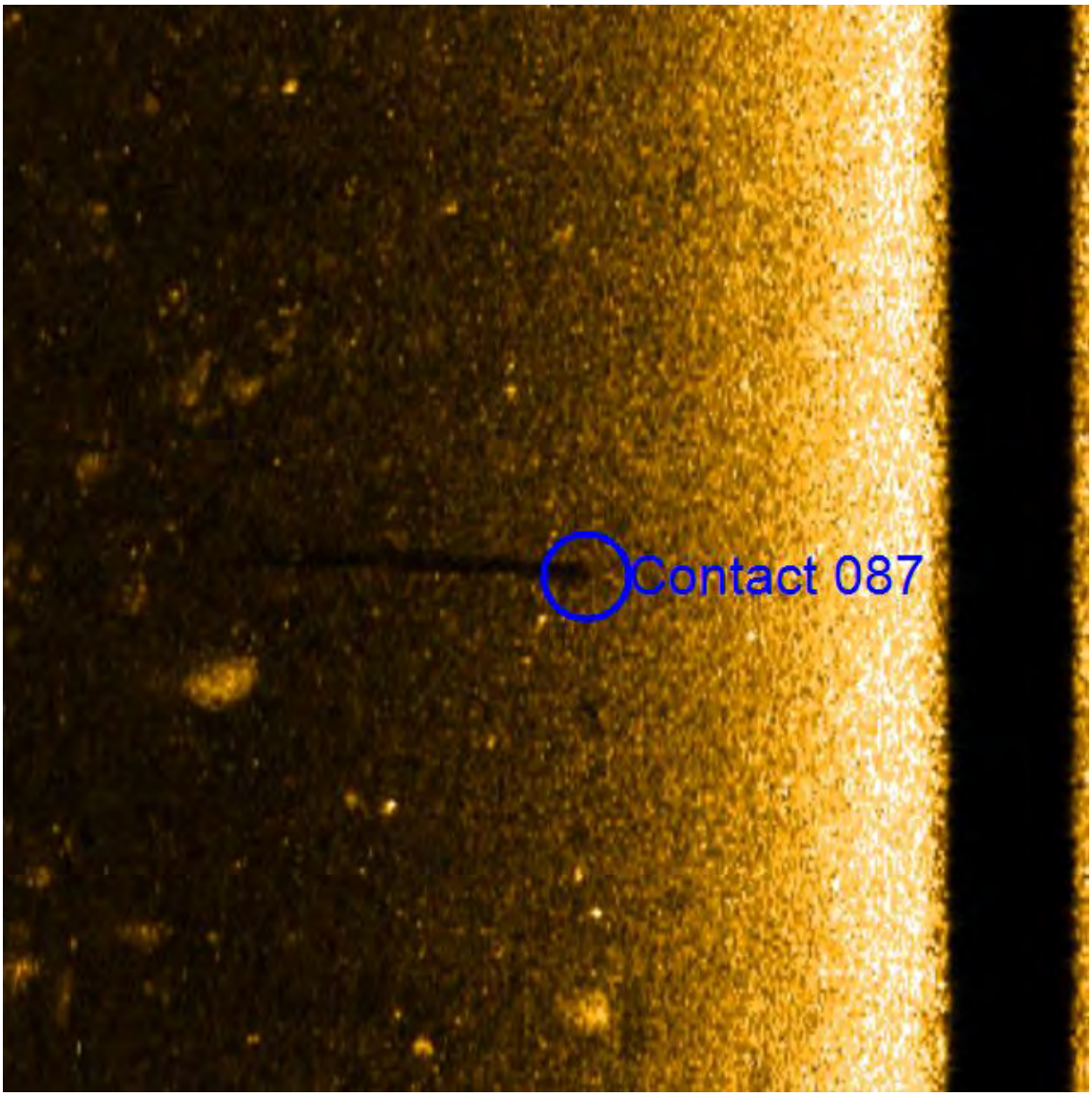


Contact 086

- Sonar Time at Target: 4/28/2015 8:51:09 AM
- Click Position
  30.0072892703 -81.1974183259 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_037.jsf
- Ping Number: 32059
- Range to target: 70.56 Meters
- Heading: 355.190 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_037

Dimensions and attributes

- Target Width: 3.98 Meters
- Target Height: 0.00 Meters
- Target Length: 2.78 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

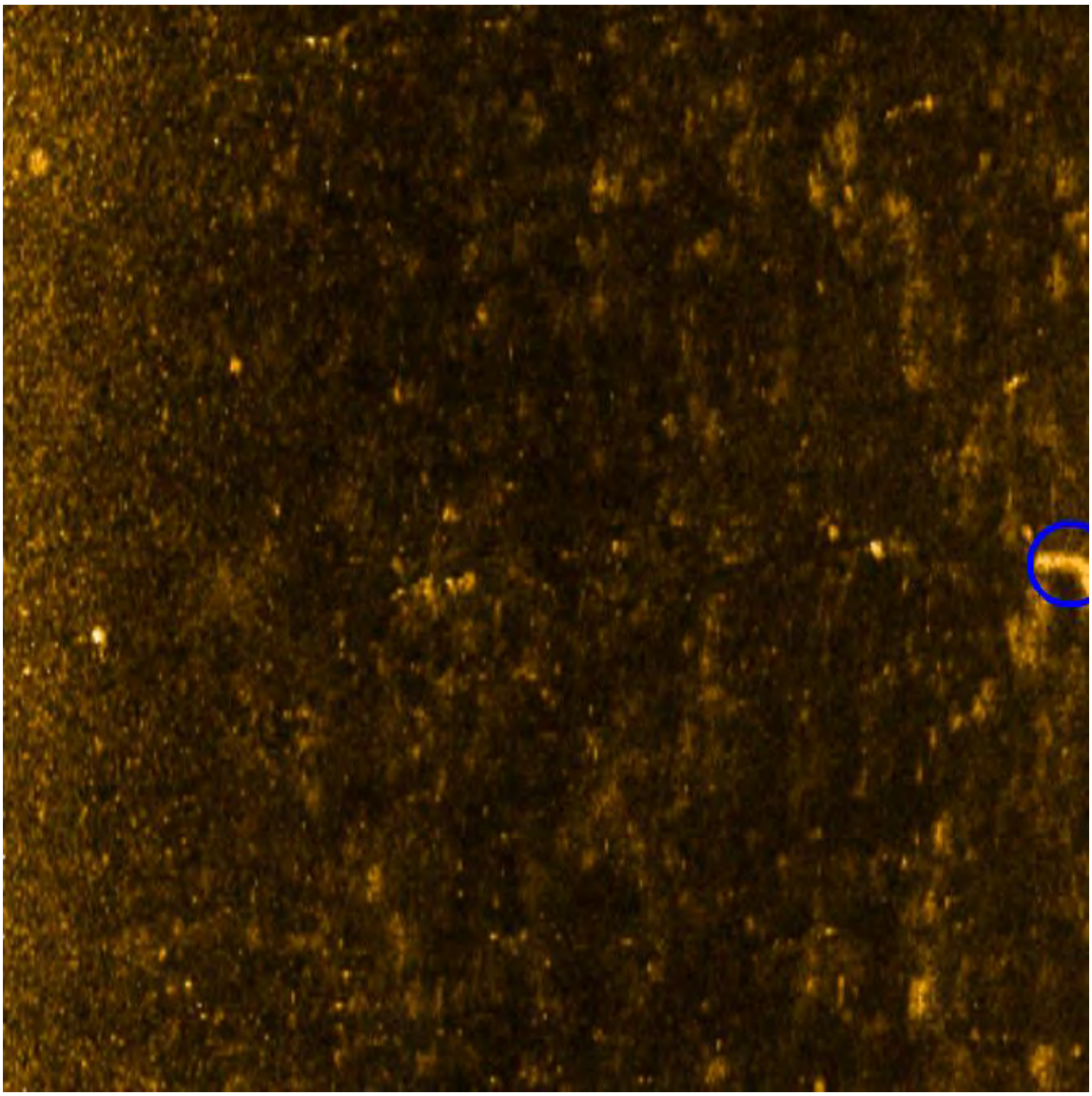


Contact 087

- Sonar Time at Target: 4/30/2015 12:58:21 PM
- Click Position
  30.5608306390 -81.3394271615 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_048_1.jsf
- Ping Number: 44778
- Range to target: 35.14 Meters
- Heading: 220.700 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_048_1

Dimensions and attributes

- Target Width: 1.26 Meters
- Target Height: 1.84 Meters
- Target Length: 2.52 Meters
- Target Shadow: 18.62 Meters
- Classification1: debris
- Description: Potential Debris

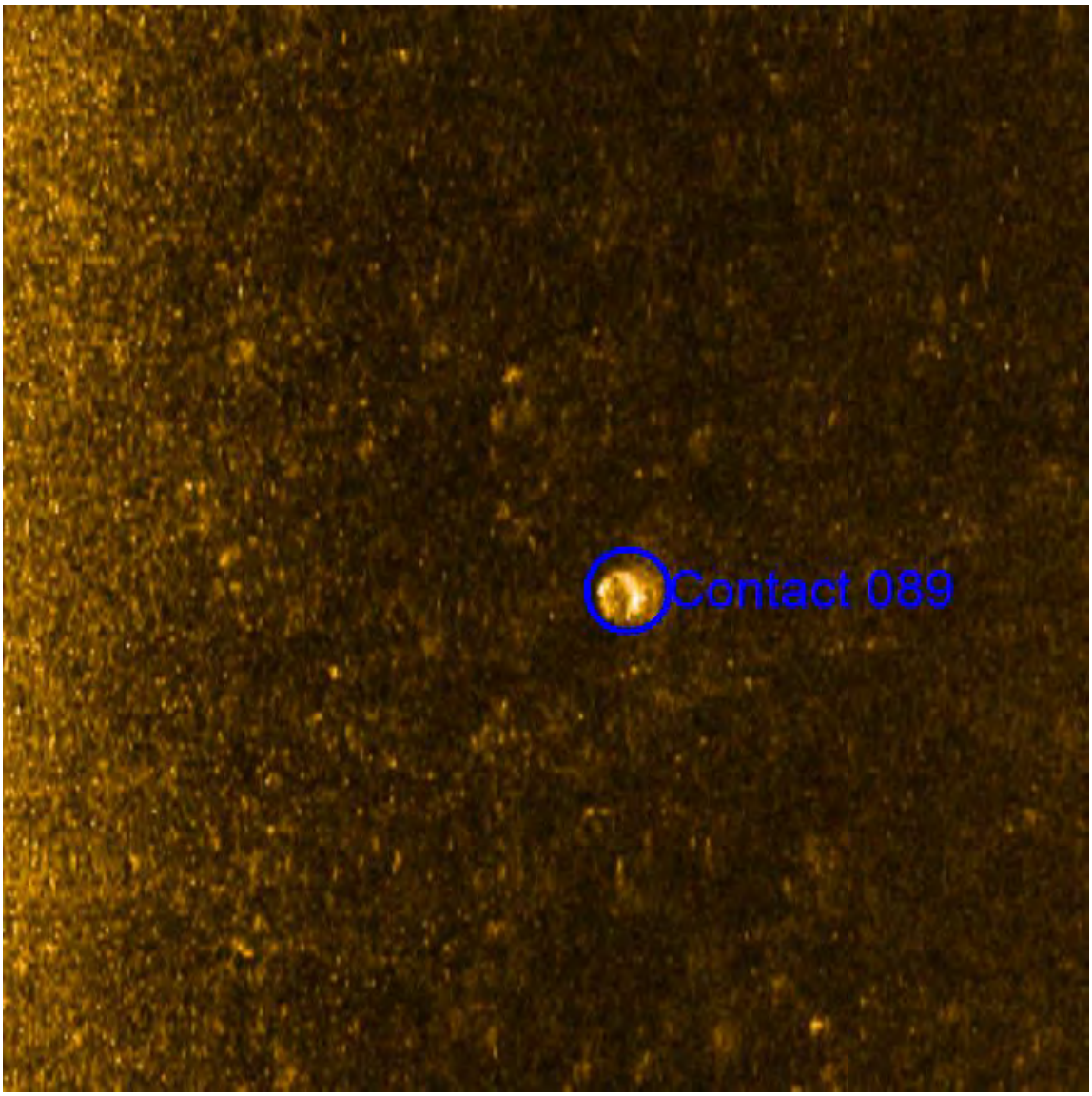


Contact 088

- Sonar Time at Target: 4/30/2015 6:08:37 PM
- Click Position
  30.5650614859 -81.3450242062 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_053.jsf
- Ping Number: 131489
- Range to target: 125.50 Meters
- Heading: 295.500 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_053

Dimensions and attributes

- Target Width: 2.16 Meters
- Target Height: 0.00 Meters
- Target Length: 7.22 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

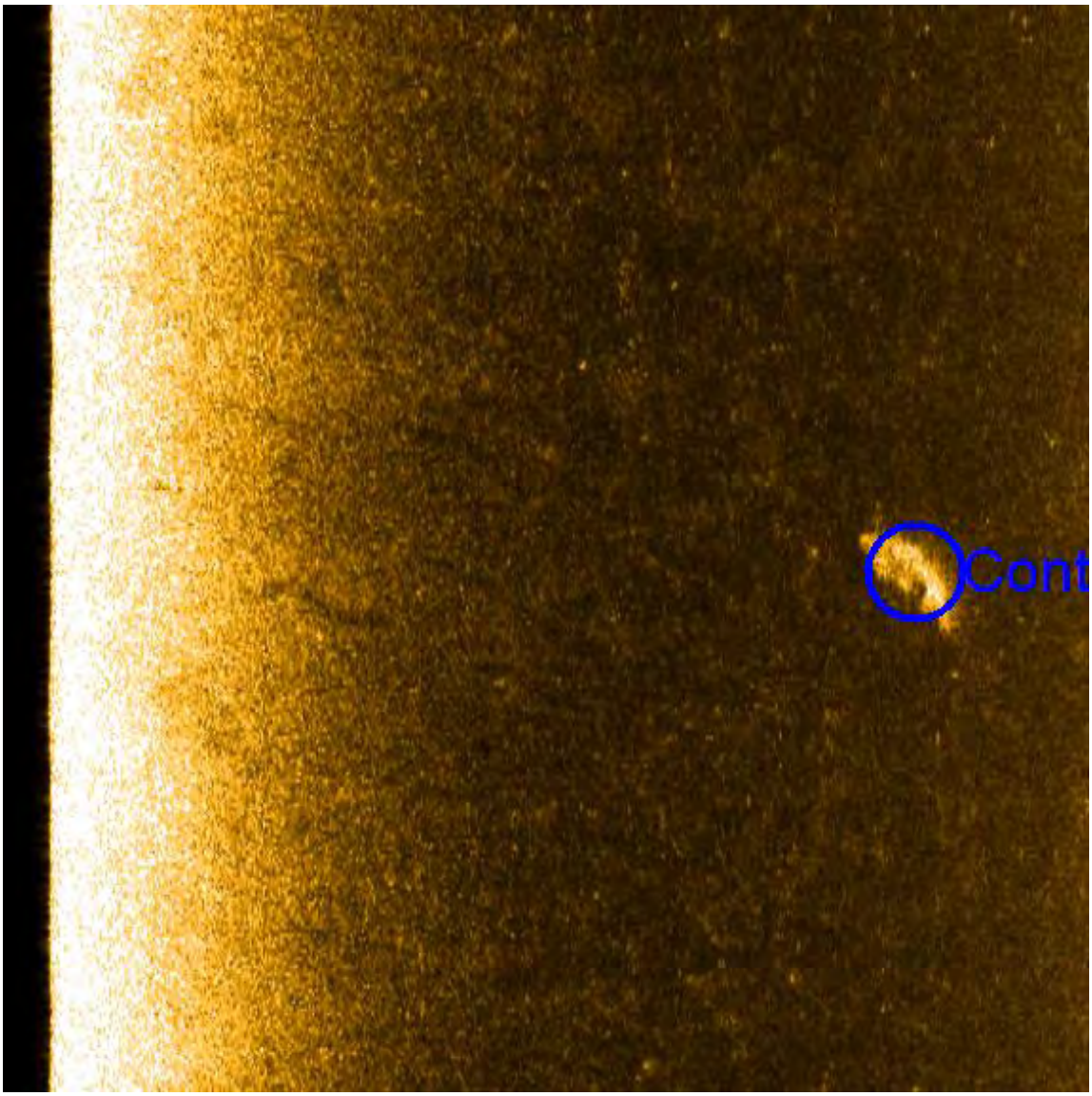


Contact 089

- Sonar Time at Target: 4/30/2015 6:36:38 PM
- Click Position
  30.5718425200 -81.3835730052 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_053.jsf
- Ping Number: 139324
- Range to target: 84.86 Meters
- Heading: 292.300 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_053

Dimensions and attributes

- Target Width: 5.11 Meters
- Target Height: 0.00 Meters
- Target Length: 4.15 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

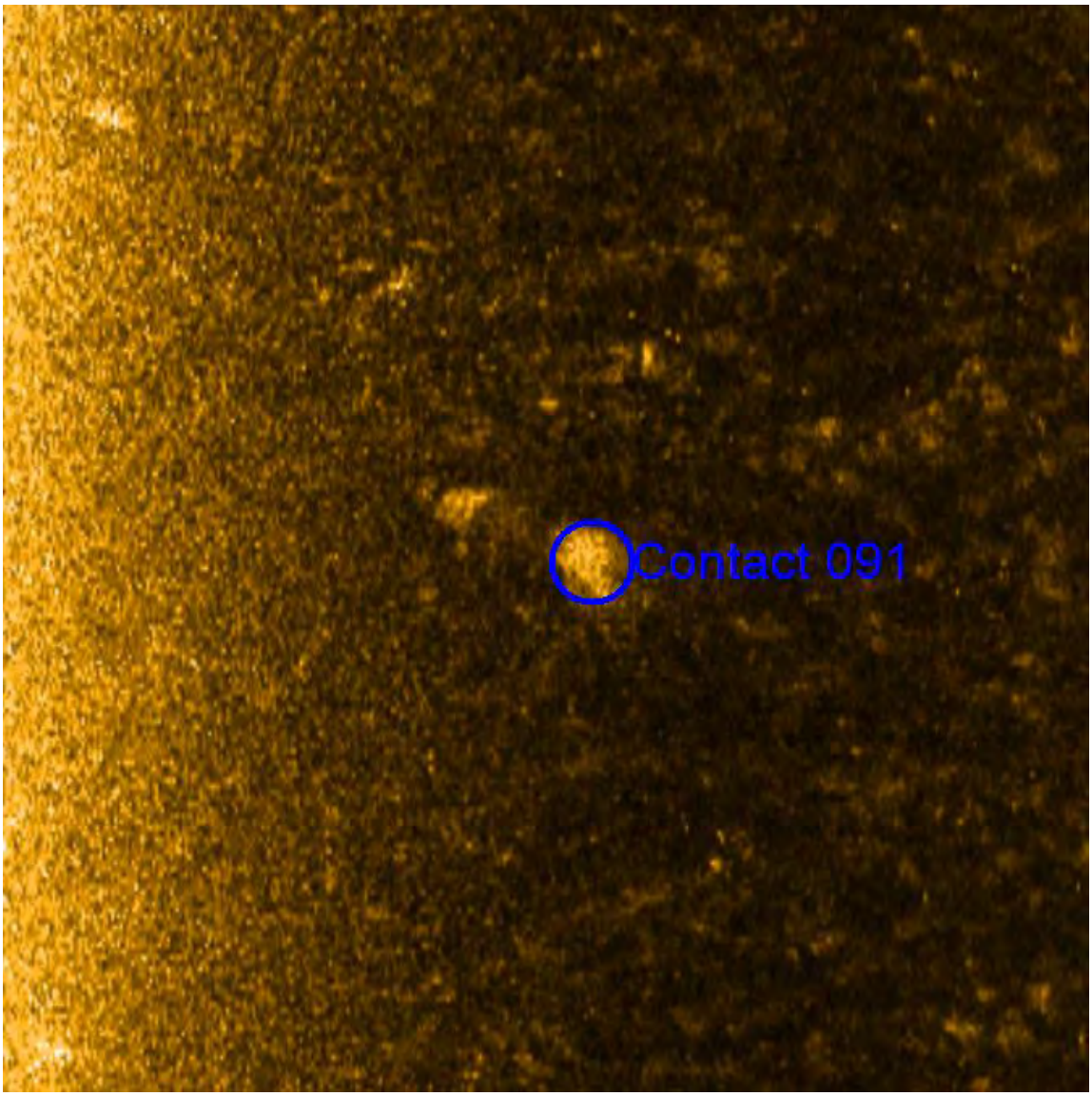


Contact 090

- Sonar Time at Target: 4/30/2015 8:29:39 PM
- Click Position
  30.5376651755 -81.3756339613 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_051.jsf
- Ping Number: 170909
- Range to target: 129.56 Meters
- Heading: 300.400 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_051

Dimensions and attributes

- Target Width: 5.55 Meters
- Target Height: 0.00 Meters
- Target Length: 18.59 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

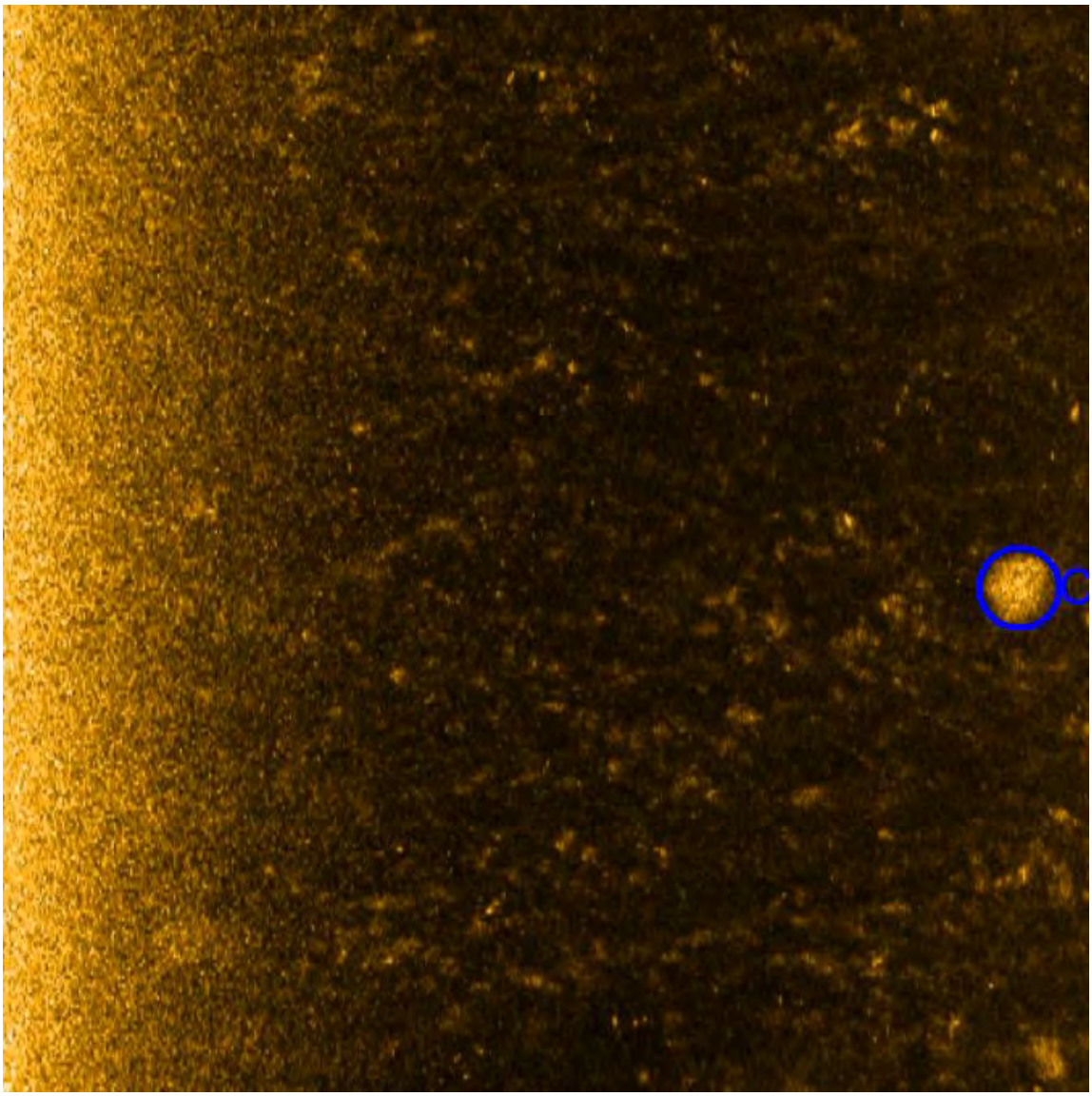


Contact 091

- Sonar Time at Target: 5/1/2015 8:14:20 AM
- Click Position
  30.5822293841 -81.3714123926 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_046.jsf
- Ping Number: 13414
- Range to target: 65.13 Meters
- Heading: 8.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_046

Dimensions and attributes

- Target Width: 5.01 Meters
- Target Height: 0.00 Meters
- Target Length: 6.67 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

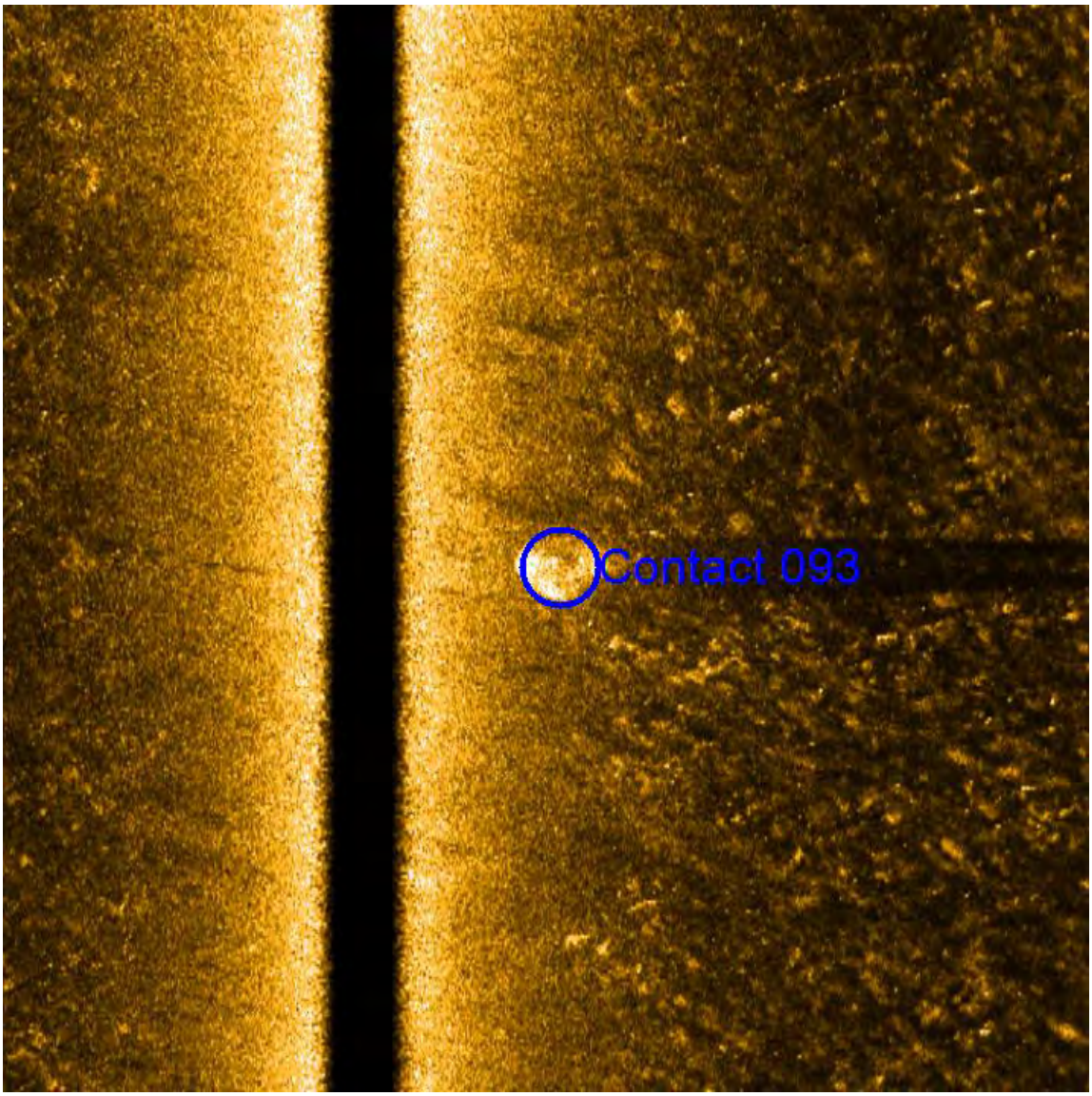


Contact 092

- Sonar Time at Target: 5/1/2015 8:15:59 AM
- Click Position
  30.5840312355 -81.3701512592 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_046.jsf
- Ping Number: 13871
- Range to target: 132.09 Meters
- Heading: 6.100 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_046

Dimensions and attributes

- Target Width: 7.13 Meters
- Target Height: 0.00 Meters
- Target Length: 7.59 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

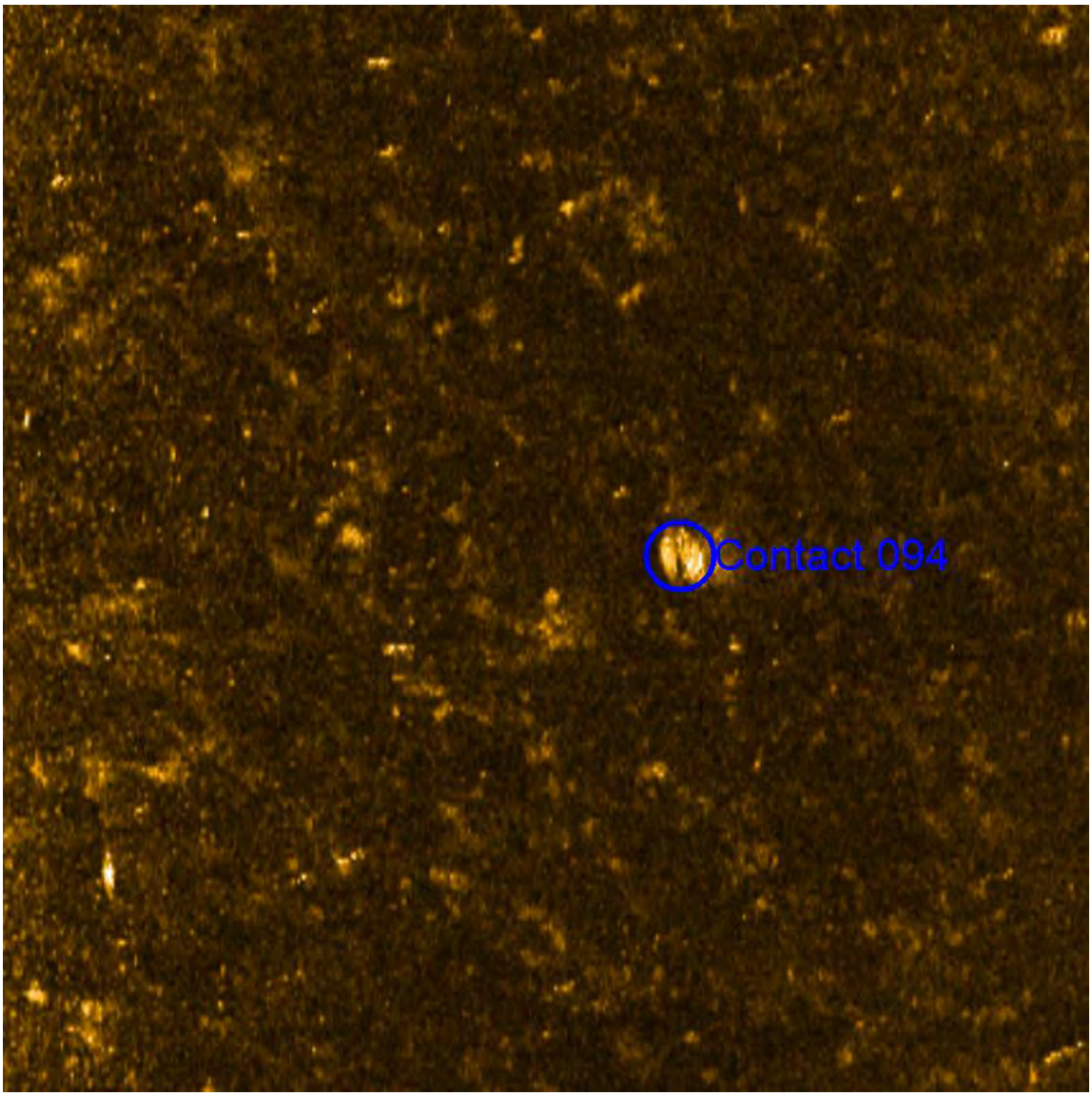


Contact 093

- Sonar Time at Target: 5/1/2015 9:27:05 AM
- Click Position
  30.6170730409 -81.3627721697 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_056.jsf
- Ping Number: 33743
- Range to target: 27.48 Meters
- Heading: 296.590 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_056

Dimensions and attributes

- Target Width: 8.52 Meters
- Target Height: 0.00 Meters
- Target Length: 14.57 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

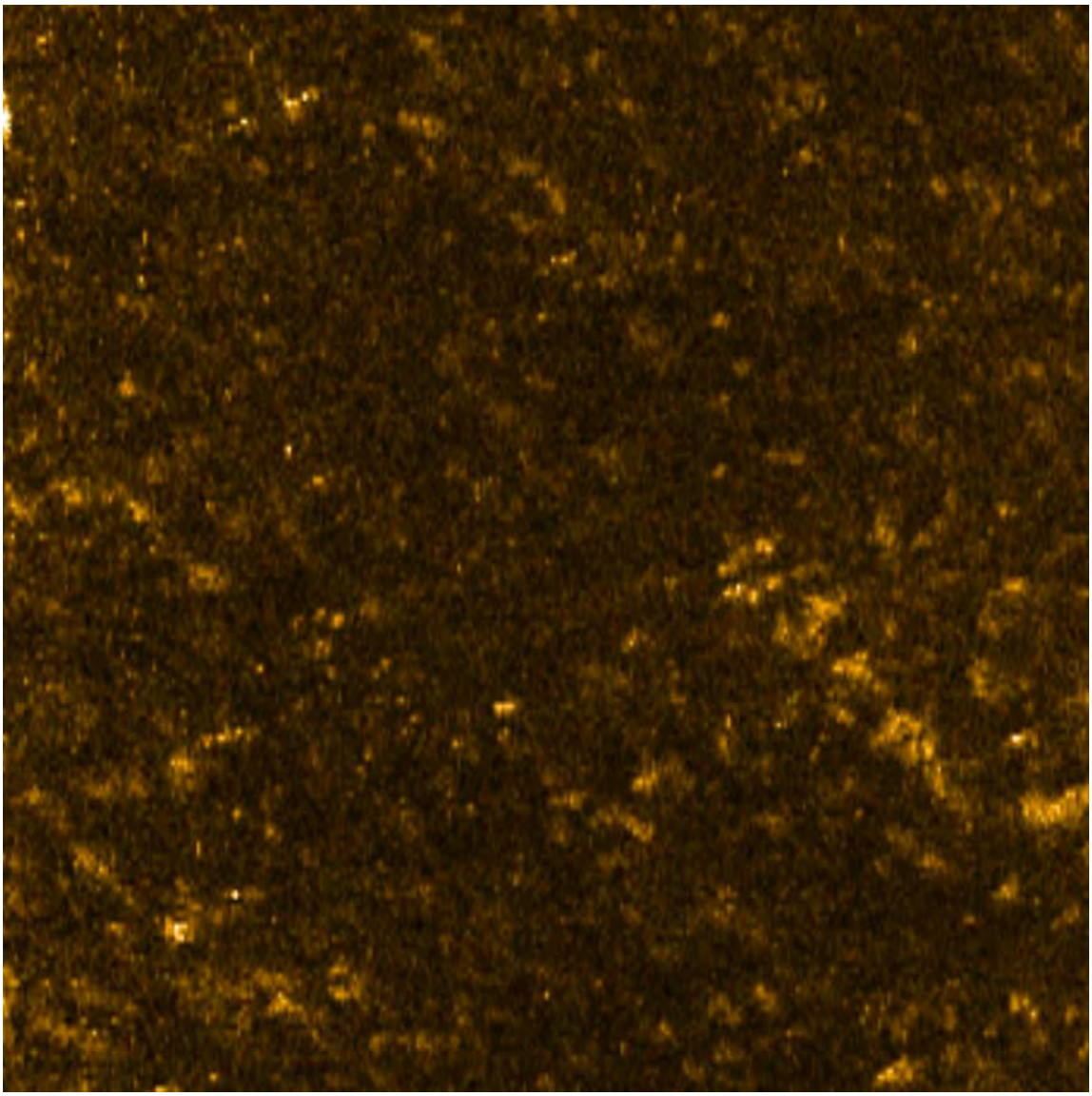


Contact 094

- Sonar Time at Target: 5/1/2015 10:41:50 AM
- Click Position
  30.5876314455 -81.3797091019 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_054.jsf
- Ping Number: 54632
- Range to target: 88.99 Meters
- Heading: 298.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_054

Dimensions and attributes

- Target Width: 5.61 Meters
- Target Height: 0.00 Meters
- Target Length: 4.60 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

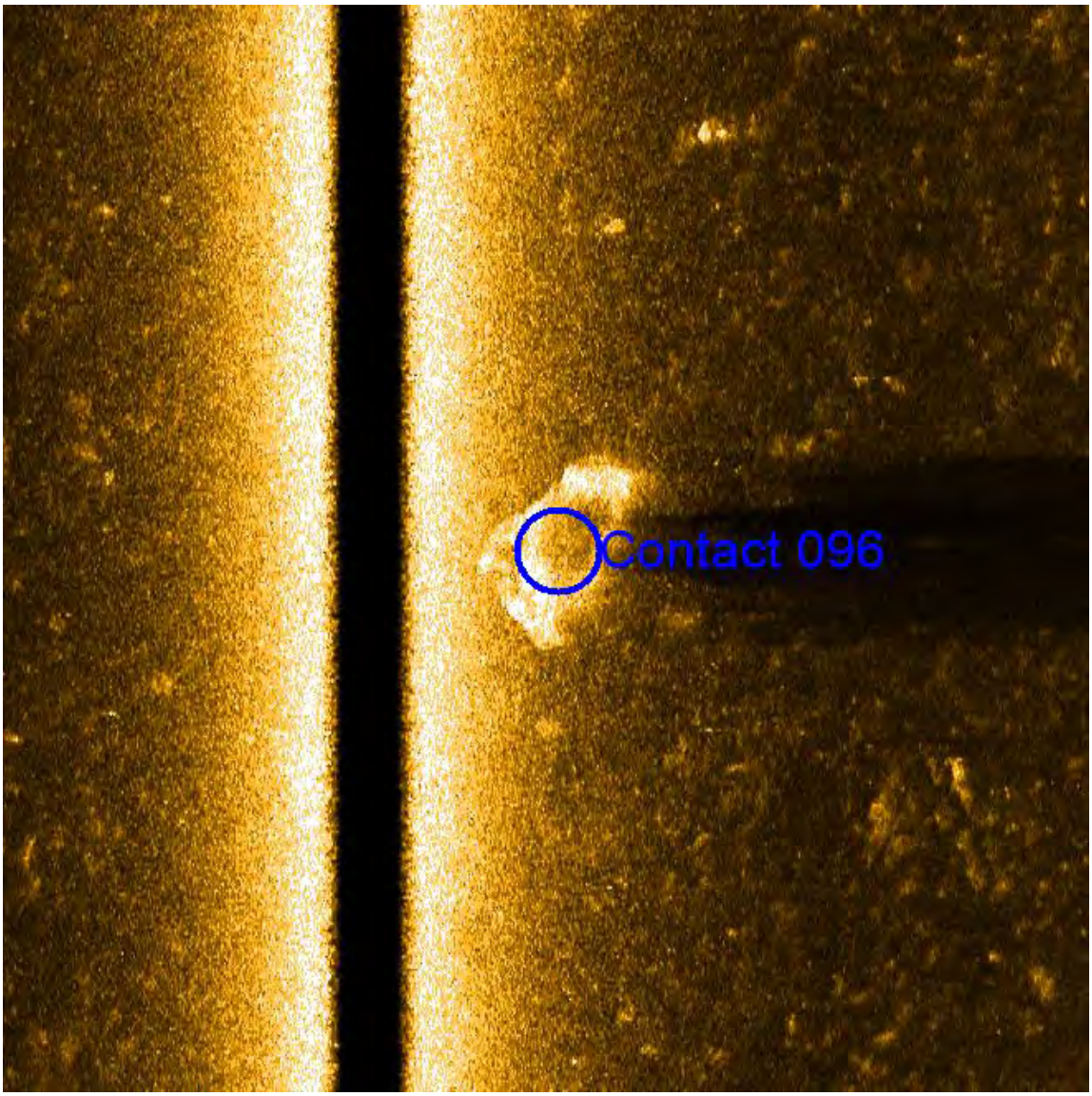


Contact 095

- Sonar Time at Target: 5/1/2015 10:42:18 AM
- Click Position
  30.5881068311 -81.3801876026 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_054.jsf
- Ping Number: 54765
- Range to target: 128.52 Meters
- Heading: 296.590 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_054

Dimensions and attributes

- Target Width: 2.81 Meters
- Target Height: 0.00 Meters
- Target Length: 12.49 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

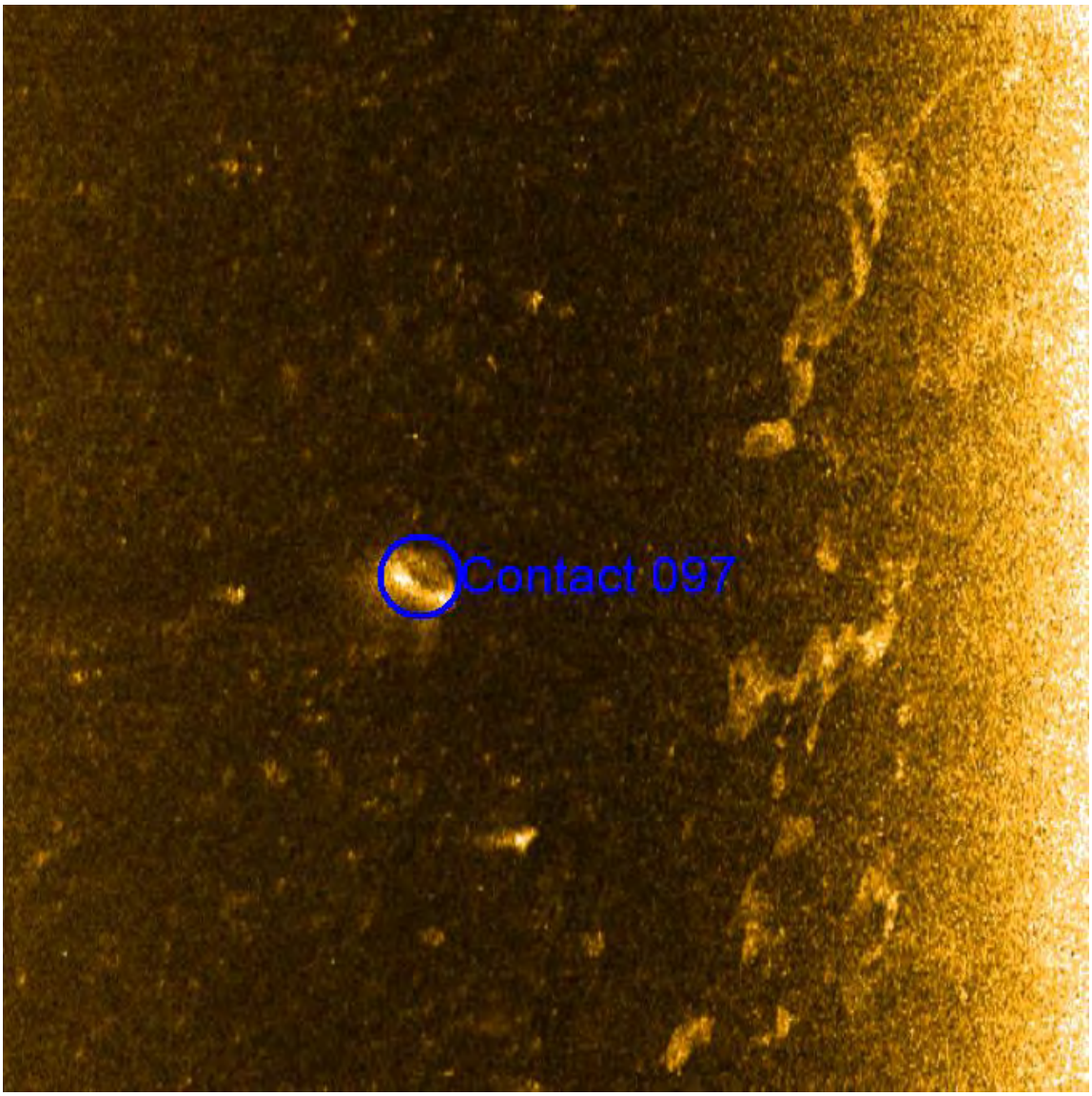


Contact 096

- Sonar Time at Target: 5/1/2015 11:20:45 AM
- Click Position
  30.5913440975 -81.3788146444 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_045.jsf
- Ping Number: 65509
- Range to target: 27.26 Meters
- Heading: 5.800 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_045

Dimensions and attributes

- Target Width: 19.49 Meters
- Target Height: 0.00 Meters
- Target Length: 28.38 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

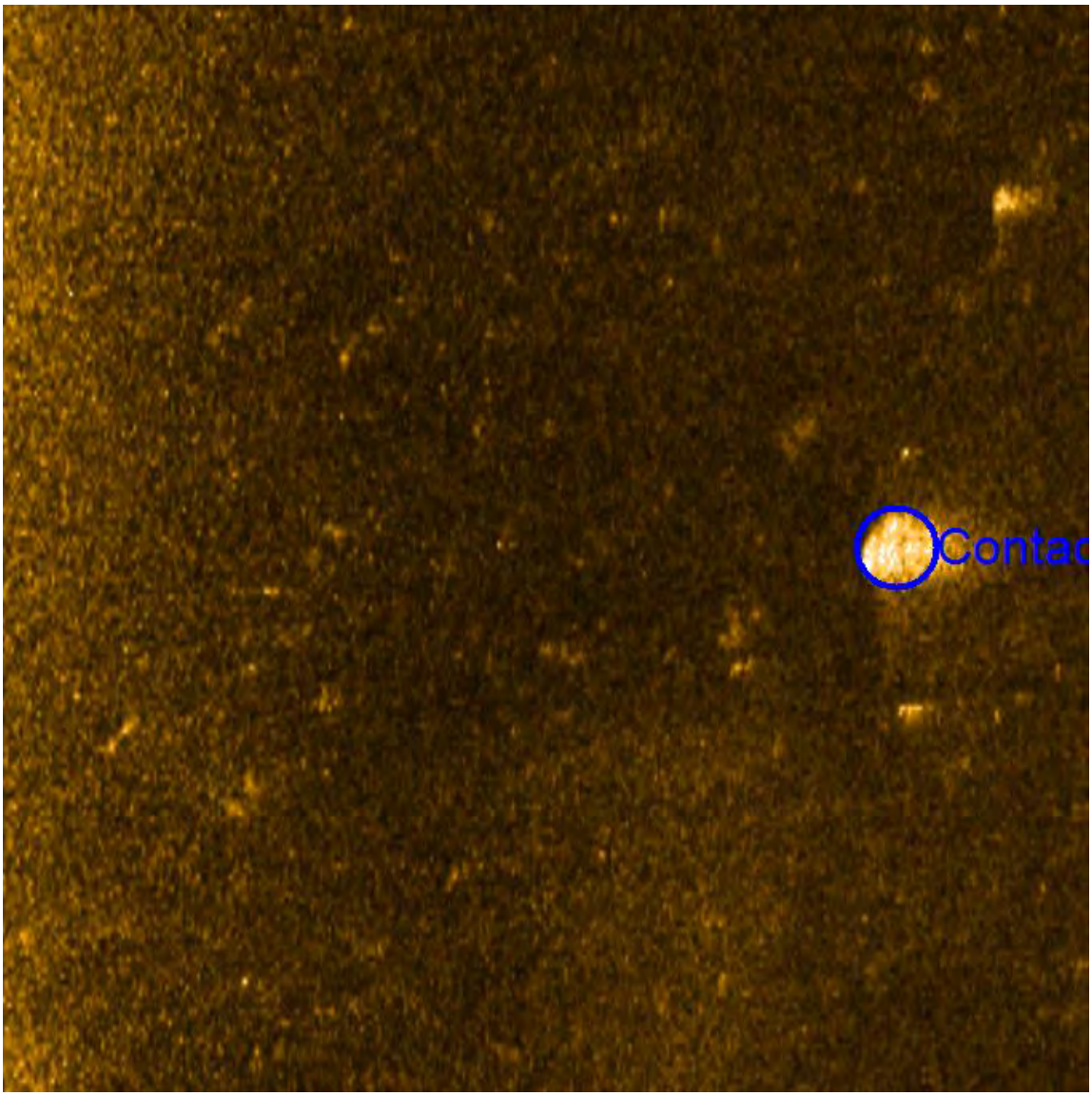


Contact 097

- Sonar Time at Target: 5/1/2015 12:52:50 PM
- Click Position
  30.6817222167 -81.3296914615 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_057.jsf
- Ping Number: 91243
- Range to target: 97.54 Meters
- Heading: 341.890 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_057

Dimensions and attributes

- Target Width: 6.11 Meters
- Target Height: 0.00 Meters
- Target Length: 10.88 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

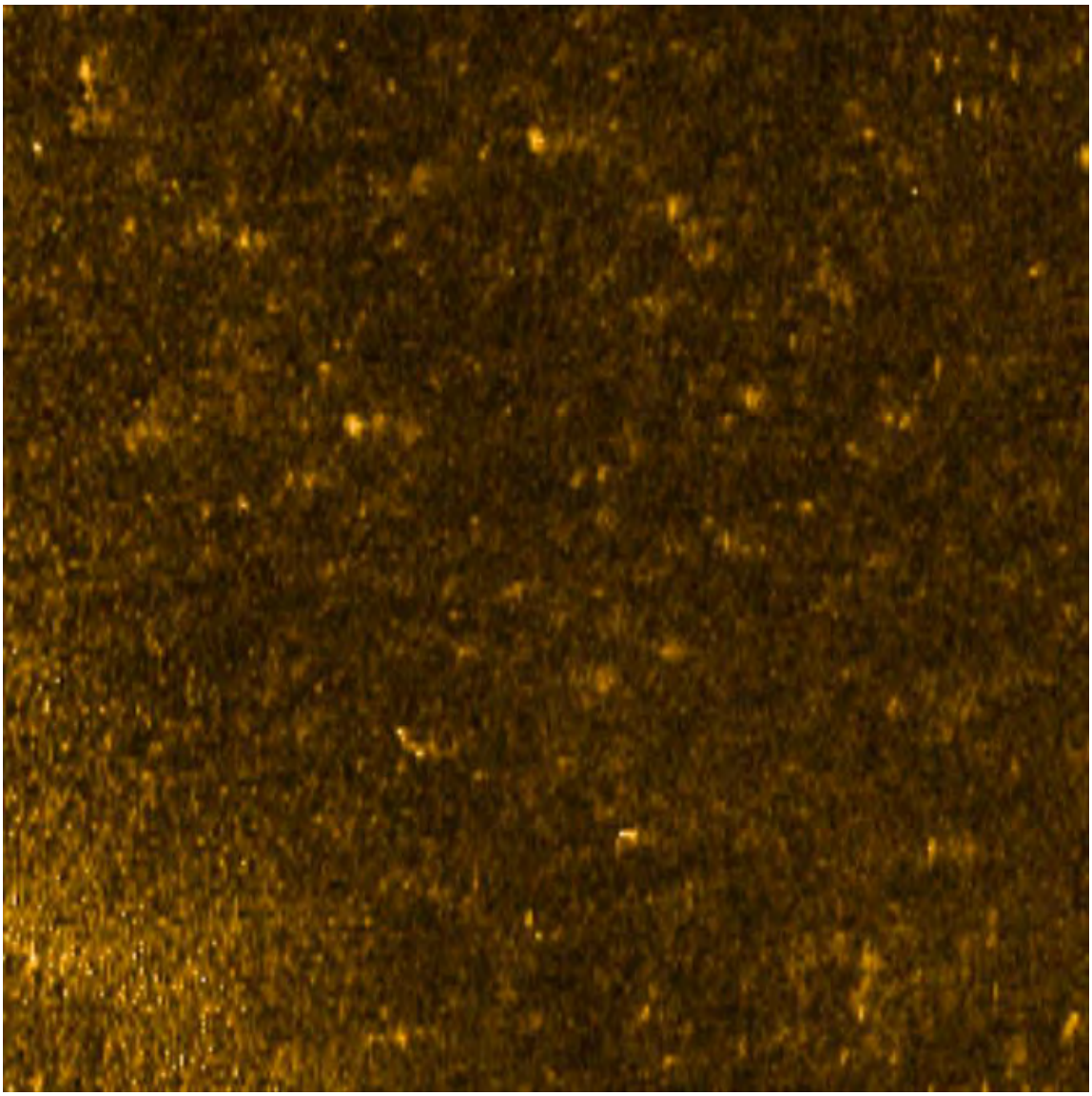


Contact 098

- Sonar Time at Target: 5/1/2015 12:54:19 PM
- Click Position
  30.6839281907 -81.3281609374 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_057.jsf
- Ping Number: 91660
- Range to target: 106.65 Meters
- Heading: 345.300 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_057

Dimensions and attributes

- Target Width: 8.47 Meters
- Target Height: 0.00 Meters
- Target Length: 5.87 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

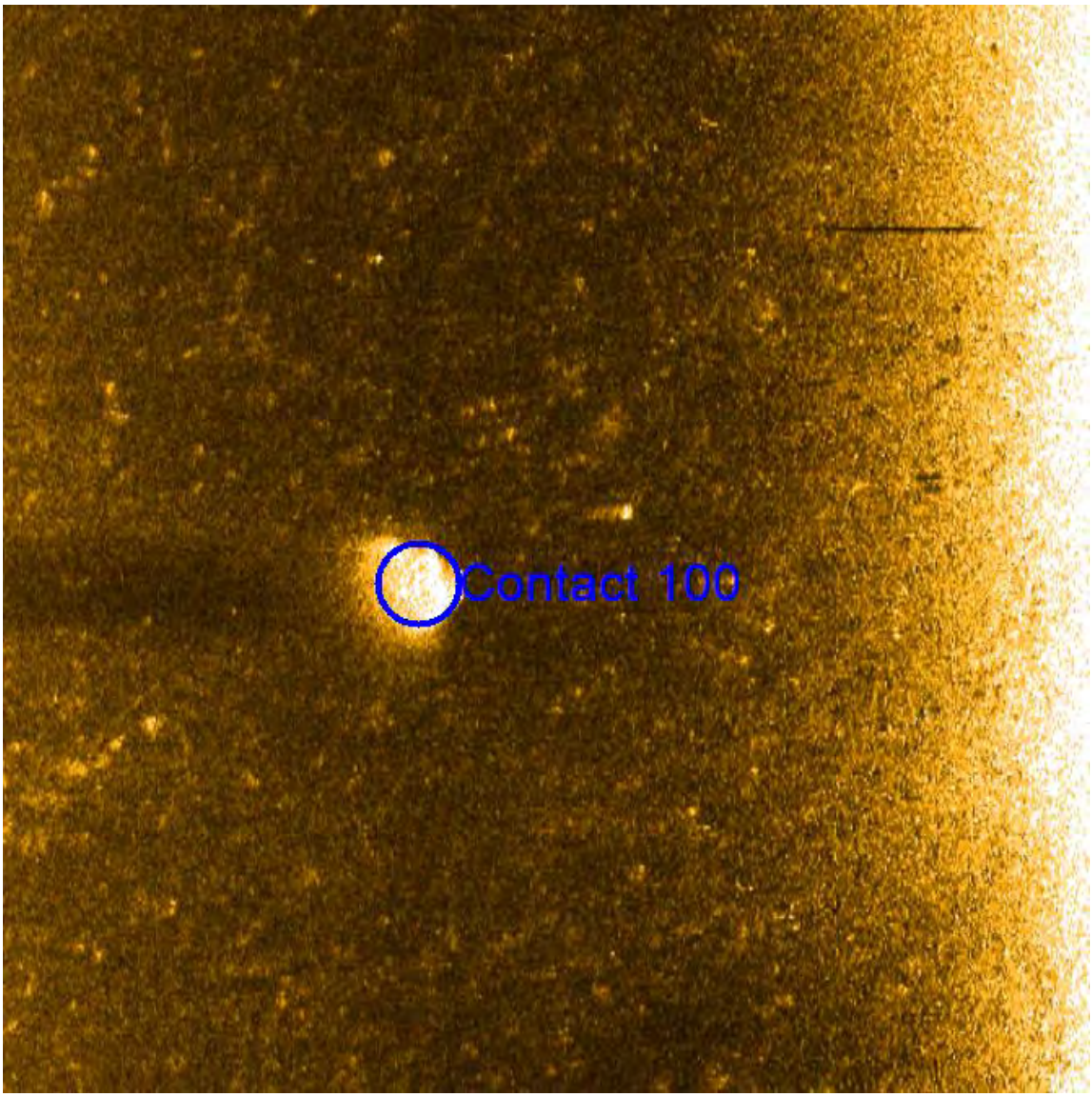


Contact 099

- Sonar Time at Target: 5/1/2015 1:00:19 PM
- Click Position
  30.6909035775 -81.3295114060 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_057.jsf
- Ping Number: 93339
- Range to target: 137.97 Meters
- Heading: 342.500 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_057

Dimensions and attributes

- Target Width: 2.86 Meters
- Target Height: 0.00 Meters
- Target Length: 10.71 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

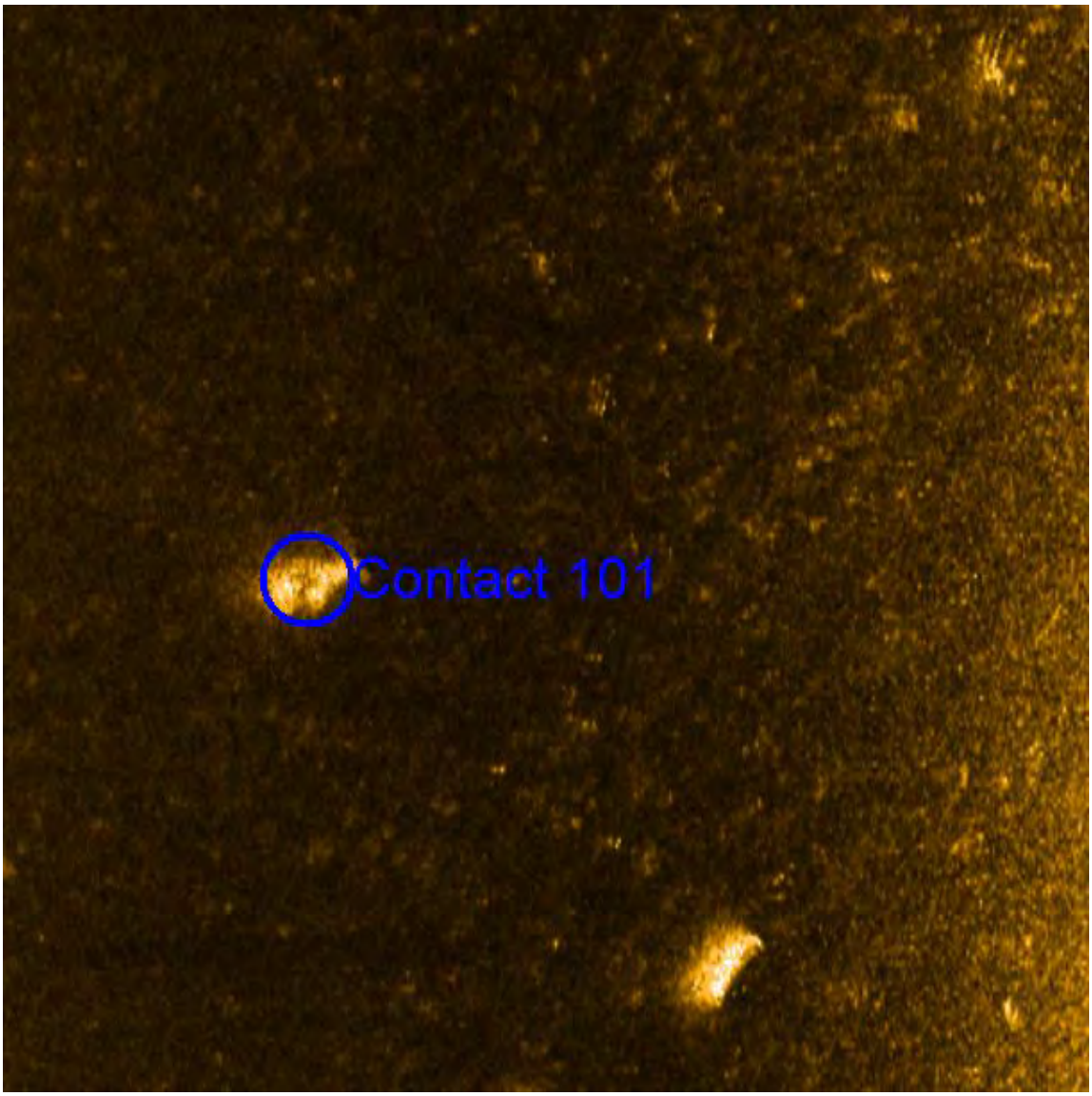


Contact 100

- Sonar Time at Target: 5/1/2015 1:03:30 PM
- Click Position
  30.6940780267 -81.3328194280 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_057.jsf
- Ping Number: 94229
- Range to target: 99.50 Meters
- Heading: 343.600 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_057

Dimensions and attributes

- Target Width: 15.33 Meters
- Target Height: 0.00 Meters
- Target Length: 12.45 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

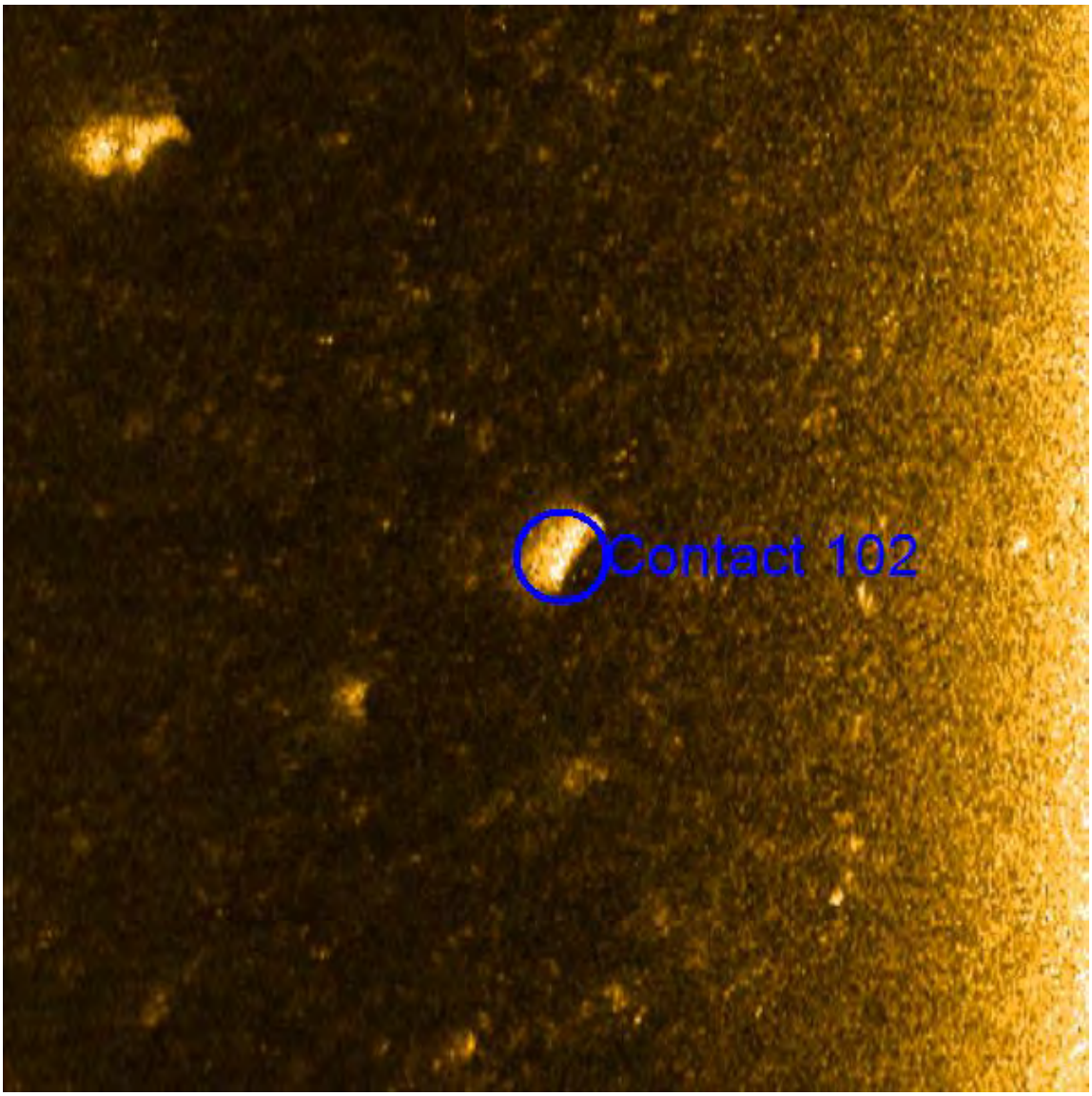


Contact 101

- Sonar Time at Target: 5/1/2015 1:48:36 PM
- Click Position
  30.7208057058 -81.3180150108 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 106833
- Range to target: 106.44 Meters
- Heading: 190.390 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 6.06 Meters
- Target Height: 0.00 Meters
- Target Length: 12.21 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

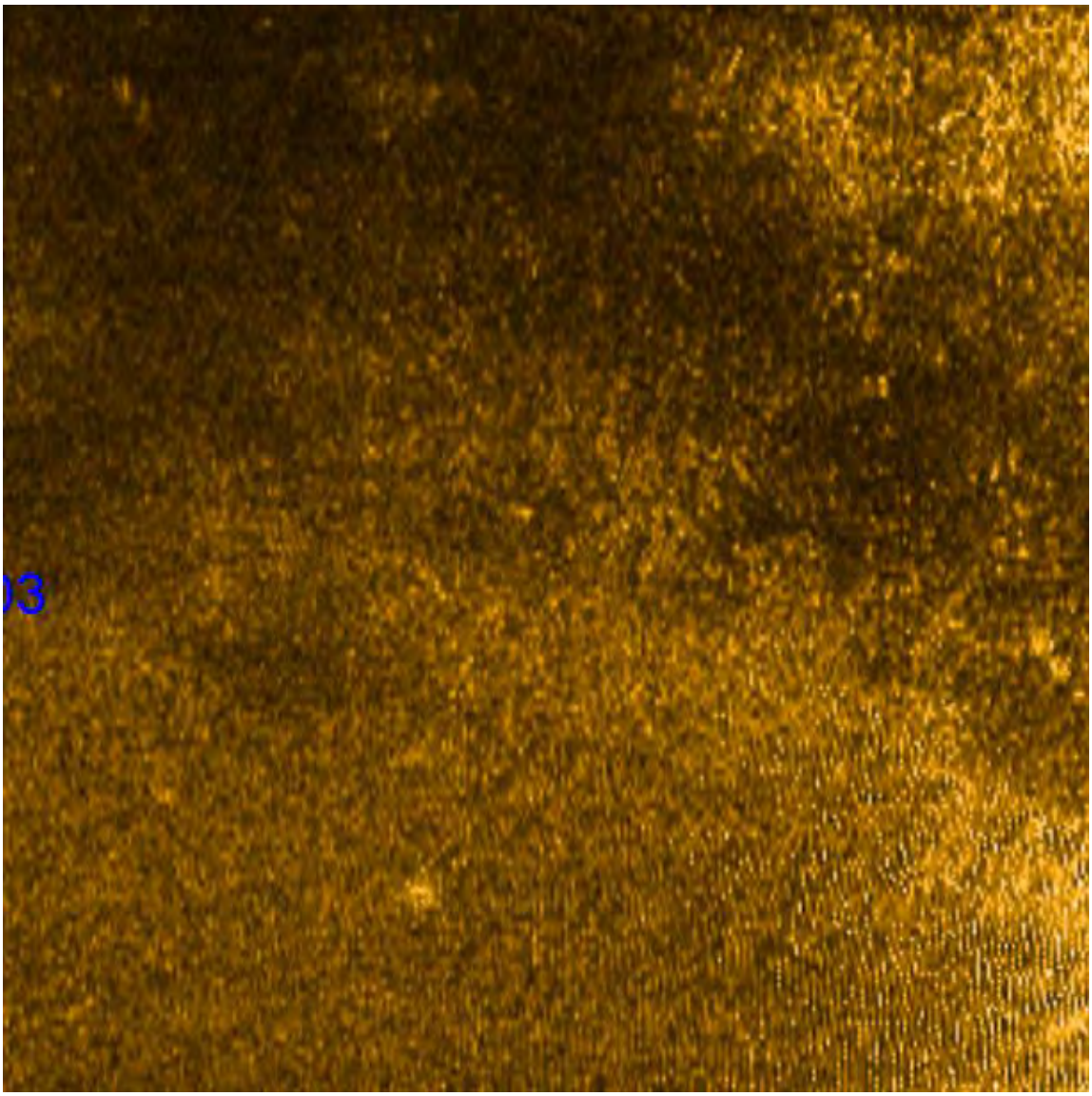


Contact 102

- Sonar Time at Target: 5/1/2015 1:48:53 PM
- Click Position
  30.7202490229 -81.3183619853 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 106910
- Range to target: 63.20 Meters
- Heading: 191.390 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 5.37 Meters
- Target Height: 0.00 Meters
- Target Length: 9.37 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

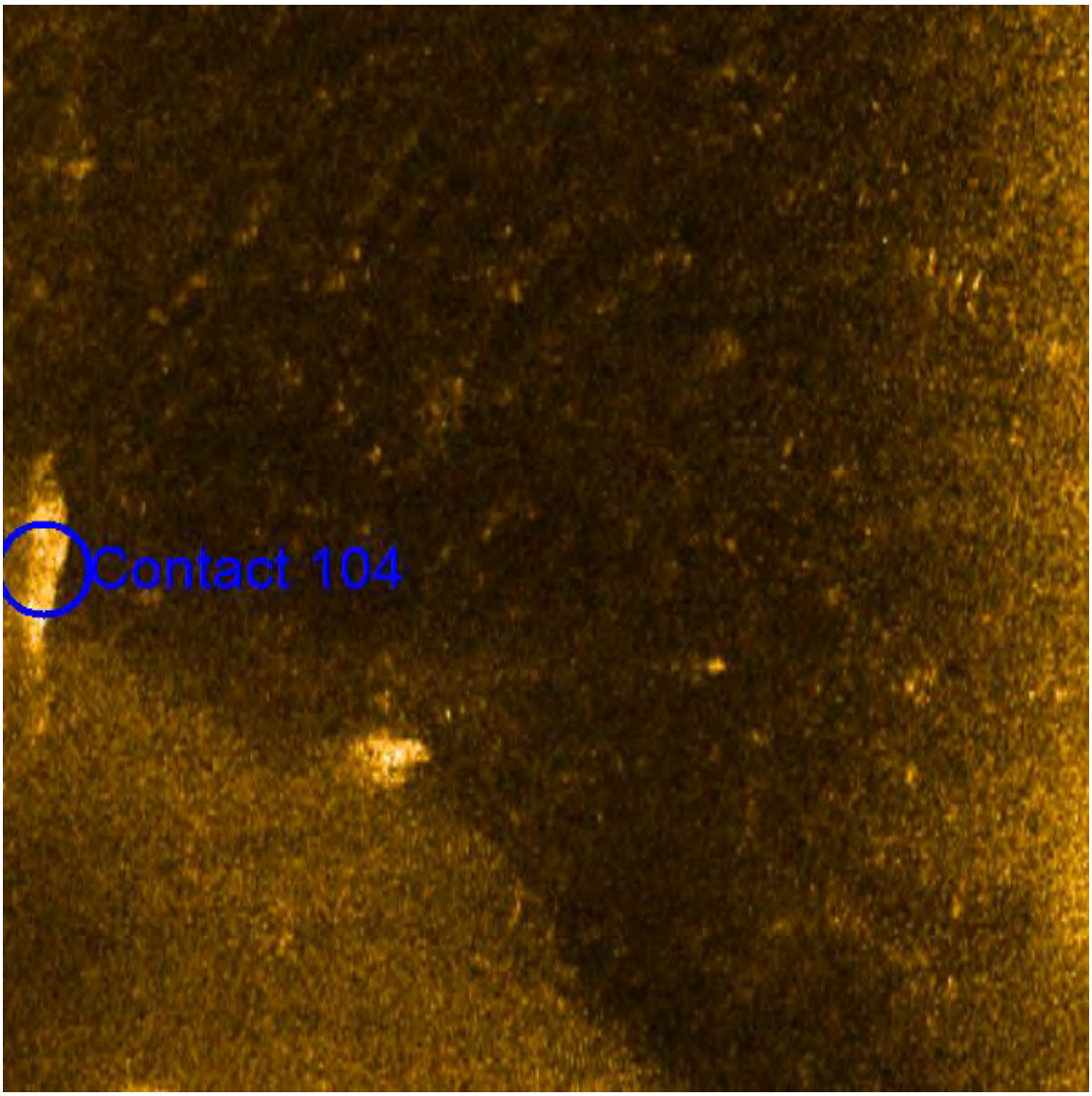


Contact 103

- Sonar Time at Target: 5/1/2015 1:51:26 PM
- Click Position
  30.7173274982 -81.3166973912 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 107622
- Range to target: 145.33 Meters
- Heading: 182.290 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 2.67 Meters
- Target Height: 0.00 Meters
- Target Length: 8.24 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

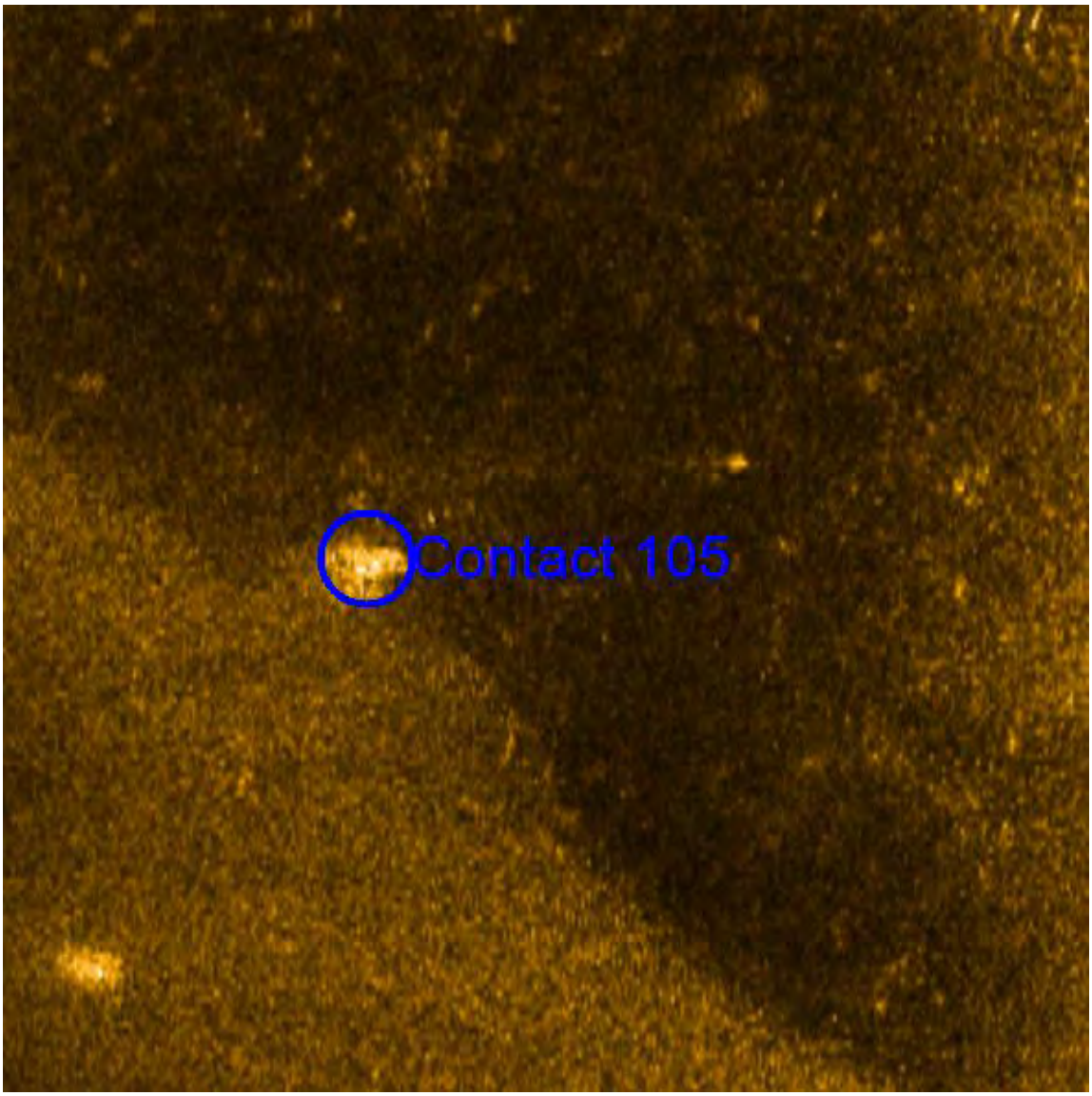


Contact 104

- Sonar Time at Target: 5/1/2015 2:00:55 PM
- Click Position
  30.7049774121 -81.3135104530 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 110269
- Range to target: 131.97 Meters
- Heading: 187.800 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 3.22 Meters
- Target Height: 0.00 Meters
- Target Length: 20.94 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

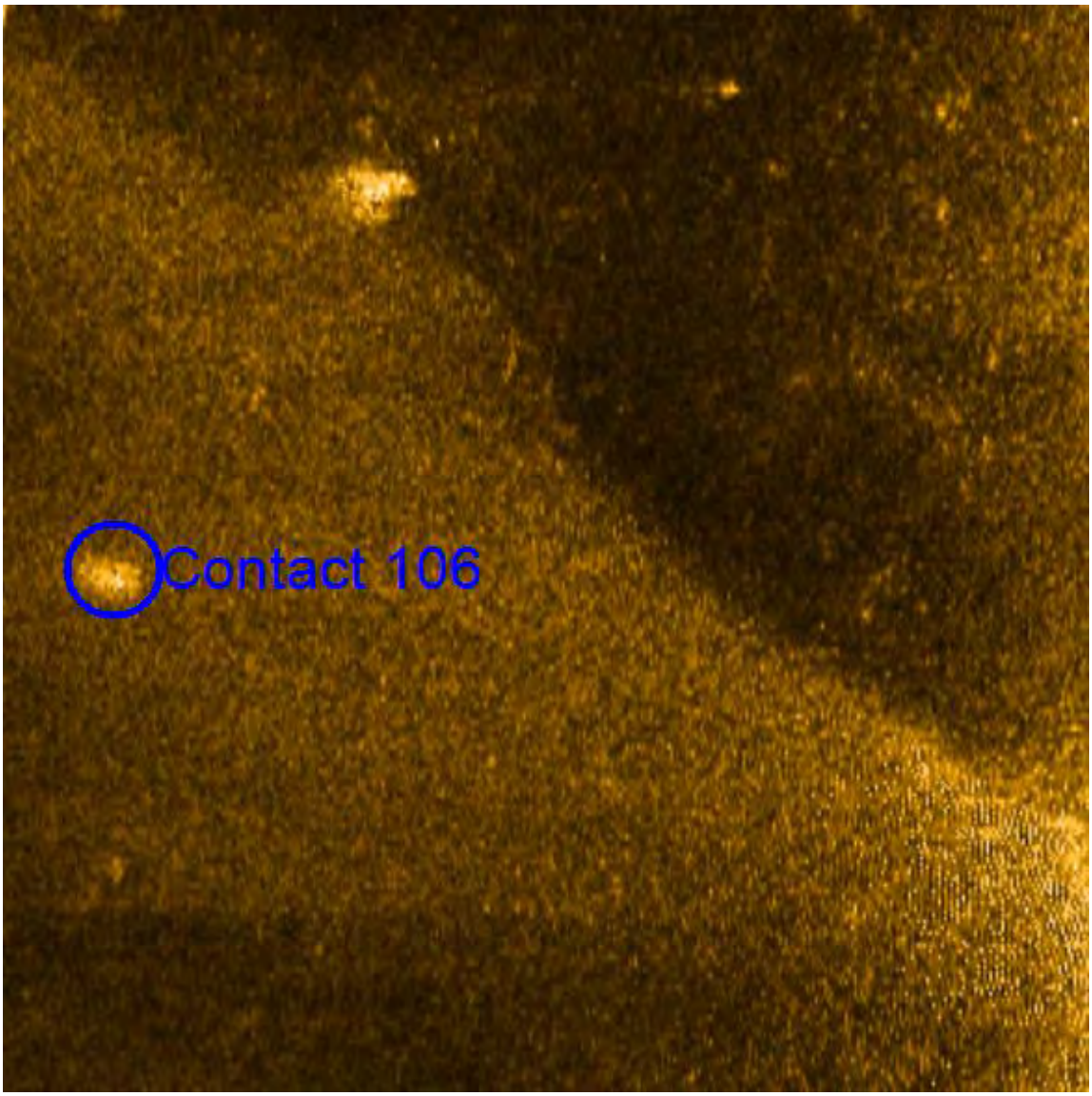


Contact 105

- Sonar Time at Target: 5/1/2015 2:01:01 PM
- Click Position
  30.7045917646 -81.3137855701 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 110303
- Range to target: 97.20 Meters
- Heading: 188.390 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 4.88 Meters
- Target Height: 0.00 Meters
- Target Length: 9.49 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

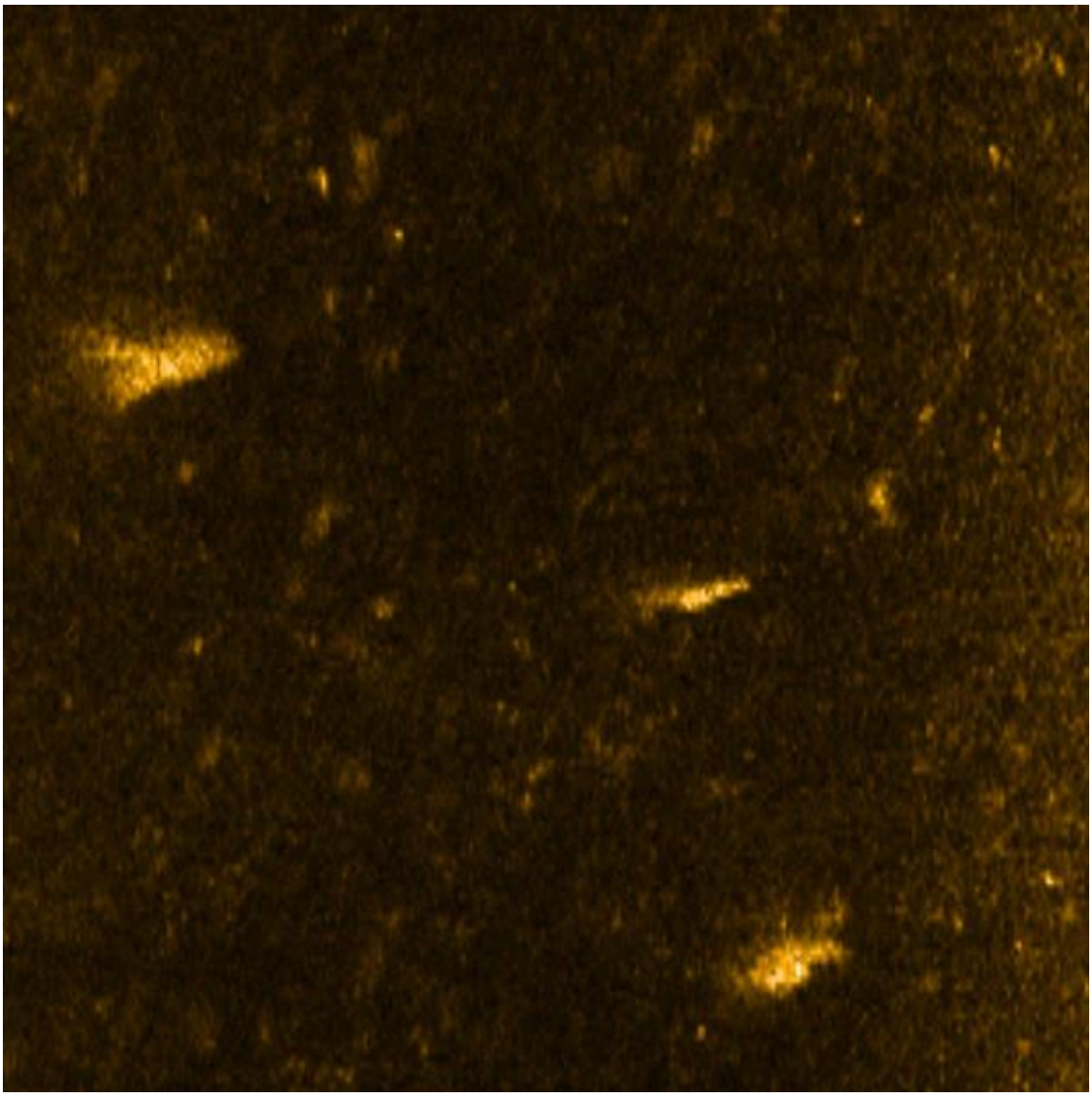


Contact 106

- Sonar Time at Target: 5/1/2015 2:01:15 PM
- Click Position
  30.7044977477 -81.3135258925 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 110368
- Range to target: 120.98 Meters
- Heading: 192.190 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 3.29 Meters
- Target Height: 0.00 Meters
- Target Length: 5.76 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

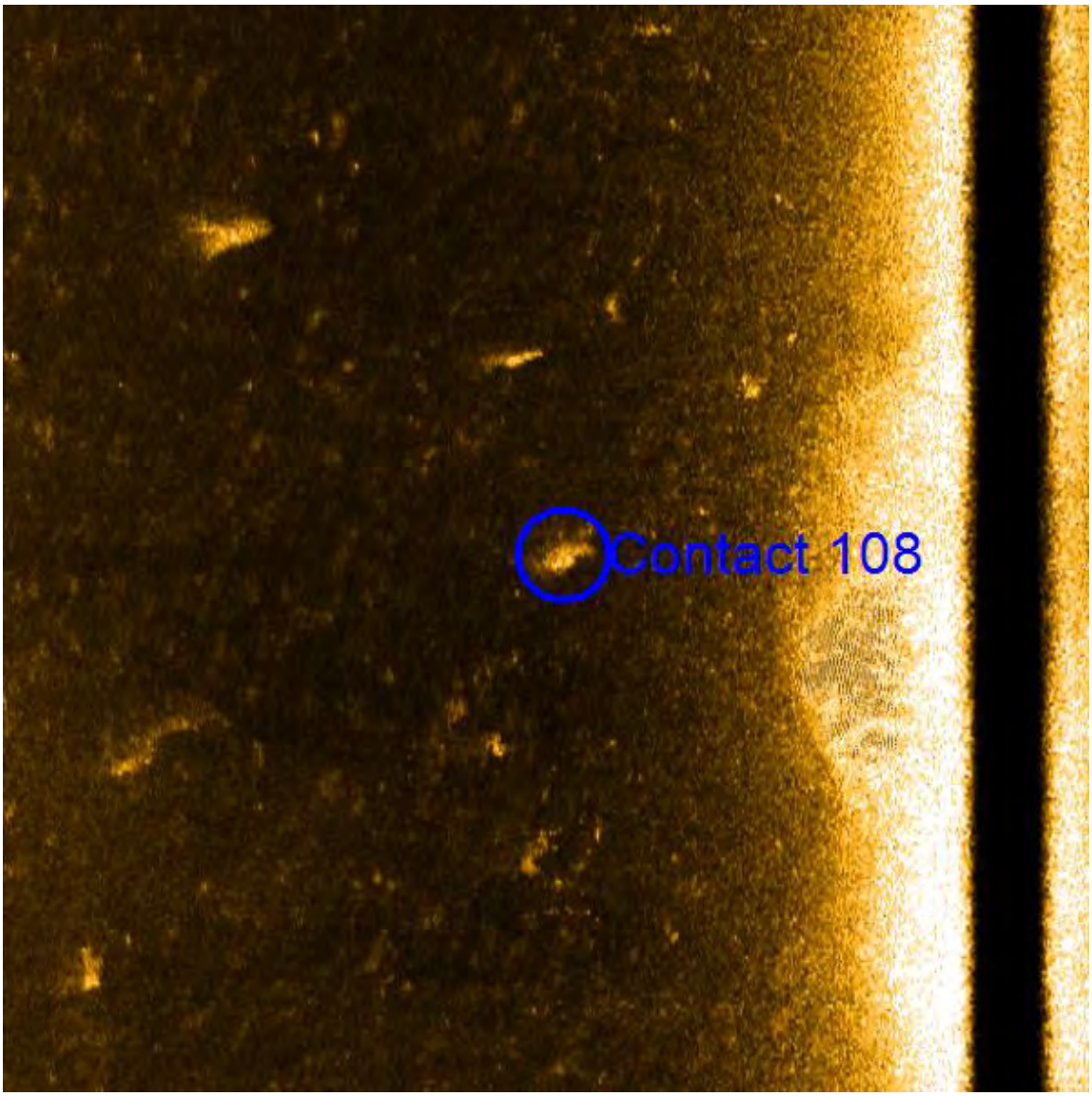


Contact 107

- Sonar Time at Target: 5/1/2015 1:59:53 PM
- Click Position
  30.7063017728 -81.3138130692 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 109984
- Range to target: 150.53 Meters
- Heading: 179.200 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 2.66 Meters
- Target Height: 0.00 Meters
- Target Length: 17.50 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

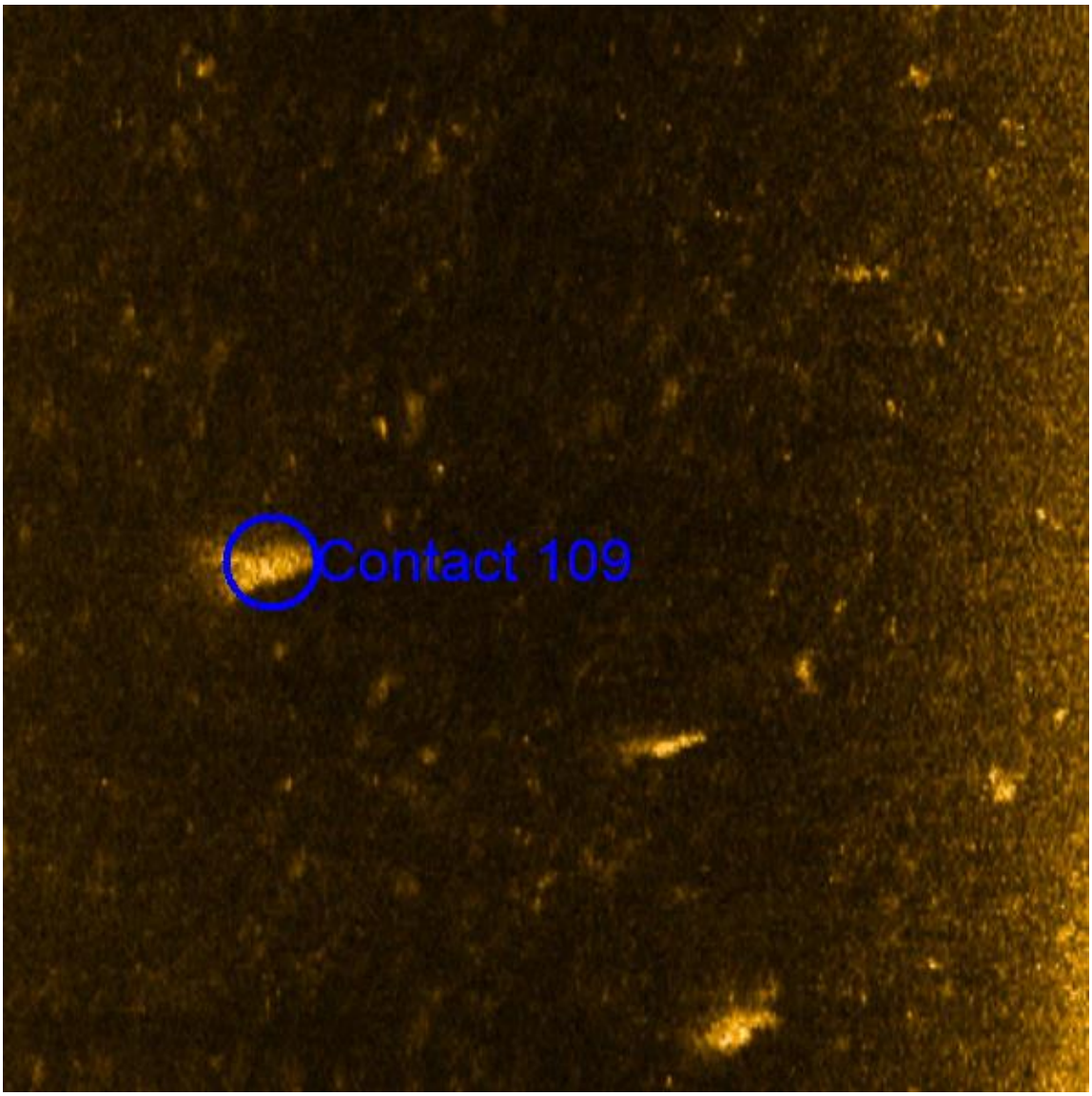


Contact 108

- Sonar Time at Target: 5/1/2015 2:00:05 PM
- Click Position
  30.7058152767 -81.3145835142 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 110040
- Range to target: 62.72 Meters
- Heading: 177.890 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 3.35 Meters
- Target Height: 0.00 Meters
- Target Length: 9.05 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

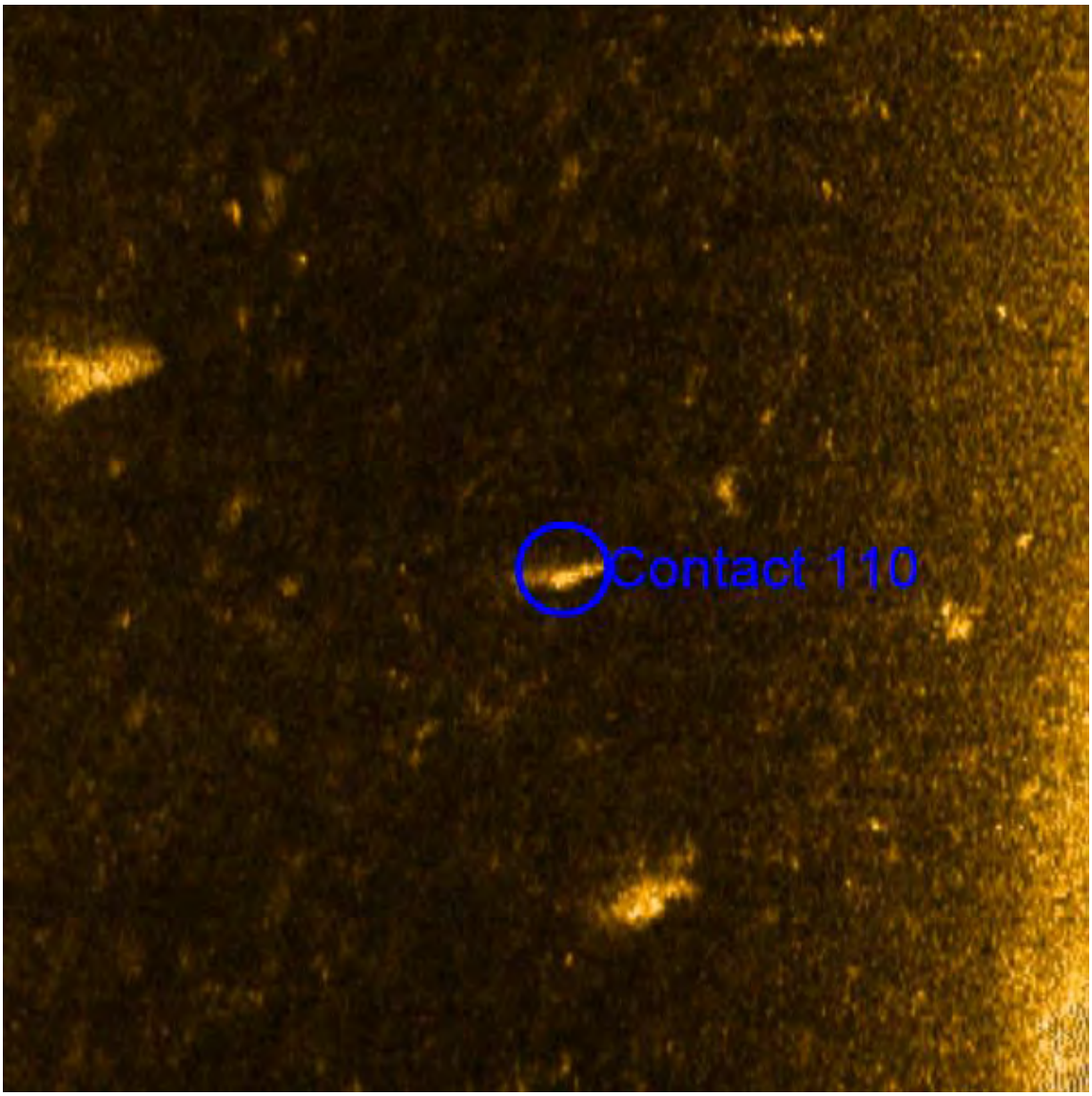


Contact 109

- Sonar Time at Target: 5/1/2015 1:59:46 PM
- Click Position
  30.7064899768 -81.3143421240 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 109955
- Range to target: 109.12 Meters
- Heading: 180.600 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 9.52 Meters
- Target Height: 0.00 Meters
- Target Length: 10.62 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

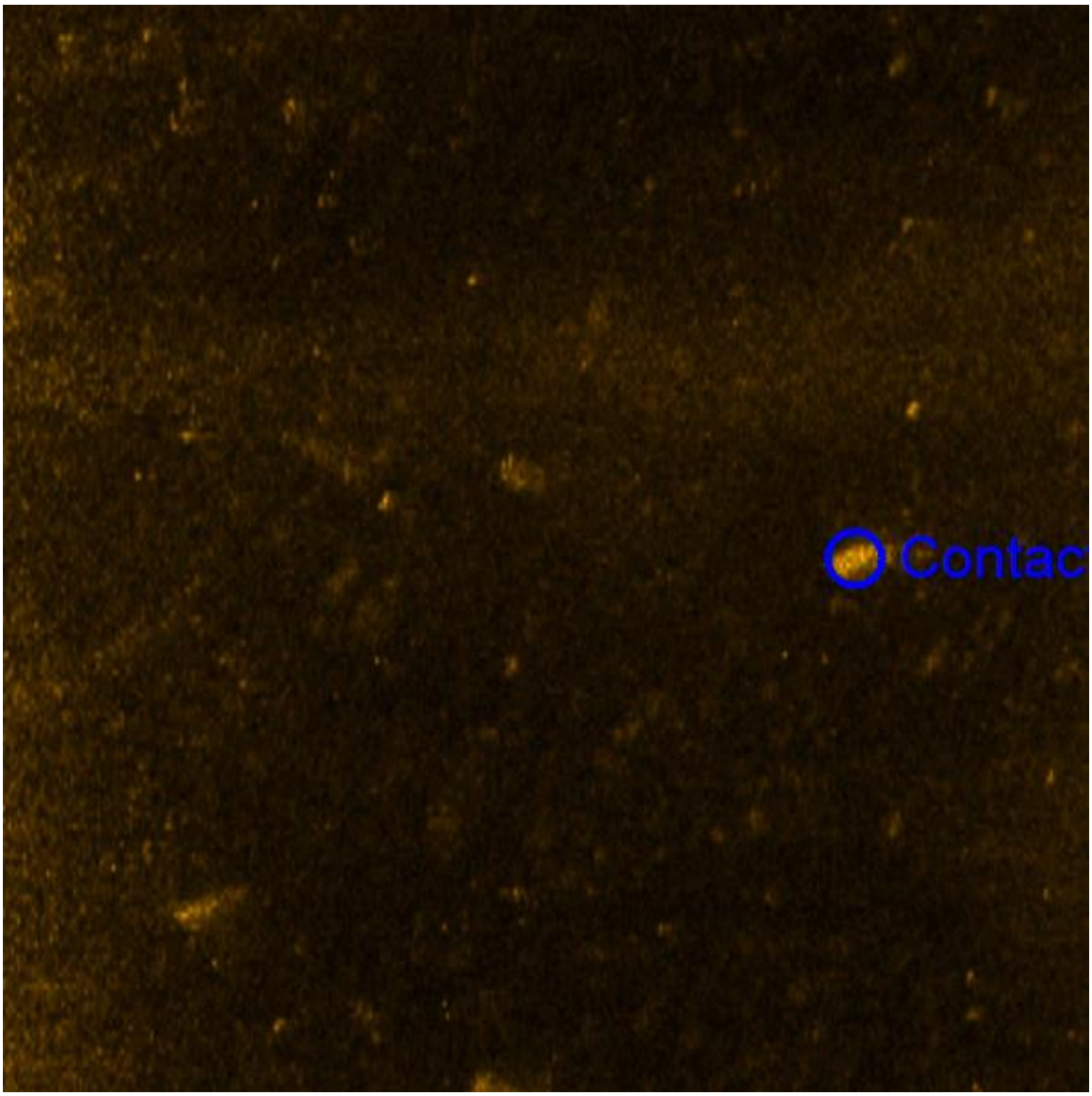


Contact 110

- Sonar Time at Target: 5/1/2015 1:59:54 PM
- Click Position
  30.7061521571 -81.3146386829 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 109988
- Range to target: 70.08 Meters
- Heading: 178.790 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 2.13 Meters
- Target Height: 0.00 Meters
- Target Length: 8.84 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

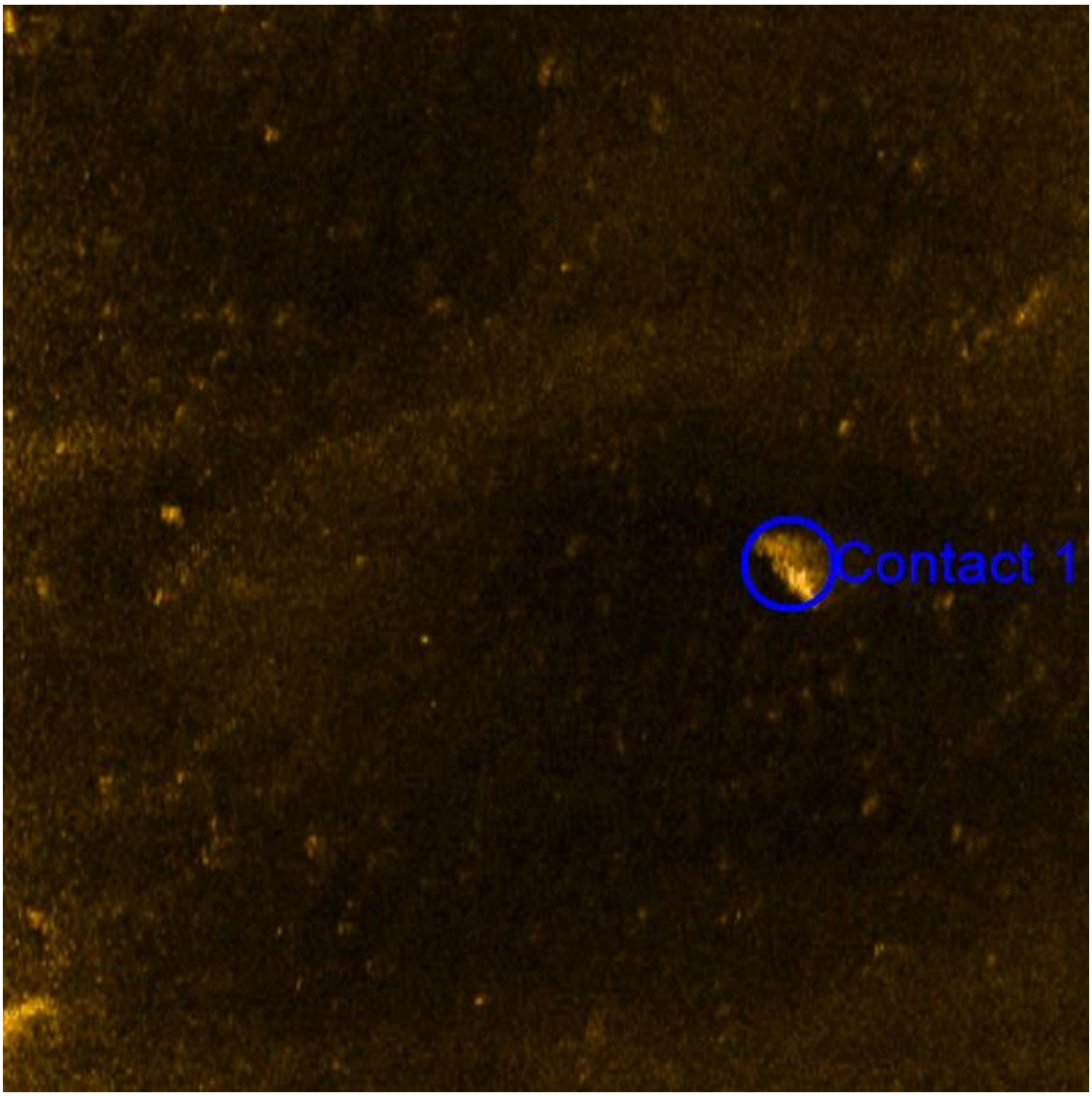


Contact 111

- Sonar Time at Target: 5/1/2015 1:59:29 PM
- Click Position
  30.7062176165 -81.3165887042 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 109873
- Range to target: 106.14 Meters
- Heading: 185.590 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 2.89 Meters
- Target Height: 0.00 Meters
- Target Length: 6.97 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

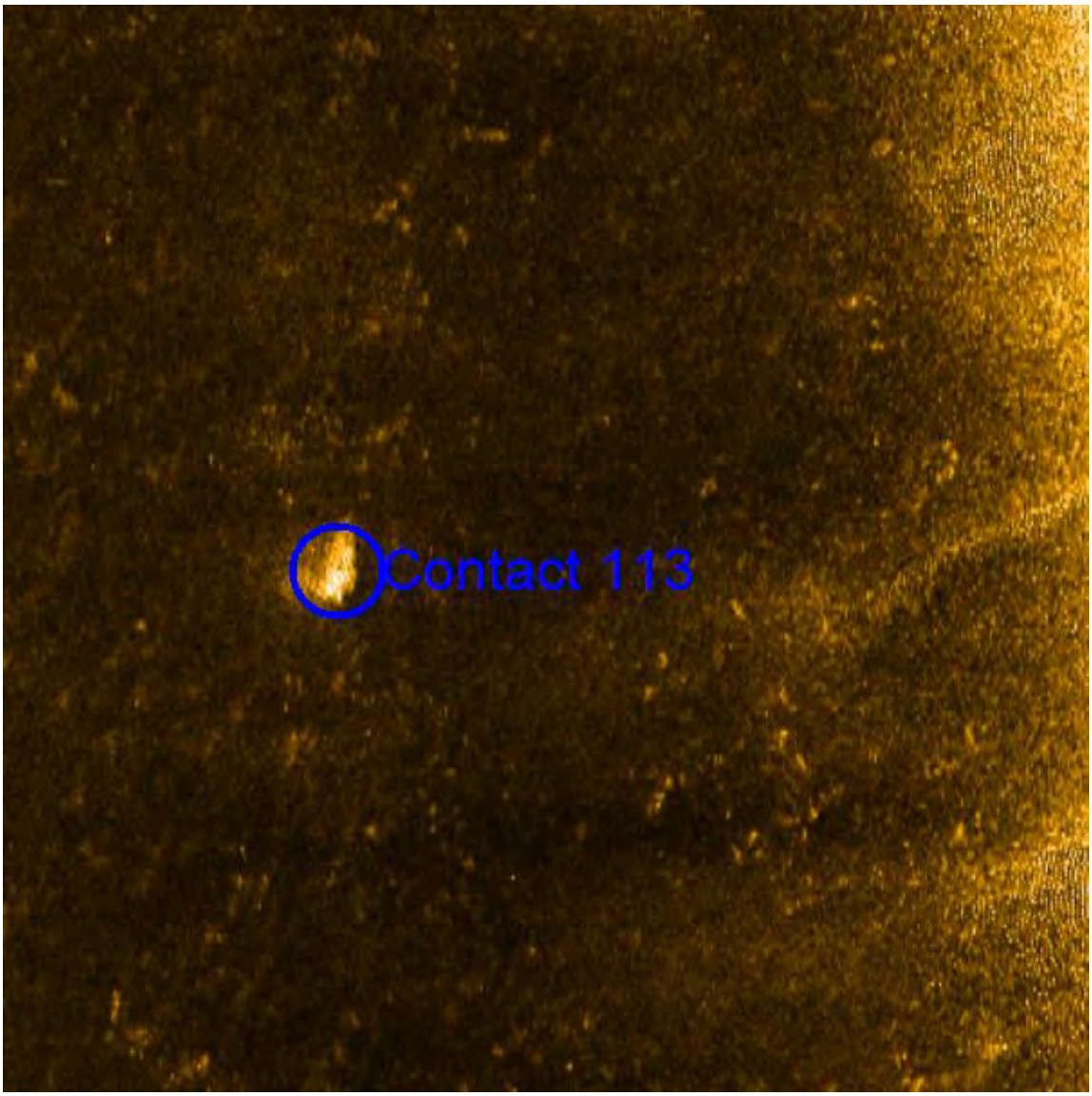


Contact 112

- Sonar Time at Target: 5/1/2015 1:59:02 PM
- Click Position
  30.7069489331 -81.3167265776 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 109746
- Range to target: 101.96 Meters
- Heading: 190.100 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 4.95 Meters
- Target Height: 0.00 Meters
- Target Length: 8.90 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

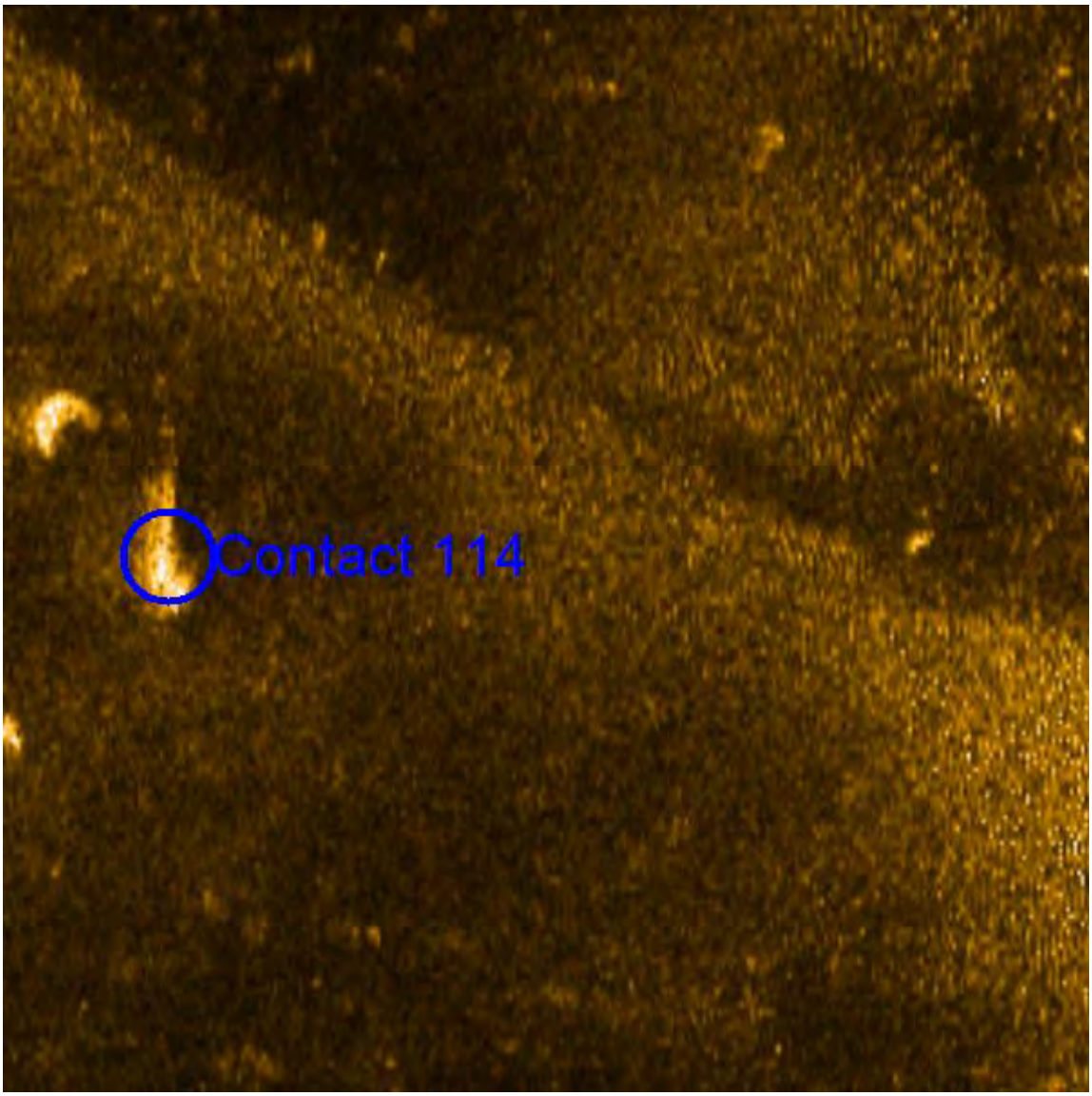


Contact 113

- Sonar Time at Target: 5/1/2015 1:57:45 PM
- Click Position
  30.7089167171 -81.3149278266 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 109386
- Range to target: 104.62 Meters
- Heading: 186.590 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 6.43 Meters
- Target Height: 0.00 Meters
- Target Length: 10.16 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

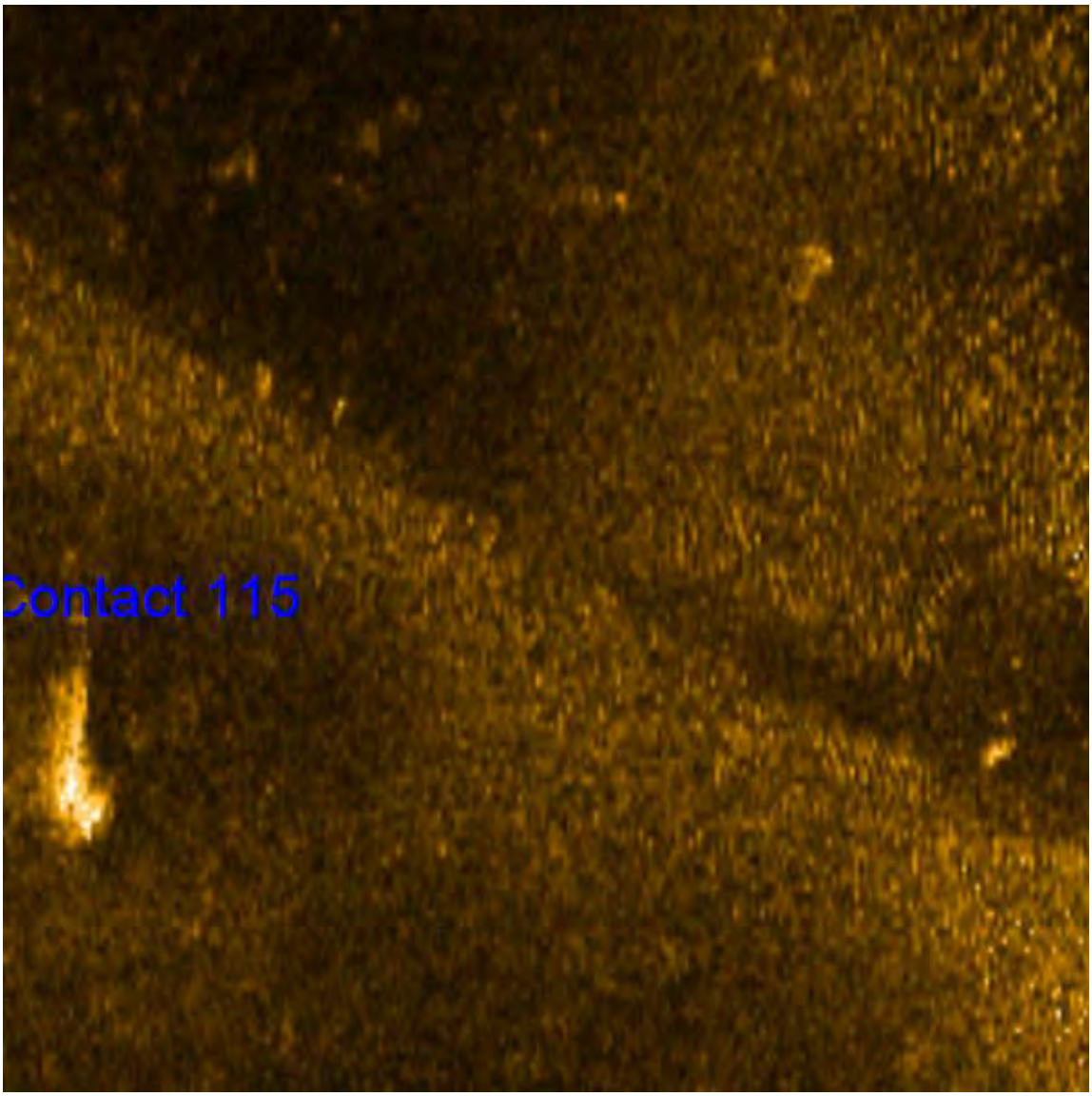


Contact 114

- Sonar Time at Target: 5/1/2015 1:57:06 PM
- Click Position
  30.7098201512 -81.3151540456 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 109209
- Range to target: 108.66 Meters
- Heading: 180.890 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 5.89 Meters
- Target Height: 0.00 Meters
- Target Length: 11.73 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

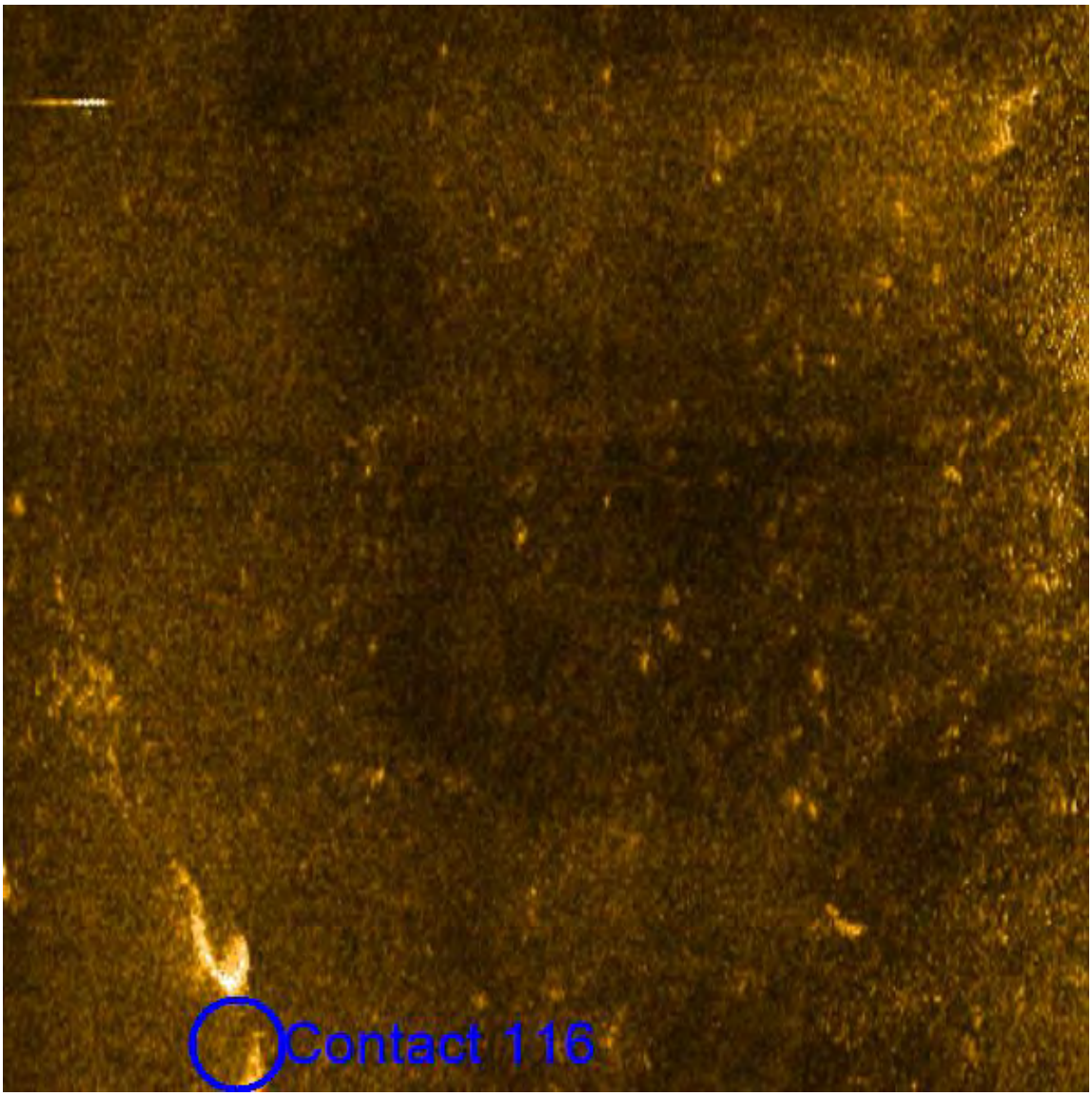


Contact 115

- Sonar Time at Target: 5/1/2015 1:57:02 PM
- Click Position
  30.7099314687 -81.3151067738 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 109190
- Range to target: 116.95 Meters
- Heading: 180.690 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 3.21 Meters
- Target Height: 0.00 Meters
- Target Length: 4.58 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

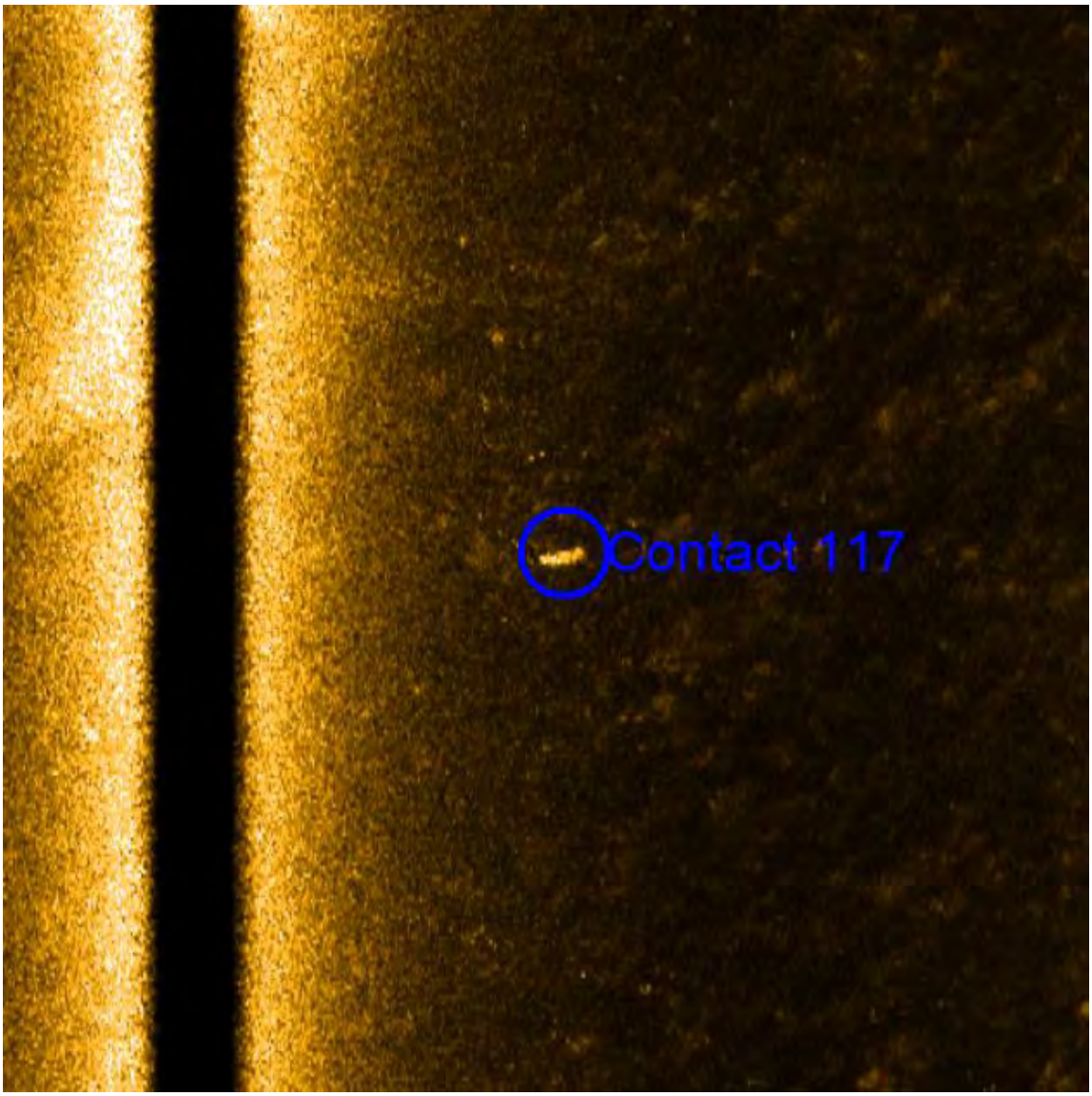


Contact 116

- Sonar Time at Target: 5/1/2015 2:04:18 PM
- Click Position
  30.7005770626 -81.3125972955 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_058.jsf
- Ping Number: 111199
- Range to target: 114.28 Meters
- Heading: 182.500 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_058

Dimensions and attributes

- Target Width: 4.66 Meters
- Target Height: 0.00 Meters
- Target Length: 38.11 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

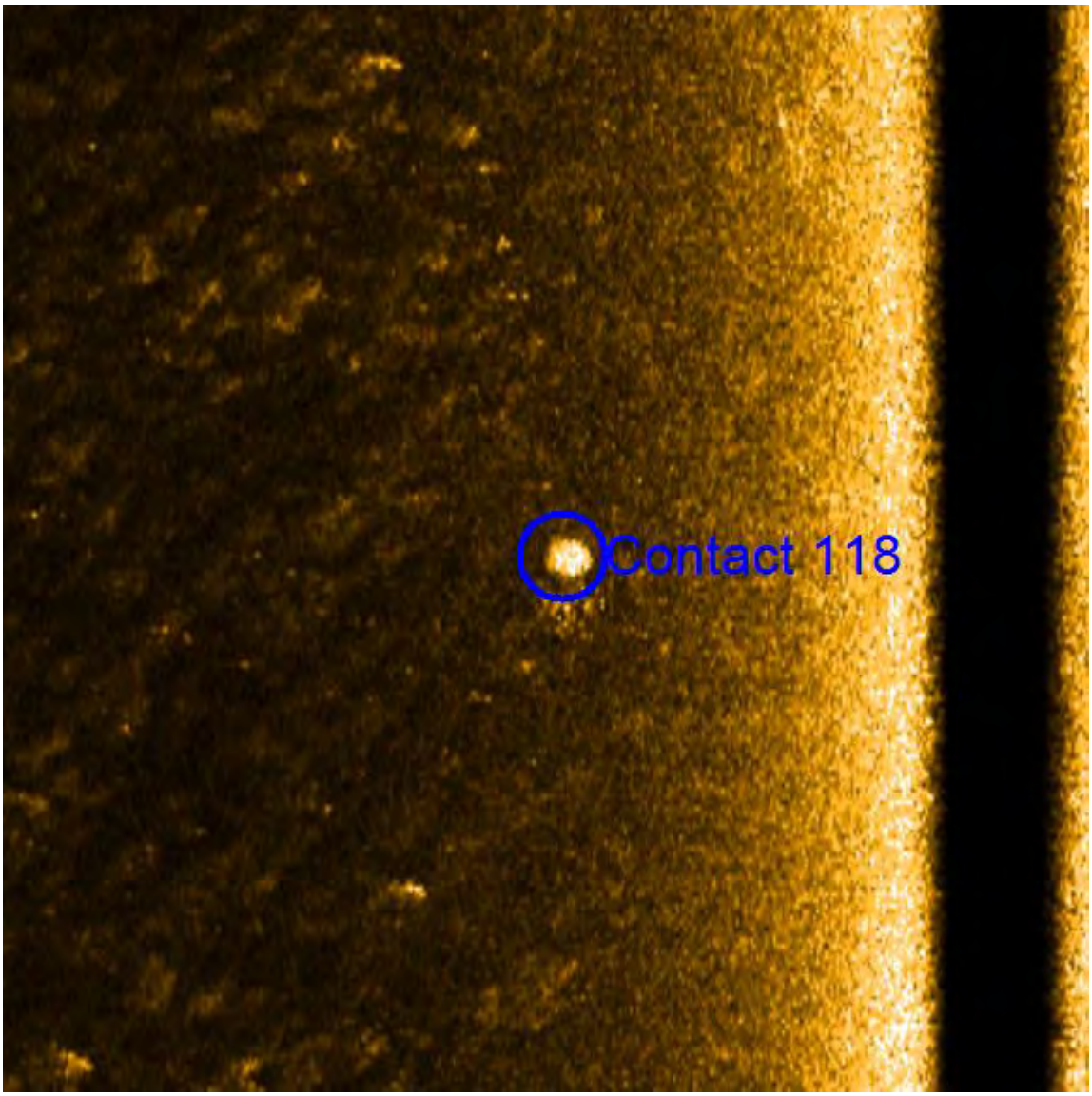


Contact 117

- Sonar Time at Target: 5/1/2015 2:39:35 PM
- Click Position
  30.7274510449 -81.3014061772 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_059.jsf
- Ping Number: 121079
- Range to target: 45.21 Meters
- Heading: 342.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_059

Dimensions and attributes

- Target Width: 1.78 Meters
- Target Height: 0.00 Meters
- Target Length: 6.39 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

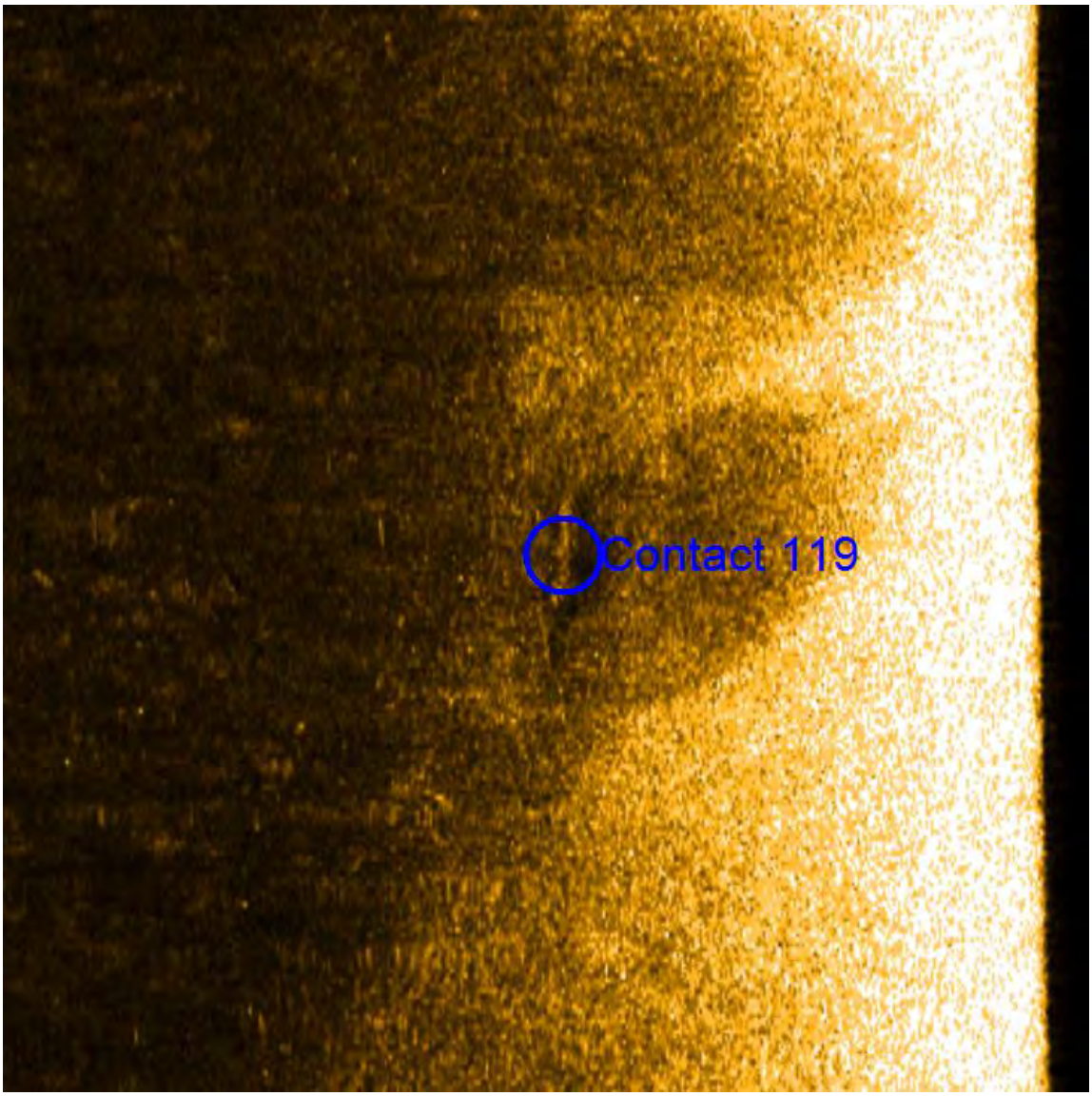


Contact 118

- Sonar Time at Target: 5/1/2015 2:40:34 PM
- Click Position
  30.7284313919 -81.3025807222 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_059.jsf
- Ping Number: 121355
- Range to target: 37.63 Meters
- Heading: 347.500 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_059

Dimensions and attributes

- Target Width: 4.29 Meters
- Target Height: 0.00 Meters
- Target Length: 3.79 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

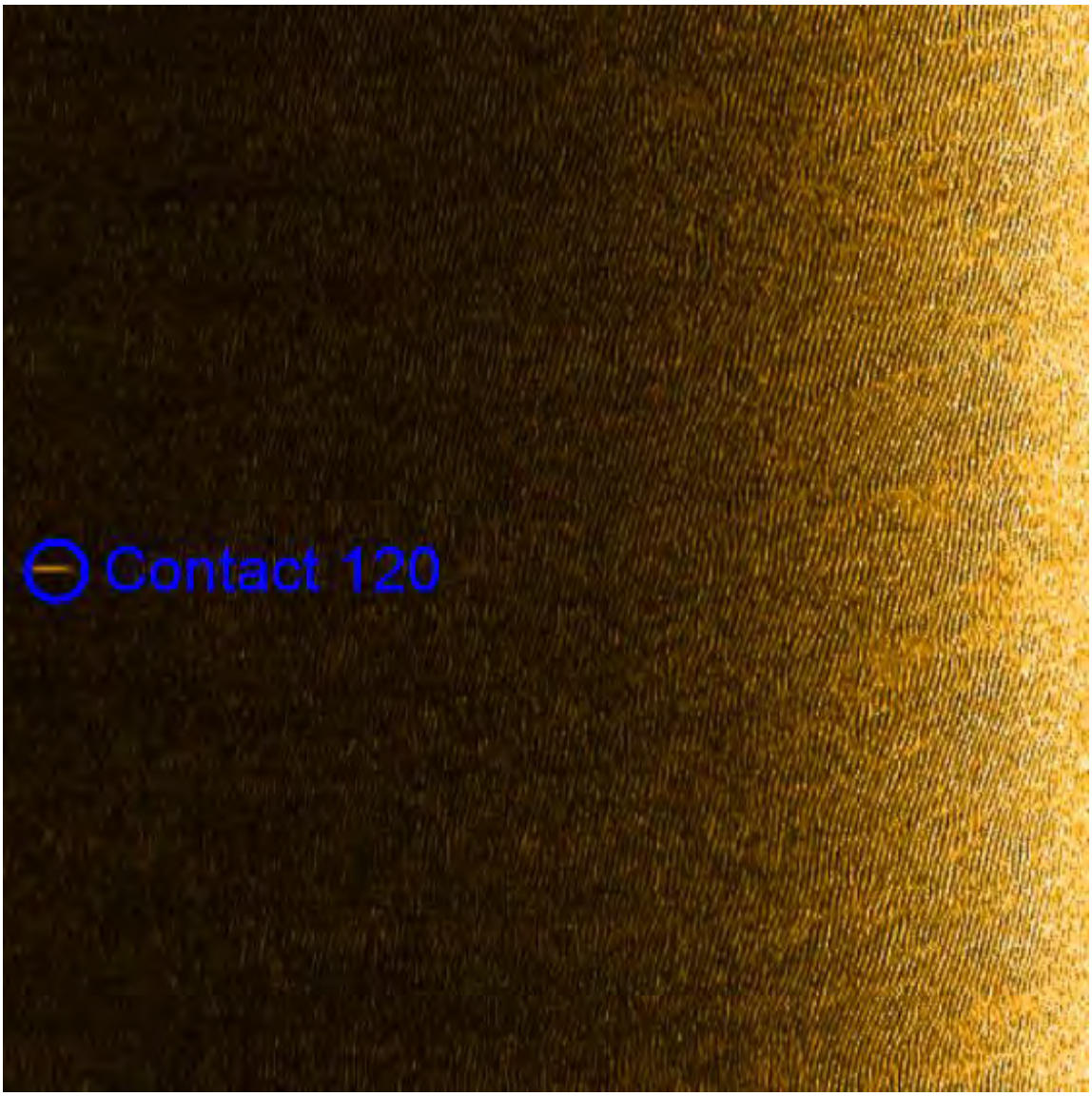


Contact 119

- Sonar Time at Target: 5/1/2015 4:27:24 PM
- Click Position
  30.7023494076 -81.3221036907 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_060.jsf
- Ping Number: 151207
- Range to target: 48.52 Meters
- Heading: 63.690 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_060

Dimensions and attributes

- Target Width: 1.54 Meters
- Target Height: 0.00 Meters
- Target Length: 9.03 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

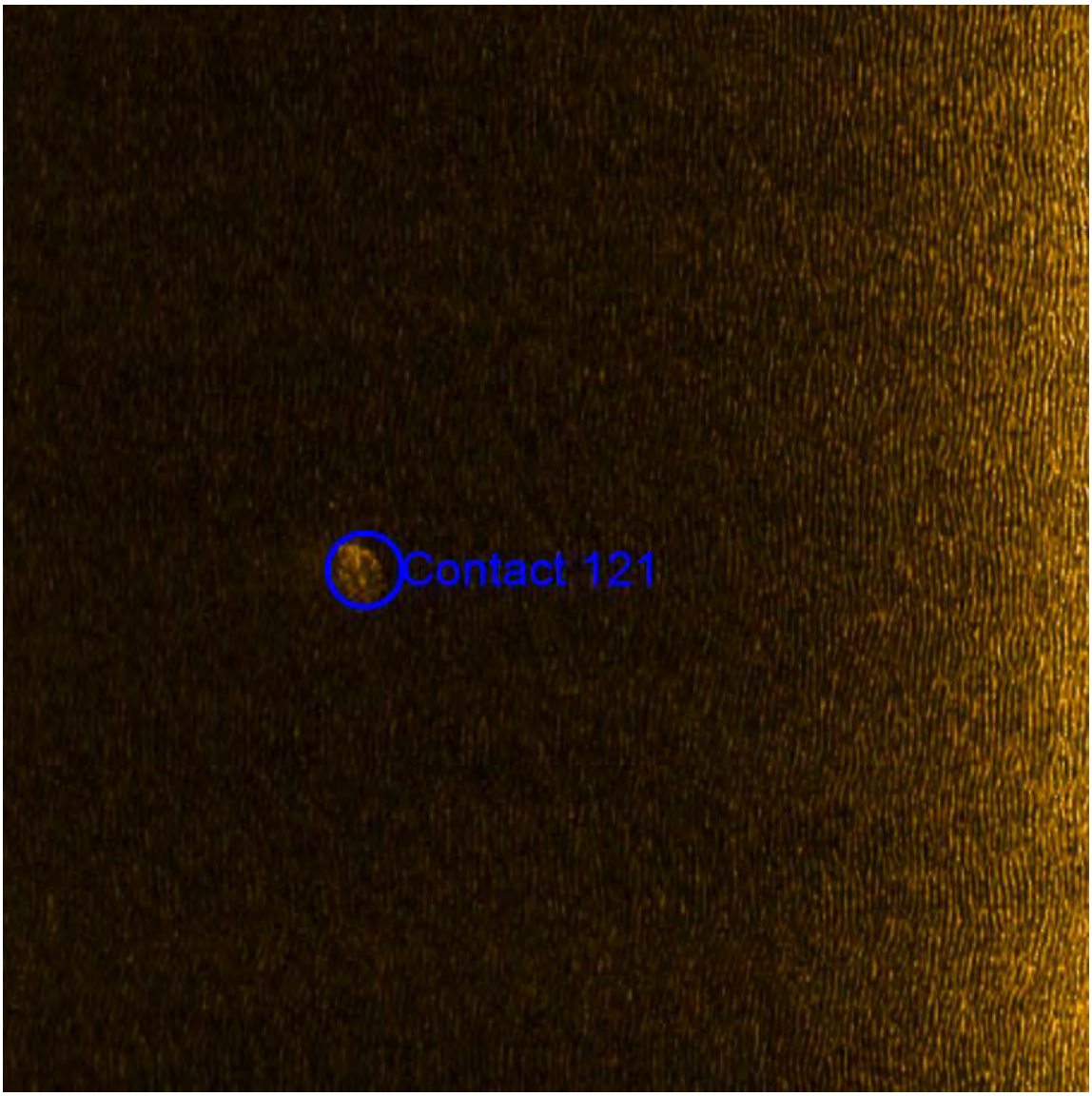


Contact 120

- Sonar Time at Target: 4/20/2015 11:35:25 AM
- Click Position
  27.9252481504 -80.3924450252 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_002.004.jsf
- Ping Number: 38527
- Range to target: 139.77 Meters
- Heading: 334.390 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_002.004

Dimensions and attributes

- Target Width: 0.57 Meters
- Target Height: 0.00 Meters
- Target Length: 6.02 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

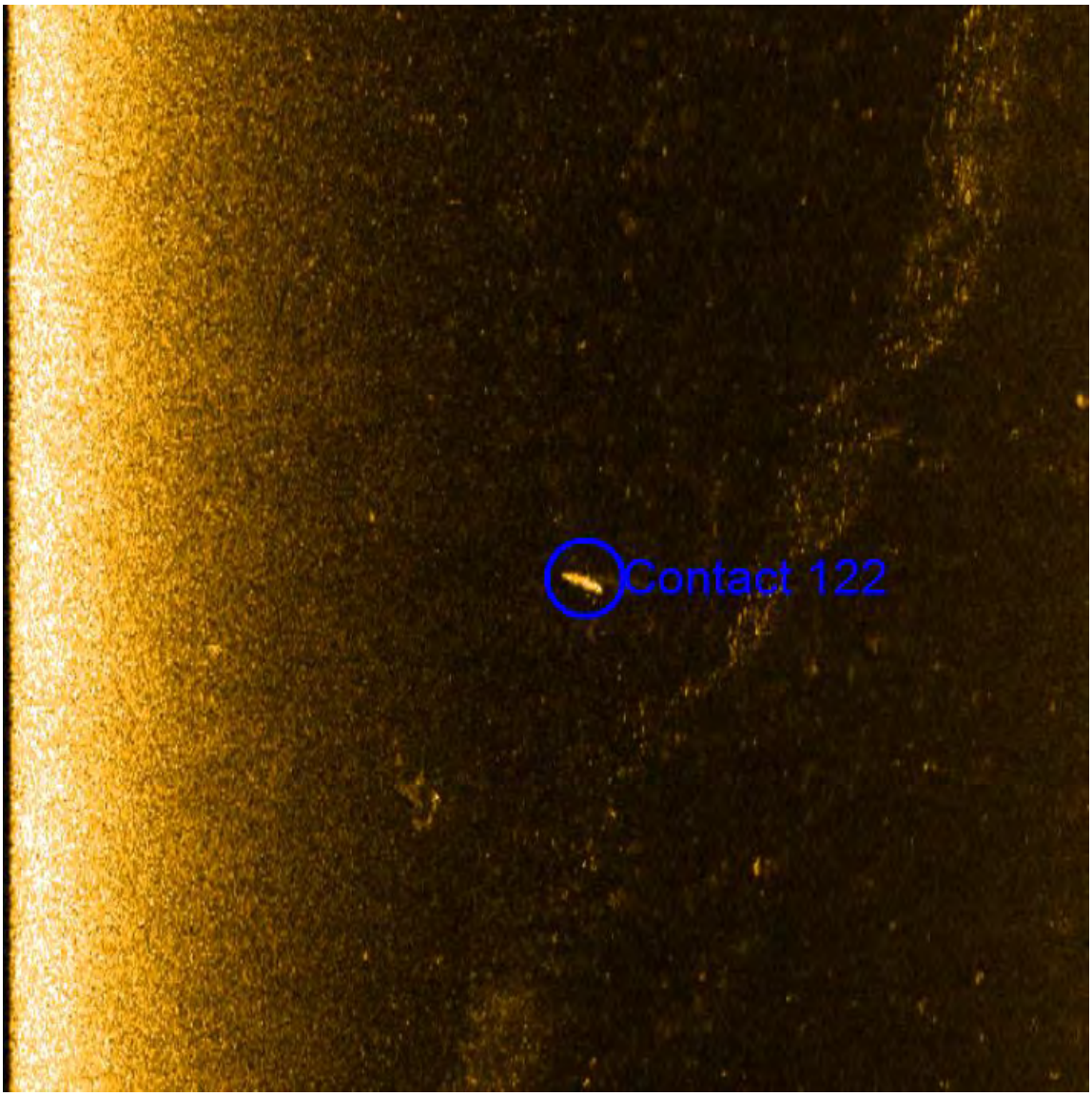


Contact 121

- Sonar Time at Target: 4/21/2015 12:35:10 PM
- Click Position
  27.8343176786 -80.3026783494 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_003_B.001.jsf
- Ping Number: 36040
- Range to target: 98.01 Meters
- Heading: 169.390 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_003_B.001

Dimensions and attributes

- Target Width: 4.17 Meters
- Target Height: 0.00 Meters
- Target Length: 5.93 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

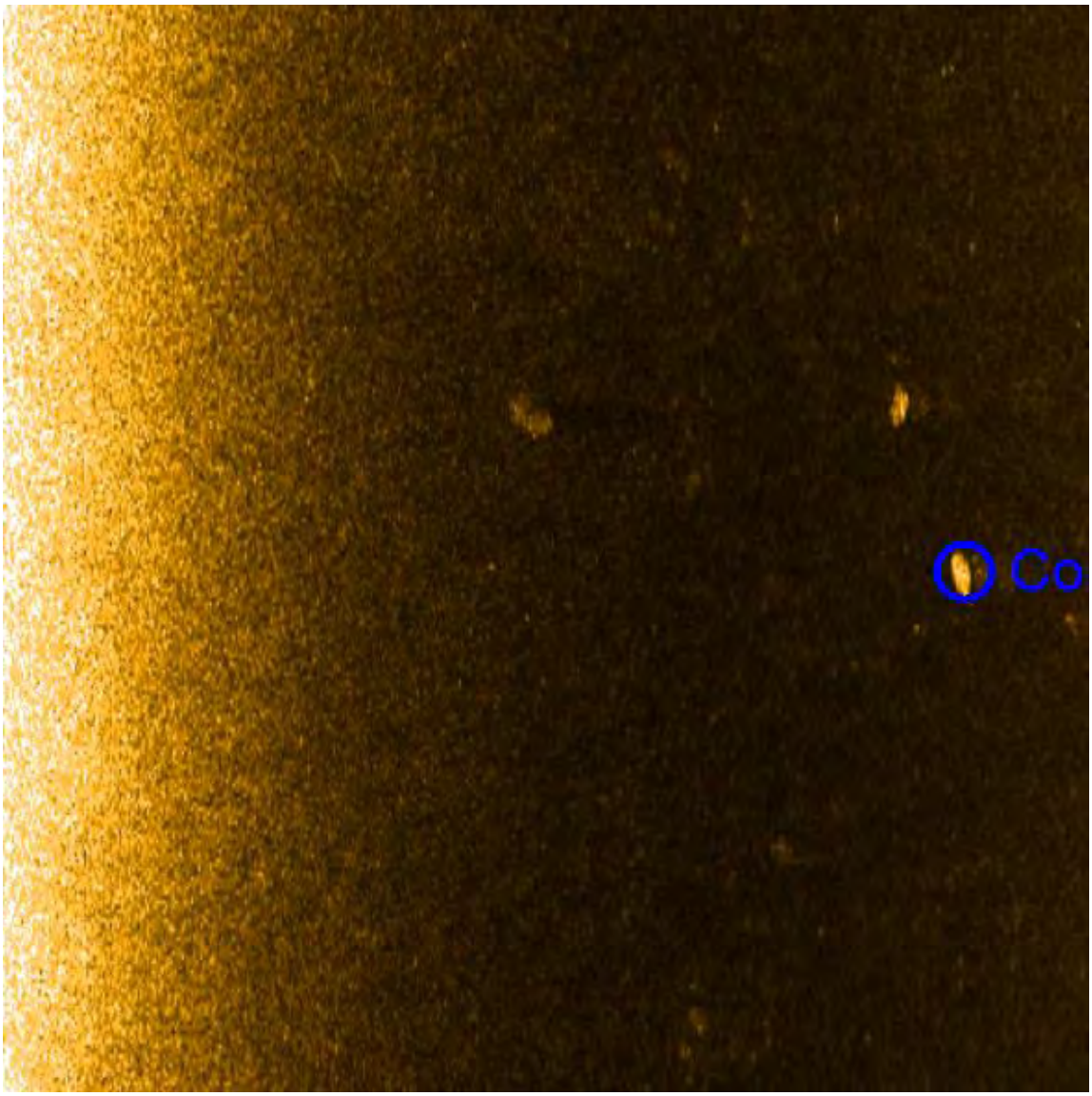


Contact 122

- Sonar Time at Target: 4/25/2015 6:32:32 PM
- Click Position
  29.0859965234 -80.8333800695 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_021.jsf
- Ping Number: 178087
- Range to target: 82.17 Meters
- Heading: 88.000 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_021

Dimensions and attributes

- Target Width: 1.51 Meters
- Target Height: 0.00 Meters
- Target Length: 6.45 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

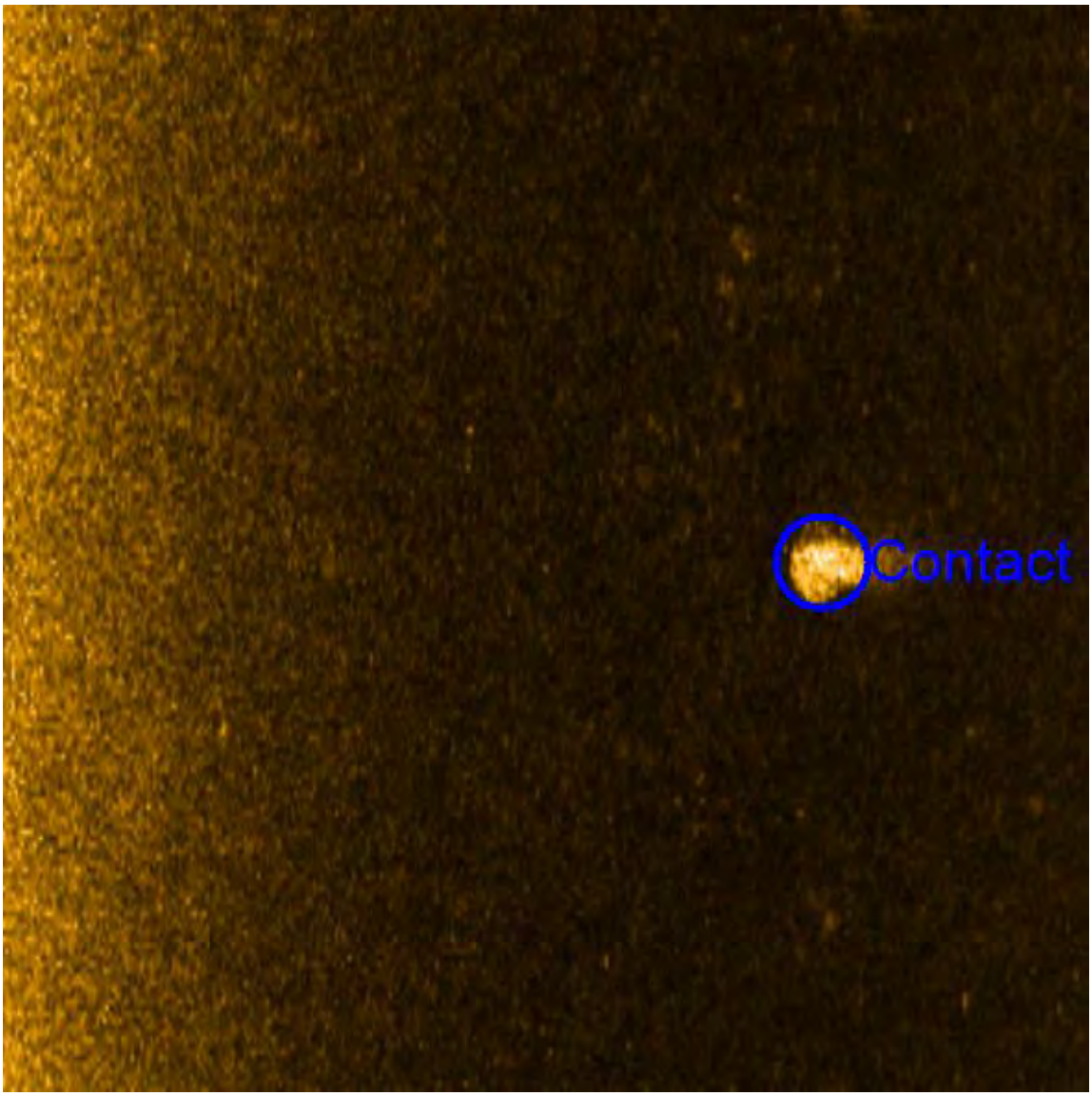


Contact 123

- Sonar Time at Target: 4/26/2015 5:57:33 PM
- Click Position
  29.3904562761 -80.9969559376 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_034.jsf
- Ping Number: 164041
- Range to target: 126.23 Meters
- Heading: 280.190 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_034

Dimensions and attributes

- Target Width: 1.92 Meters
- Target Height: 0.00 Meters
- Target Length: 5.86 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

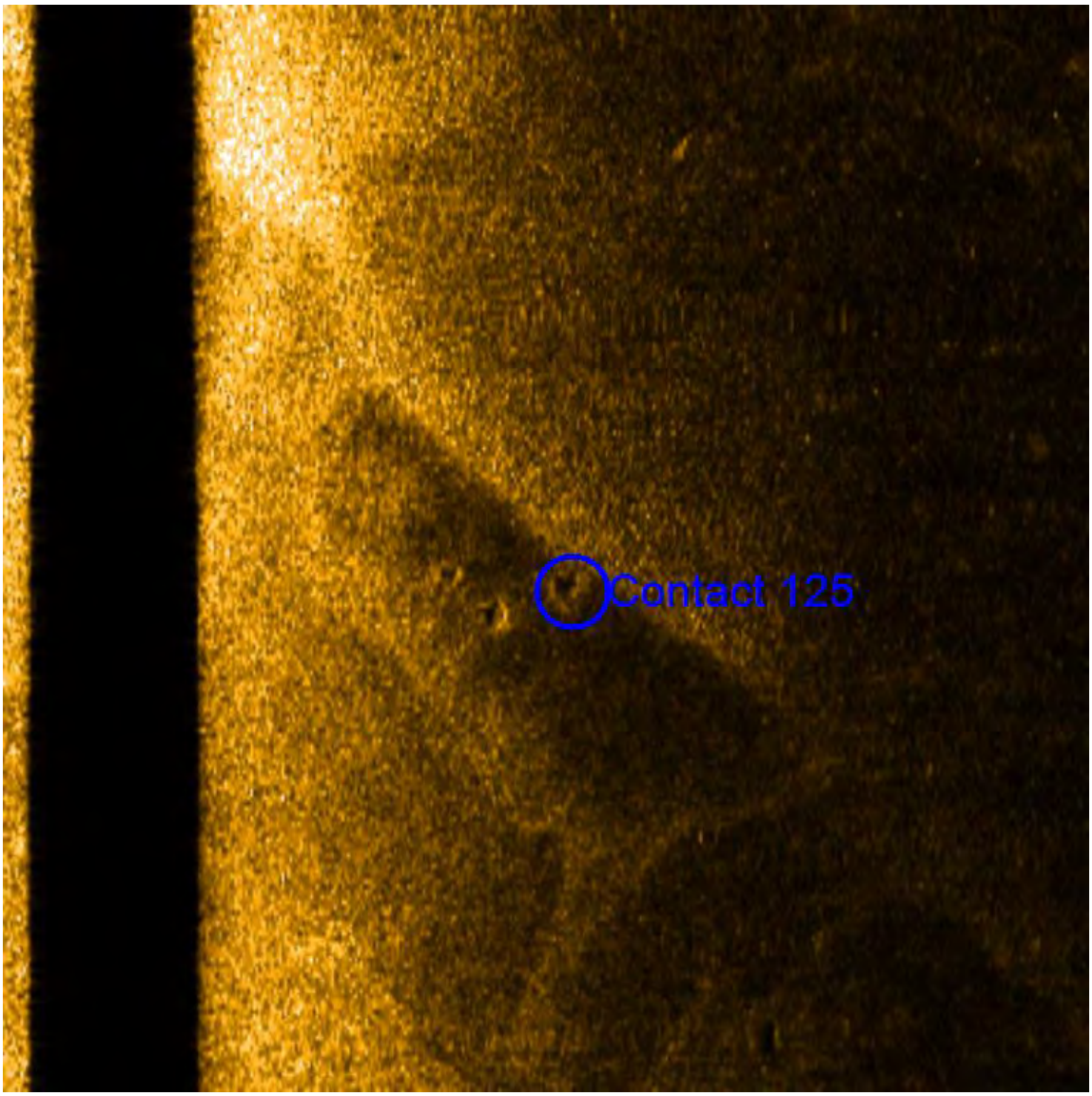


Contact 124

- Sonar Time at Target: 4/26/2015 5:58:04 PM
- Click Position
  29.3901904015 -80.9975603257 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_034.jsf
- Ping Number: 164187
- Range to target: 102.01 Meters
- Heading: 284.590 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_034

Dimensions and attributes

- Target Width: 6.24 Meters
- Target Height: 0.00 Meters
- Target Length: 7.89 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop

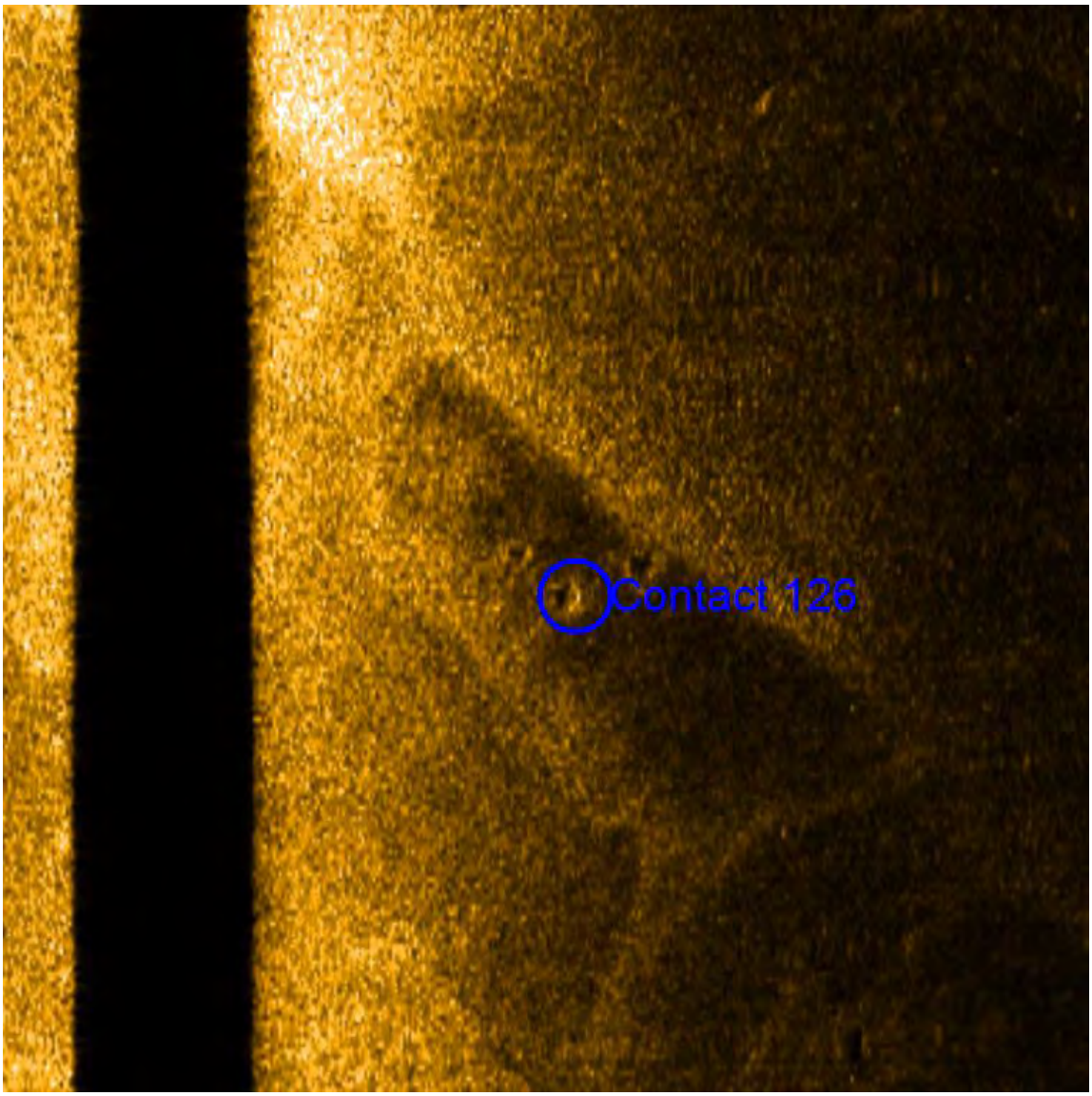


Contact 125

- Sonar Time at Target: 4/28/2015 9:23:56 AM
- Click Position
  30.0400278218 -81.1969851650 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_037.001.jsf
- Ping Number: 41221
- Range to target: 36.14 Meters
- Heading: 354.300 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_037.001

Dimensions and attributes

- Target Width: 3.46 Meters
- Target Height: 0.00 Meters
- Target Length: 3.32 Meters
- Target Shadow: 0.00 Meters
- Classification1: large rocks
- Description: Potential Rocks

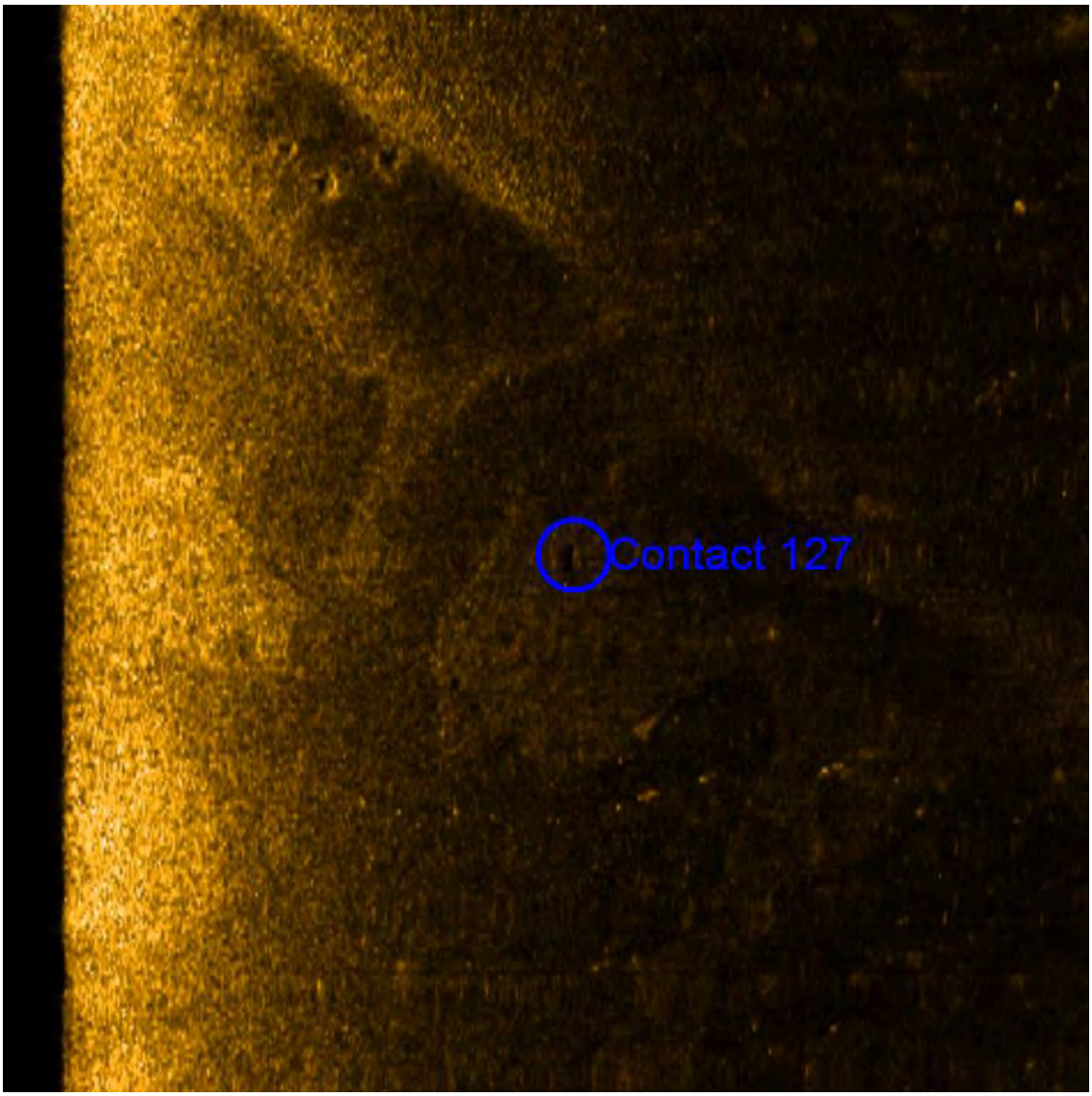


Contact 126

- Sonar Time at Target: 4/28/2015 9:23:57 AM
- Click Position
  30.0400435173 -81.1970445171 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_037.001.jsf
- Ping Number: 41225
- Range to target: 30.42 Meters
- Heading: 354.500 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_037.001

Dimensions and attributes

- Target Width: 1.69 Meters
- Target Height: 0.00 Meters
- Target Length: 2.74 Meters
- Target Shadow: 0.00 Meters
- Classification1: large rocks
- Description: Potential Rocks

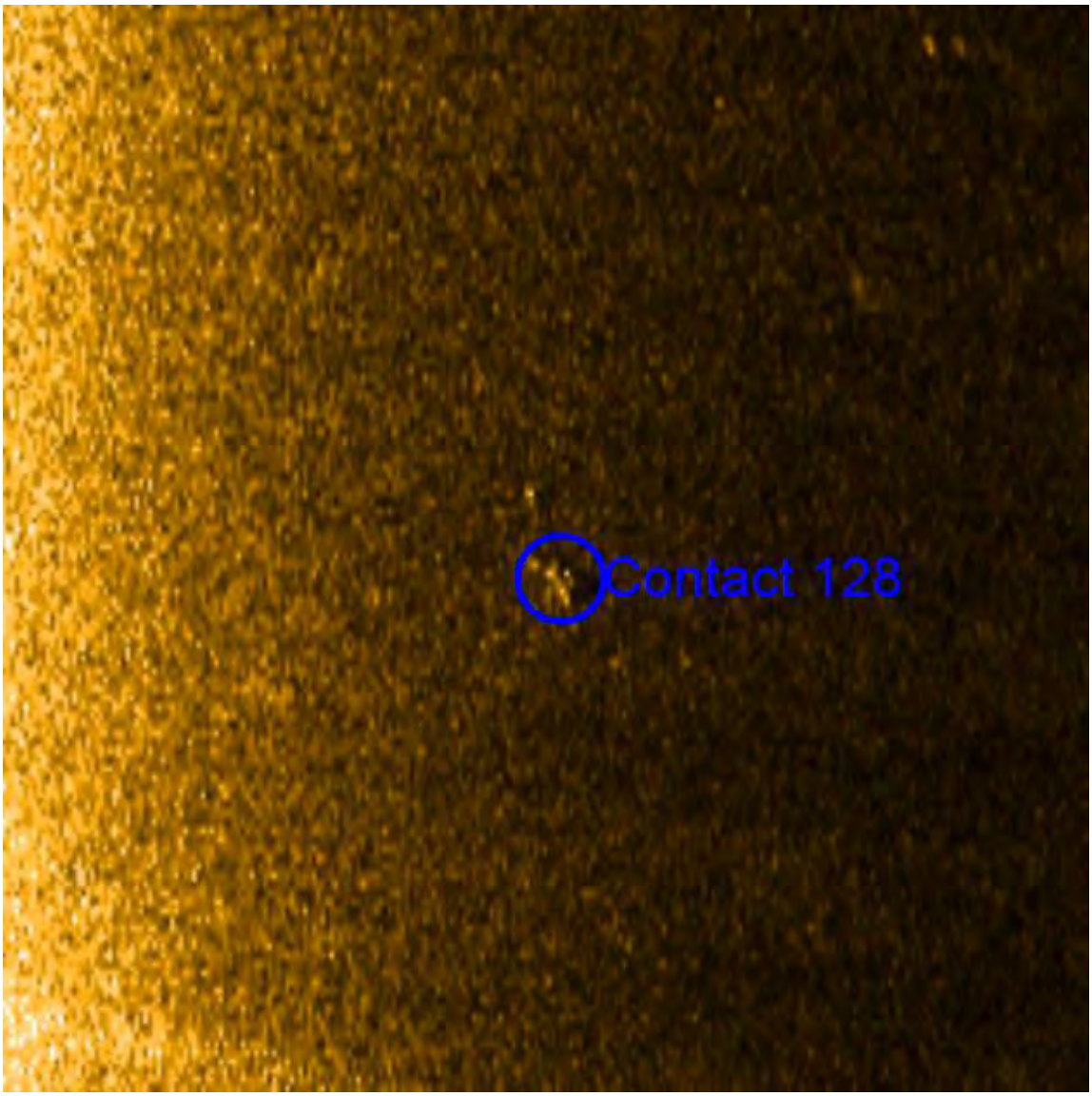


Contact 127

- Sonar Time at Target: 4/28/2015 9:24:15 AM
- Click Position
  30.0403565034 -81.1968080551 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_037.001.jsf
- Ping Number: 41306
- Range to target: 52.57 Meters
- Heading: 354.390 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_037.001

Dimensions and attributes

- Target Width: 0.63 Meters
- Target Height: 0.00 Meters
- Target Length: 2.30 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential Debris

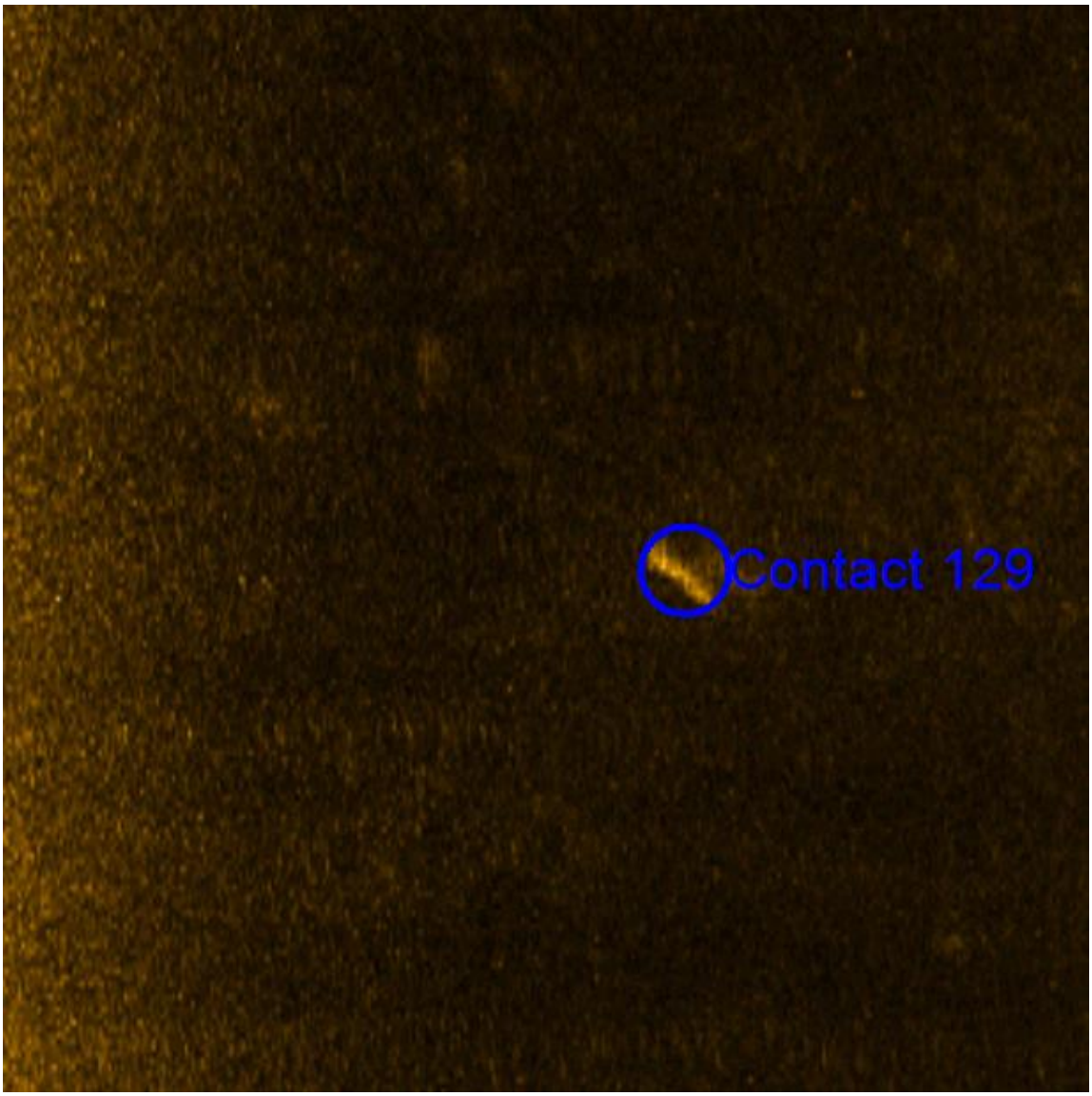


Contact 128

- Sonar Time at Target: 4/27/2015 5:41:43 PM
- Click Position
  30.0467853979 -81.2353390330 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_036.jsf
- Ping Number: 150363
- Range to target: 46.80 Meters
- Heading: 202.790 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_036

Dimensions and attributes

- Target Width: 1.61 Meters
- Target Height: 0.21 Meters
- Target Length: 3.98 Meters
- Target Shadow: 1.53 Meters
- Classification1: debris
- Description: Potential Debris

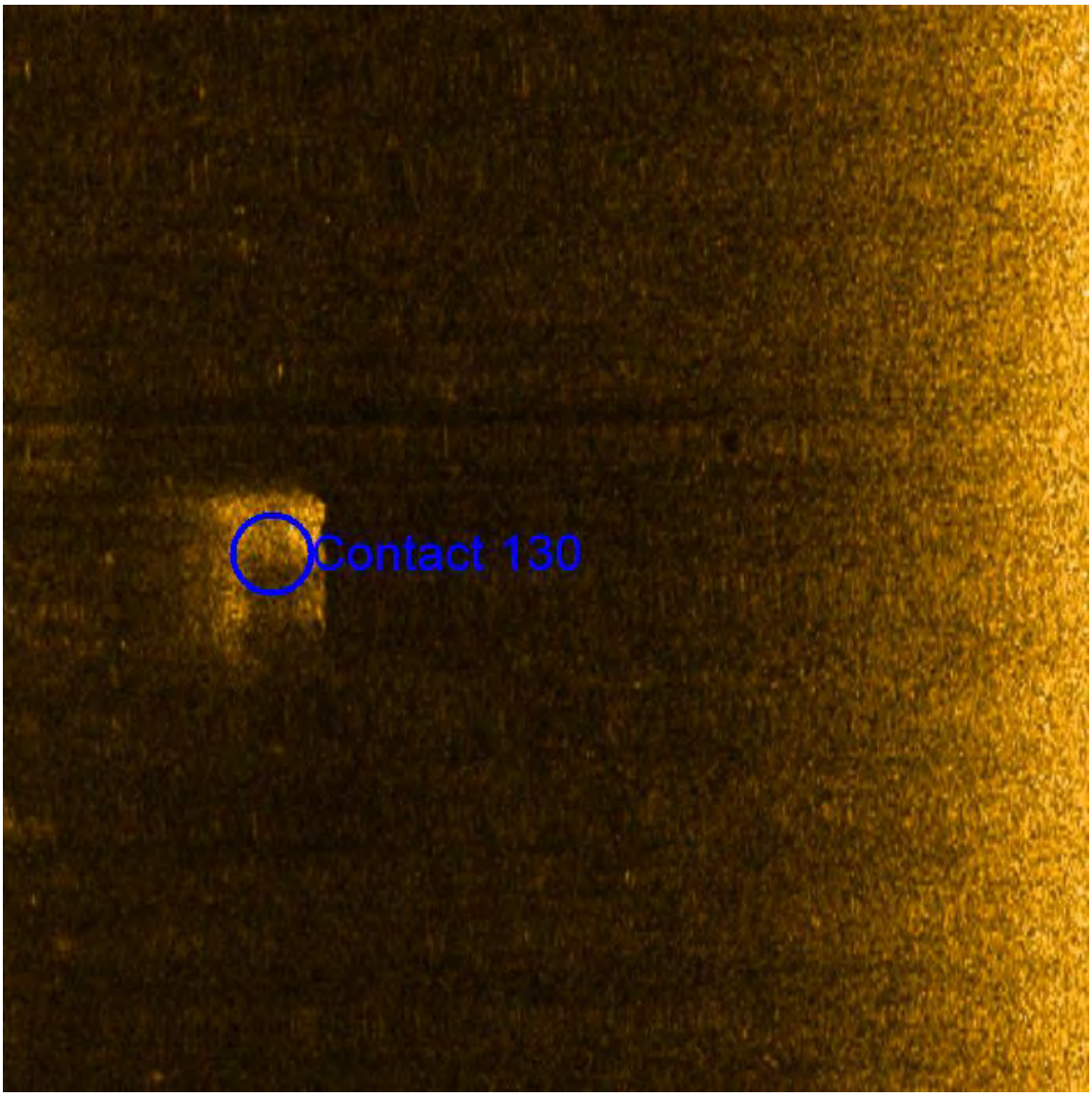


Contact 129

- Sonar Time at Target: 4/27/2015 5:40:16 PM
- Click Position
  30.0486605121 -81.2357625886 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_036.jsf
- Ping Number: 149959
- Range to target: 89.58 Meters
- Heading: 203.500 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_036

Dimensions and attributes

- Target Width: 1.67 Meters
- Target Height: 0.00 Meters
- Target Length: 6.81 Meters
- Target Shadow: 0.00 Meters
- Classification1: rock outcrop
- Description: Potential Outcrop



Contact 130

- Sonar Time at Target: 4/27/2015 3:46:06 PM
- Click Position
  30.0891816815 -81.2738844372 (WGS84)
- Map Projection: UTM84-17N
- Acoustic Source File: C:\SonarWiz-Projects\FDEP SSS 2016\BOEM_FL_2015 Data\BOEM_Line_FL_035.jsf
- Ping Number: 118307
- Range to target: 108.88 Meters
- Heading: 353.100 Degrees
- Event Number: (-1)
- Line Name: BOEM_Line_FL_035

Dimensions and attributes

- Target Width: 11.10 Meters
- Target Height: 0.00 Meters
- Target Length: 13.39 Meters
- Target Shadow: 0.00 Meters
- Classification1: debris
- Description: Potential burined debris

APPENDIX I

Sidescan Sonar Low Frequency Web-Based Project
(Digital Only)

Low frequency sidescan sonar data are organized by study area and viewable as a project in any standard web-browser software program (including Internet Explorer, Safari, Chrome, etc.). The imagery for each line can be viewed by opening the following file in the Appendix I digital submittal:

FDEP_Reconnaissance_BE7-R166_Sidescan_Data_Viewer.htm
FDEP_Reconnaissance_IR6-R002_Sidescan_Data_Viewer.htm
FDEP_Reconnaissance_MI5-R071_Sidescan_Data_Viewer.htm
FDEP_Reconnaissance_NA5-R063_Sidescan_Data_Viewer.htm
FDEP_Reconnaissance_NA7-R009_Sidescan_Data_Viewer.htm
FDEP_Reconnaissance_SJ-6-R88-C-SA_Sidescan_Data_Viewer.htm
FDEP_Reconnaissance_VO5-R041_Sidescan_Data_Viewer.htm
FDEP_Reconnaissance_VO6-R153_Sidescan_Data_Viewer.htm

Once opened, the webpage will contain imagery for all of the collected low frequency sidescan sonar data. To view low frequency sidescan sonar lines, click on the line name link and the chirp sidescan sonar line will appear in a new window in a large-scale format. If you would like to see the entire line within the window (at a smaller scale), simply click on the line imagery and it will zoom out to fit the screen. To zoom back in to the original scale, simply click on the imagery again. If your web browser asks for security permissions, please allow them as this will allow you to see the cursor position in georeferenced coordinates as you scroll around the imagery.

APPENDIX J

Sidescan Sonar Low Frequency Mosaics
(Digital Only)

APPENDIX K

Sidescan Sonar Shapefiles
(Digital Only)

Digitized seafloor features/bottom types
Identified Contacts

APPENDIX L

Magnetic Anomalies Table

Florida BOEM Reconnaissance Magnetometer Anomalies													
Anomaly Identification	Easting	Northing	Latitude	Longitude	Line Number	Anomaly On-Line	Signature Characteristics	Gamma Intensity	Duration in Meters	Assessment	CR and Hazardous Potential	Sonar Association	Site Location
001-1-mc-78.65g-69.50m	590383.90	3003393.36	27.15014199 N	80.08781951 W	1	1	multicomponent	78.65g	69.50m	Potential Moderate Object (s)	Insufficient Data for Assessment		MT5-R71
002-1-mc-64.49g-82.080m	567418.37	3073062.97	27.78038898 N	80.31570567 W	2	1	multicomponent	64.49g	82.80m	Potential Moderate Object (s)	Insufficient Data for Assessment		BR7-R166
002-2-nm-11.23g-38.32m	560796.64	3087253.12	27.90879951 N	80.38218722 W	2	2	negative monopolar	11.23g	38.32m	Potential Moderate Object (s)	Insufficient Data for Assessment		BR7-R166
002-3-dp-11.45g-37.47m	561993.95	3084650.50	27.88525091 N	80.37015691 W	2	3	dipolar	11.45g	37.47m	Potential Moderate Object (s)	Insufficient Data for Assessment		BR7-R166
002-4-mc-15.5g-49.00m	558160.31	3092906.33	27.95994804 N	80.40869858 W	2	4	multicomponent	15.5g	49.00m	Potential Moderate Object (s)	Insufficient Data for Assessment		BR7-R166
002-5-mc-14.77g-53.82m	556293.59	3096923.27	27.99628865 N	80.42748484 W	2	5	multicomponent	14.77g	53.82m	Potential Small Object	Insufficient Data for Assessment		BR7-R166
002-6-nm-49.67g-66.01m	555802.63	3097989.00	28.00592956 N	80.43242739 W	2	6	negative monopolar	49.67g	66.01m	Potential Moderate Object (s)	Insufficient Data for Assessment		BR7-R166
002-7-mc-11.2g-51.5m	554538.03	3100643.06	28.02993980 N	80.44516639 W	2	7	multicomponent	11.2g	51.5m	Potential Moderate Object (s)	Insufficient Data for Assessment		BR7-R166
002-8-mc-45.48g-90.57m	554528.04	3100726.31	28.03069176 N	80.44526424 W	2	8	multicomponent	45.48g	90.57m	Potential Moderate Object (s)	Insufficient Data for Assessment		BR7-R166
002-9-mc-15.15g-70.08m	554478.82	3100783.06	28.03120602 N	80.44576229 W	2	9	multicomponent	15.15g	70.08m	Potential Moderate Object (s)	Insufficient Data for Assessment		BR7-R166
002-10-mc-8.72g-30.75m	552997.29	3103963.26	28.05997308 N	80.46069085 W	2	10	multicomponent	8.72g	30.75m	Potential Small Object	Insufficient Data for Assessment		BR7-R166
003-1-mc-17.89g-73.94m	564624.39	3087490.79	27.91076502 N	80.34327890 W	3	1	multicomponent	17.89g	73.94m	Potential Moderate Object (s)	Insufficient Data for Assessment		BR7-R166
003-2-mc-16.50g-46.92m	564678.20	3087382.72	27.90978686 N	80.34273797 W	3	2	multicomponent	16.50g	46.92m	Potential Moderate Object (s)	Insufficient Data for Assessment		BR7-R166
003-3-mc-37.88g-43.31m	566609.95	3083236.33	27.87226320 N	80.32334133 W	3	3	multicomponent	37.88g	43.31m	Potential Moderate Object (s)	Insufficient Data for Assessment		BR7-R166
003-4-dp-23.59g-30.75m	566845.36	3082723.91	27.86762595 N	80.32097892 W	3	4	dipolar	23.59g	30.75m	Potential Moderate Object (s)	Insufficient Data for Assessment		BR7-R166
012-1-dp-3.95g-17.15m	558402.61	3098400.73	28.00953444 N	80.40596360 W	12	1	dipolar	3.95g	17.15m	Potential Debris	Associated Cluster	Contact 012	BR7-R166
012-2-dp-5.36g-11.20m	557165.03	3098394.33	28.00953050 N	80.41855120 W	12	2	dipolar	5.36g	11.20m	Potential Small Object	Insufficient Data for Assessment		BR7-R166
014-1-pm-13.56g-12.10m	515192.88	3227731.57	29.17813288 N	80.84374698 W	14	1	positive monopolar	13.56g	12.10m	Potential Moderate Object (s)	Insufficient Data for Assessment		VO6-R153
014-2-pm-9.96g-11.81m	515783.47	3226340.87	29.16557361 N	80.83769268 W	14	2	positive monopolar	9.96g	11.81m	Potential Small Object	Insufficient Data for Assessment		VO6-R153
014-3-nm-10.74g-15.01m	515815.73	3226275.97	29.16498743 N	80.83736192 W	14	3	negative monopolar	10.74g	15.01m	Potential Moderate Object (s)	Insufficient Data for Assessment		VO6-R153
014-nm-29.75g-5.83m	520342.76	3215705.47	29.06951611 N	80.79100221 W	14	4	negative monopolar	29.75g	5.83m	Potential Moderate Object (s)	Insufficient Data for Assessment		VO6-R153
017-1-dp-6.89g-18.32m	526145.48	3203360.83	28.95798916 N	80.73167466 W	17	1	dipolar	6.89g	18.32m	Potential Small Object	Insufficient Data for Assessment		VO6-R153
017-1-dp-6.89g-18.32m	526145.48	3203360.83	28.95798916 N	80.73167466 W	17	2	dipolar	6.89g	18.32m	Potential Small Object	Insufficient Data for Assessment		VO6-R153
020-1-dp-8.45g-55.72m	520562.31	3214070.78	29.05475810 N	80.78877671 W	20	1	dipolar	8.45g	55.72m	Potential Small Object	Insufficient Data for Assessment		VO6-R153
020-2-nm-5.87g-18.86m	521402.56	3214088.01	29.05489978 N	80.78014509 W	20	2	negative monopolar	5.87g	18.86m	Potential Small Object	Insufficient Data for Assessment		VO6-R153
021-1-nm-11.03g-32.37m	518397.12	3217637.94	29.08698783 N	80.81095942 W	21	1	negative monopolar	11.03g	32.37m	Potential Moderate Object (s)	Insufficient Data for Assessment		VO6-R153
022-1-dp-8.71g-26.20m	517274.23	3221212.89	29.11927035 N	80.82244234 W	22	1	dipolar	8.71g	26.20m	Potential Small Object	Insufficient Data for Assessment		VO6-R153
023-1-pm-5.55g-22.50m	514519.82	3224771.42	29.15142329 N	80.85070778 W	23	1	positive monopolar	5.55g	22.50m	Potential Small Object	Insufficient Data for Assessment		VO6-R153
023-2-dp-10.09g-23.61m	512425.07	3224743.32	29.15119192 N	80.87224619 W	23	2	dipolar	10.09g	23.61m	Potential Moderate Object (s)	Insufficient Data for Assessment		VO6-R153
029-1-mp-3.52g-39.63m	501470.46	3249335.61	29.37321248 N	80.98484813 W	29	1	positive monopolar	3.52g	39.63m	Potential Small Object	Insufficient Data for Assessment		VO5-R41
029-2-mp-3.52g-39.63m	501470.46	3249335.61	29.37321248 N	80.98484813 W	29	2	positive monopolar	3.52g	39.63m	Potential Small Object	Insufficient Data for Assessment		VO5-R41
036-1-pm-17.02g-45.14m	477361.59	3324440.70	30.05082748 N	81.23484158 W	36	1	positive monopolar	17.02g	45.14m	Potential Moderate Object (s)	Insufficient Data for Assessment		SJ-R88
037-1-pm-4.55g-13.76m	481144.91	3312728.90	29.94519782 N	81.19538809 W	37	1	positive monopolar	4.55g	13.76m	Potential Small Object	Insufficient Data for Assessment		SJ-R88
037-2-mc-6.57g-23.08m	481092.23	3315955.61	29.97431680 N	81.19599108 W	37	2	multicomponent	6.57g	23.08m	Potential Small Object	Insufficient Data for Assessment		SJ-R88
039-1-nm-34.00g-2.91m	481094.05	3312719.32	29.94511054 N	81.19591493 W	39	1	negative monopolar	34.00g	2.91m	Potential Moderate Object (s)	Insufficient Data for Assessment		SJ-R88
039-2-nm-188.43g-3.25m	477829.12	3312648.66	29.94441825 N	81.22974646 W	39	2	negative monopolar	188.43g	3.25m	Potential Moderate Object (s)	Insufficient Data for Assessment		SJ-R88
039-3-nm-5922.4g-2.94m	477819.65	3312648.43	29.94441601 N	81.22984457 W	39	3	negative monopolar	5922.4g	2.94m	Potential Moderate Object (s)	Insufficient Data for Assessment		SJ-R88
041-1-nm-297.27g-21.03m	476625.16	3319781.73	30.00876878 N	81.24237866 W	41	1	negative monopolar	297.27g	21.03m	Potential Moderate Object (s)	Insufficient Data for Assessment		SJ-R88
042-1-pm-3.40g-30.13m	477357.94	3323369.14	30.04115712 N	81.23485668 W	42	1	positive monopolar	3.40g	30.13m	Potential Moderate Object (s)	Insufficient Data for Assessment		SJ-R88
046-1-pm-7.85g-8.59m	464654.38	3384678.17	30.59410780 N	81.36868916 W	46	1	positive monopolar	7.85g	8.59m	Potential Small Object	Insufficient Data for Assessment		NA5-R63
046-2-dp-4.13g-8.88m	464780.74	3385178.74	30.59862845 N	81.36738817 W	46	2	dipolar	4.13g	8.88m	Potential Small Object	Insufficient Data for Assessment		NA5-R63
046-3-pm-26.94g-8.10m	465040.46	3386193.16	30.60778978 N	81.36471331 W	46	3	positive monopolar	26.94g	8.10m	Potential Moderate Object (s)	Insufficient Data for Assessment		NA5-R63
047-1-dp-7.64g-5.94m	465673.80	3381374.33	30.56432477 N	81.35794631 W	47	1	dipolar	7.64g	5.94m	Potential Small Object	Insufficient Data for Assessment		NA5-R63
047-2-mc-6.39g-15.84m	465715.39	3381539.69	30.56581818 N	81.35751807 W	47	2	multicomponent	6.39g	15.84m	Potential Small Object	Insufficient Data for Assessment		NA5-R63
048-1-mc-7.81g-32.67m	466867.57	3378770.29	30.54086042 N	81.34541488 W	48	1	multicomponent	7.81g	32.67m	Potential Small Object	Insufficient Data for Assessment		NA5-R63
048-2-dp-7.56g-23.90m	466690.60	3378059.08	30.53443772 N	81.34723700 W	48	2	dipolar	7.56g	23.90m	Potential Moderate Object (s)	Insufficient Data for Assessment		NA5-R63
048-3-mc-18.53g-27.35m	466671.81	3377971.52	30.53364712 N	81.34743004 W	48	3	multicomponent	18.53g	27.35m	Potential Moderate Object (s)	Insufficient Data for Assessment		NA5-R63
049-1-pm-10.18g-21.01m	468358.81	3377318.56	30.52780070 N	81.32982423 W	49	1	positive monopolar	10.18g	21.01m	Potential Moderate Object (s)	Insufficient Data for Assessment		NA5-R63
053-1-dp-29.35g-31.67m	469148.27	3380854.80	30.55973130 N	81.32170027 W	53	1	dipolar	29.35g	31.67m	Potential Moderate Object (s)	Insufficient Data for Assessment		NA5-R63
054-1-mc-3.18g-13.71m	464281.96	3383723.26	30.58547993 N	81.37254091 W	54	1	multicomponent	3.18g	13.71m	Potential Small Object	Insufficient Data for Assessment		NA5-R63
054-2-mc-3.55g-9.89m	463670.94	3383855.12	30.58665144 N	81.37891837 W	54	2	multicomponent	3.55g	9.89m	Potential Small Object	Insufficient Data for Assessment		NA5-R63
054-3-mc-3.26g-16.95m	463490.80	3383899.06	30.58704248 N	81.38079871 W	54	3	multicomponent	3.26g	16.95m	Object Cluster or Rock Cluster	Associated Cluster	Contact 094 and 095	NA5-R63
054-4-mc-4.35g-17.35m	463424.75	3383917.28	30.58720480 N	81.38148828 W	54	4	multicomponent	4.35g	17.35m	Potential Small Object	Insufficient Data for Assessment		NA5-R63
054-5-mc-3.11g-17.45m	463233.96	3383959.93	30.58758385 N	81.38347971 W	54	5	multicomponent	3.11g	17.45m	Potential Small Object	Insufficient Data for Assessment		NA5-R63
056-1-dp-5.48g-8.25m	465034.71	3387229.16	30.61713804 N	81.36480825 W	56	1	dipolar	5.48g	8.25m	Potential Small Object	Insufficient Data for Assessment		NA5-R63
056-2-pm-5.73g-10.38m	464999.98	3387241.64	30.61724965 N	81.36517112 W	56	2	positive monopolar	5.73g	10.38m	Potential Small Object	Insufficient Data for Assessment		NA5-R63

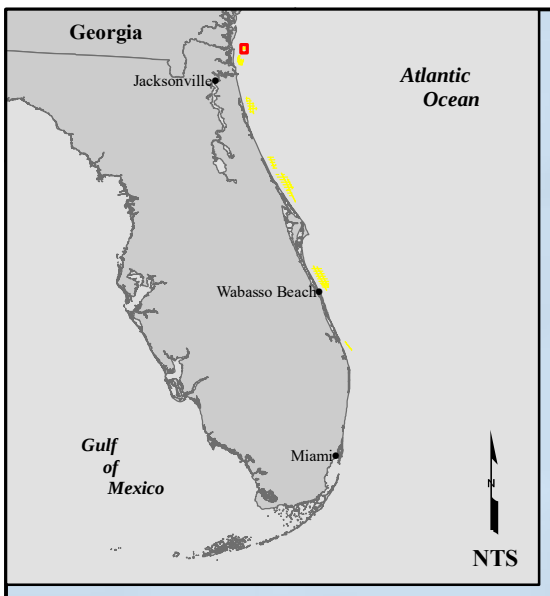
057-1-dp-6.98g-48.26m	468659.55	3393708.31	30.67570366 N	81.32718604 W	57	1	dipolar	6.98g	48.26m	Potential Small Object	Insufficient Data for Assessment		NA7-R9
057-2-nm-9.23g-42.00m	468229.80	3395737.73	30.69400483 N	81.33173509 W	57	2	negative monopolar	9.23g	42.00m	Object Cluster or Rock Cluster	Associated Cluster	Contact 100	NA7-R9
057-3-dp-40.91g-43.41m	468048.38	3396550.16	30.70133086 N	81.33365465 W	57	3	dipolar	40.91g	43.41m	Potential Moderate Object (s)	Insufficient Data for Assessment		NA7-R9
058-1-pm-14.00g-15.84m	469500.05	3398370.06	30.71779082 N	81.31854976 W	58	1	positive monopolar	14.00g	15.84m	Potential Moderate Object (s)	Insufficient Data for Assessment		NA7-R9
059-1-dp-48.72g-29.76m	471450.88	3397833.35	30.71299620 N	81.29816009 W	59	1	dipolar	48.72g	29.76m	Potential Moderate Object (s)	Insufficient Data for Assessment		NA7-R9
059-2-dp-34.60g-23.42m	471439.26	3397896.73	30.71356786 N	81.29828318 W	59	2	dipolar	34.60g	23.42m	Potential Moderate Object (s)	Insufficient Data for Assessment		NA7-R9
059-3-dp-28.07g-24.21m	471352.92	3398274.86	30.71697777 N	81.29919540 W	59	3	dipolar	28.07g	24.21m	Potential Moderate Object (s)	Insufficient Data for Assessment		NA7-R9
059-4-mc-21.61g-45.81m	471270.64	3398593.51	30.71985120 N	81.30006360 W	59	4	multicomponent	21.61g	45.81m	Potential Moderate Object (s)	Insufficient Data for Assessment		NA7-R9
059-5-nm-9.41g-13.14m	471025.72	3399787.98	30.73062349 N	81.30265537 W	59	5	negative monopolar	9.41g	13.14m	Potential Small Object	Insufficient Data for Assessment		NA7-R9
059-6-nm-22.04g-17.63m	471019.26	3399818.15	30.73089556 N	81.30272370 W	59	6	negative monopolar	22.04g	17.63m	Potential Moderate Object (s)	Insufficient Data for Assessment		NA7-R9
061-1-nm-60.77g-22.17m	470411.88	3398749.26	30.72123556 N	81.30903733 W	61	1	negative monopolar	60.77g	22.17m	Potential Moderate Object (s)	Insufficient Data for Assessment		NA7-R9
060-1-dp-15.67g-14.25m	468253.18	3396407.62	30.70005016 N	81.33151165 W	60	1	dipolar	15.67g	14.25m	Potential Moderate Object (s)	Insufficient Data for Assessment		NA7-R9

APPENDIX M

Magnetic Anomalies Shapefile
(Digital Only)

APPENDIX N

Preliminary Borrow Area Design Cut Elevation Map Series



Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

471000

Georgia

NA9-R010

NA10-R011

3399000

SS30

SS29

NA8-R010

VC28

VC27

VC26

3396000

NA6-R010

3393000

468000

471000

474000

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop

Reconnaissance Geotechnical Samples
- Surface Sample
- Vibracore - Good

- Scattered Hardbottom
- Sand Waves
- St. Marys River Entrance Channel
- Potential Borrow Areas
- NOAA AWOIS
- State Offshore Admin Boundary
- Federal/State Boundary
- USACE/EPA ODMDS

Buffered BCS Cut Elevation (ft., NAVD88)
- -35 to -30
- -40 to -35
- -50 to -40
- -55 to -50
- -60 to -55
- -65 to -60
- -70 to -65
- -75 to -70

N

0 0.5 1
Kilometers

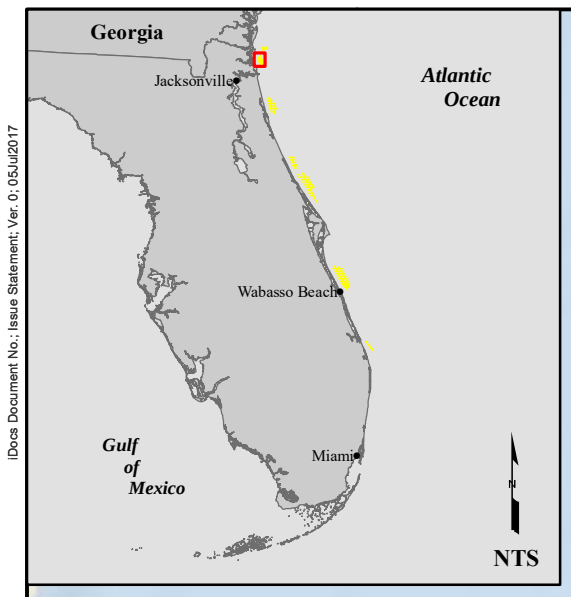
Title:
BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Nassau County - NA7-R009

App N: Preliminary Borrow Area Design Cut Elevation

Figure Number: 01	Comm No.: 6362179972	Date: 04/05/17

CBI
101 16th Ave. South, Suite 6
St. Petersburg, FL, 33701
Ph. (727) 565-4660
Fax (727) 565-4659
www.CBI.com



Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

VC25
VC24
VC23
VC22
VC21
NA7-R070
NA5-R076
465000
3385000
3380000
3375000
460000
470000

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop

Reconnaissance Geotechnical Samples
- Vibracore - Good
- Vibracore - Bad
- Vibracore - Moderate

- Hardbottom
- Scattered Hardbottom
- Sand Waves
- Potential Debris
- Potential Borrow Areas
- NOAA AWOIS
- Federal/State Boundary
- USACE/EPA ODMDS

Buffered BCS Cut Elevation (ft., NAVD88)
- -35 to -30
- -40 to -35
- -50 to -40
- -55 to -50
- -60 to -55
- -65 to -60
- -70 to -65
- -75 to -70

N
0 0.5 1
Kilometers

Title:
BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Nassau County - NA5-R063

App N: Preliminary Borrow Area Design Cut Elevation

Figure Number: 02	Comm No.: 6362179972	Date: 04/05/17

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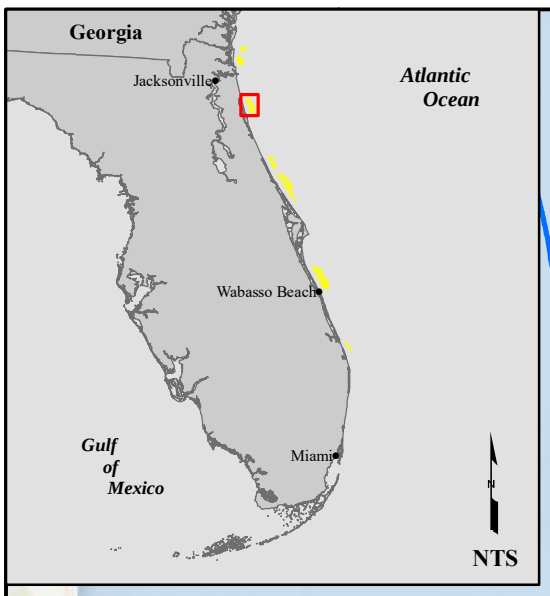

475000
480000
485000
3330000
3320000
3310000

SJ7-R093
SS20
VC16
VC17
VC18
VC19
South Ponte Vedra Beach

N
0 1 2
Kilometers

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150
- >150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop
- Potential Rocks
- Potential buried debris

Reconnaissance Geotechnical Samples
- Surface Sample
- Vibracore - Good
- Vibracore - Moderate
- Hardbottom
- Scattered Hardbottom
- Potential Outcrop
- Sand Waves

- Potential Borrow Area
- 8 Nautical Miles
- Federal/State Boundary
- ABA and PBAs

Buffered BCS Cut Elevation (ft., NAVD88)
- -35 to -30
- -40 to -35
- -50 to -40
- -55 to -50
- -60 to -55
- -65 to -60
- -70 to -65
- -75 to -70

Title:
BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

St. Johns County - SJ6-R088

App N: Preliminary Borrow Area Design Cut Elevation

Figure Number: 03	Comm No.: 6362179972	Date: 04/05/17

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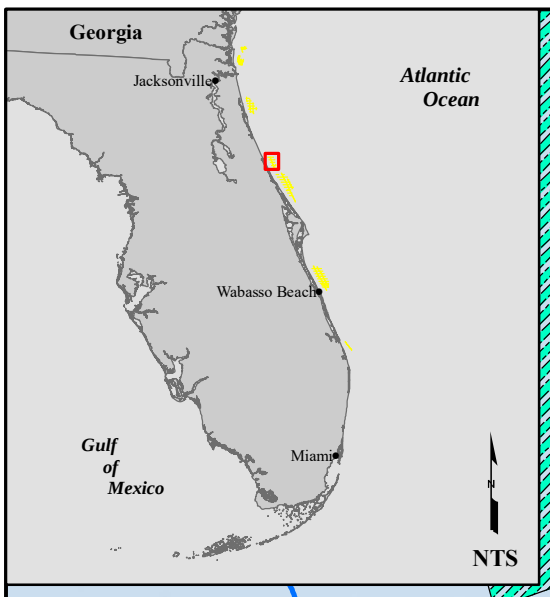

500000
505000
510000
3250000
3240000
SS11
VC10
VO7-R065

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop

Reconnaissance Geotechnical Samples
- Surface Sample
- Vibracore - Good

- Scattered Hardbottom
- Potential Outcrop
- Sand Waves
- Potential Borrow Area
- 8 Nautical Miles
- Federal/State Boundary
- ABA and PBAs

Buffered BCS Cut Elevation (ft., NAVD88)
- -35 to -30
- -40 to -35
- -50 to -40
- -55 to -50
- -60 to -55
- -65 to -60
- -70 to -65
- -75 to -70

N

0 1 2
Kilometers

Title:
BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Volusia County - VO5-R041

App N: Preliminary Borrow Area Design Cut Elevation

Figure Number: 04	Comm No.: 6362179972	Date: 04/05/17

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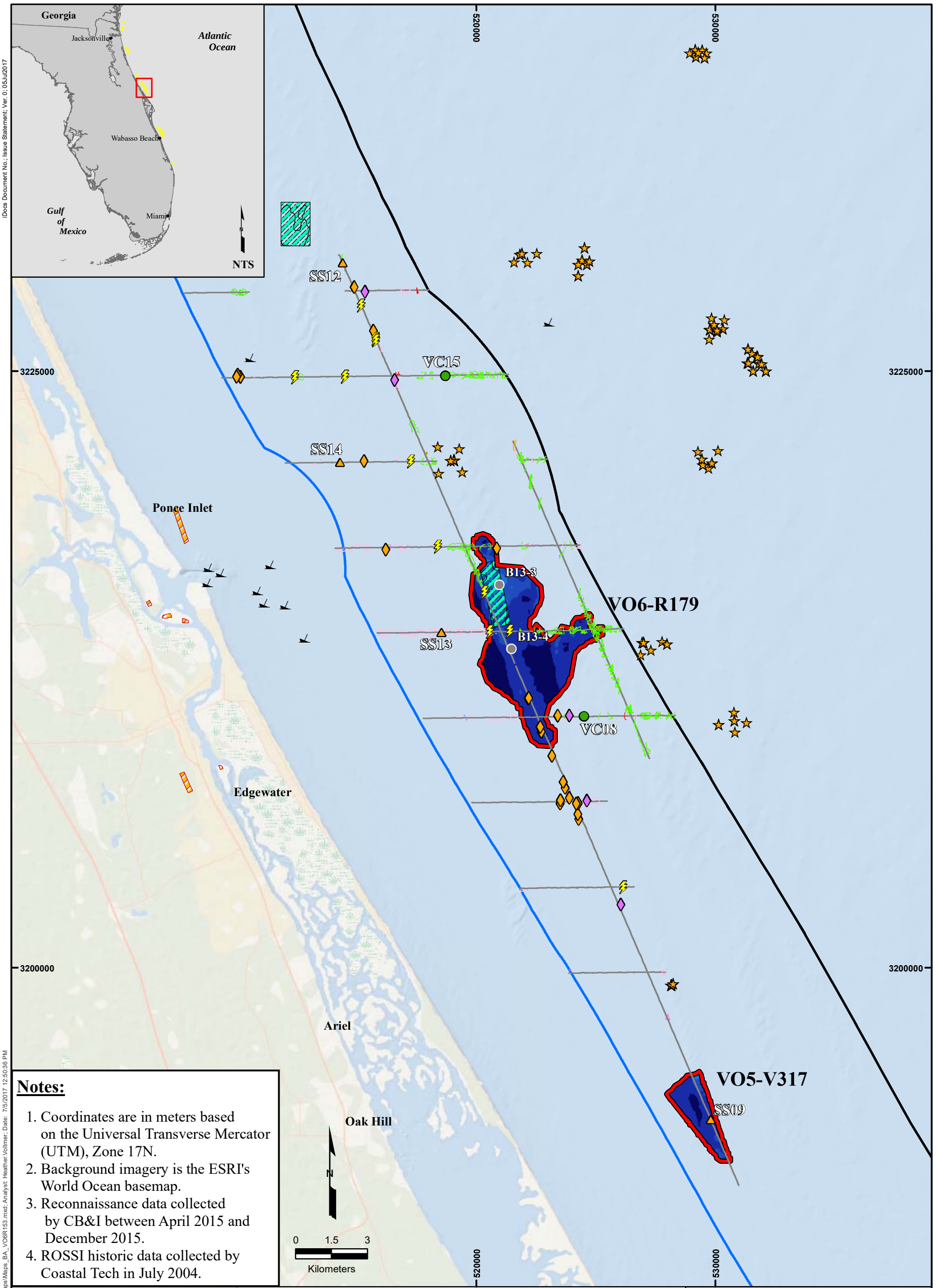

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.
4. ROSSI historic data collected by Coastal Tech in July 2004.

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop

Reconnaissance Geotechnical Samples
- Surface Sample
- Vibracore - Good

- Hardbottom
- Scattered Hardbottom
- Scattered Hardbottom Outcrop
- Outcrop
- Potential Outcrop
- Sand Waves
- Potential Debris
- Potential Mud
- Potential Borrow Areas

- ROSSI Historic Vibracores
- NOAA AWOIS
- Artificial Reefs
- 8 Nautical Miles
- Federal/State Boundary
- ABA and PBAs
- USACE/EPA ODMDS

Buffered BCS Cut Elevation (ft., NAVD88)
- -35 to -30
- -40 to -35
- -50 to -40
- -55 to -50
- -60 to -55
- -65 to -60
- -70 to -65
- -75 to -70

Title:
BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Volusia County - VO6-R153

App N: Preliminary Borrow Area Design Cut Elevation

Figure Number: 05	Comm No.: 6362179972	Date: 04/05/17

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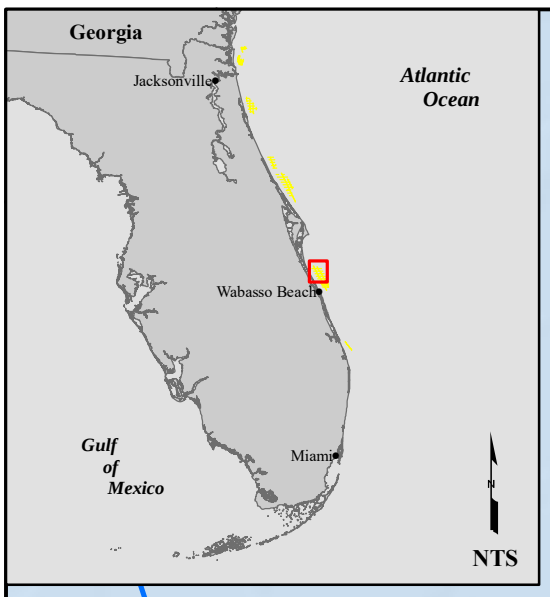

555000
560000
565000
3110000
3100000
3090000

SS06
SS05

BE5-R165
BE4-R178
BE4-R202
BE8-R210
BE8-R210

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris

Reconnaissance Geotechnical Samples
- Surface Sample
- Scattered Hardbottom
- Scattered Hardbottom Outcrop
- Outcrop
- Potential Outcrop
- Sand Waves
- Potential Mud
- Potential Borrow Areas
- 8 Nautical Miles
- Federal/State Boundary
- Cables

Buffered BCS Cut Elevation (ft., NAVD88)
- -35 to -30
- -40 to -35
- -50 to -40
- -55 to -50
- -60 to -55
- -65 to -60
- -70 to -65
- -75 to -70

N

0 1 2
Kilometers

Title:
BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Brevard County - BE7-R166

App N: Preliminary Borrow Area Design Cut Elevation

Figure Number: 06	Comm No.: 6362179972	Date: 04/05/17

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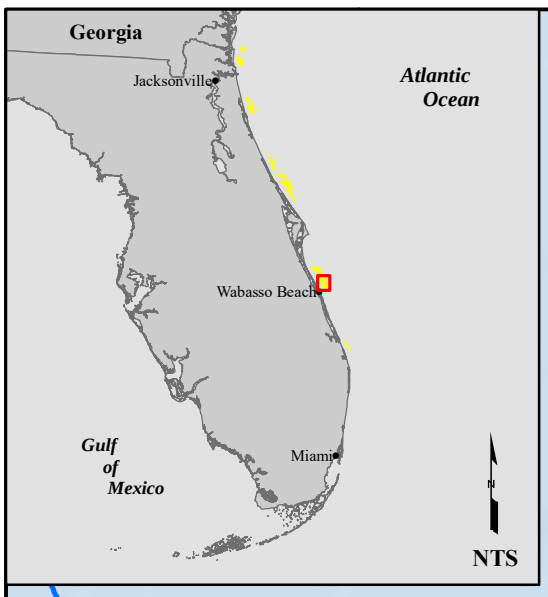

565000

570000

3090000

3080000

IR7-R214

VC04

VC03

SS07

N

0 1 2

Kilometers

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop
- Potential cable and/or anchor line.

Reconnaissance Geotechnical Samples
- Surface Sample
- Vibracore - Good

- Hardbottom
- Scattered Hardbottom
- Scattered Hardbottom Outcrop
- Outcrop
- Potential Outcrop
- Sand Waves
- Potential Mud
- Potential Borrow Area
- NOAA AWOIS
- 8 Nautical Miles
- Federal/State Boundary
- Cables
- 1km Cable Buffer

Buffered BCS Cut Elevation (ft., NAVD88)
- -35 to -30
- -40 to -35
- -50 to -40
- -55 to -50
- -60 to -55
- -65 to -60
- -70 to -65
- -75 to -70

Title:
BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Indian River County - IR6-R002

App N: Preliminary Borrow Area Design Cut Elevation

Figure Number: 07	Comm No.: 6362179972	Date: 04/05/17

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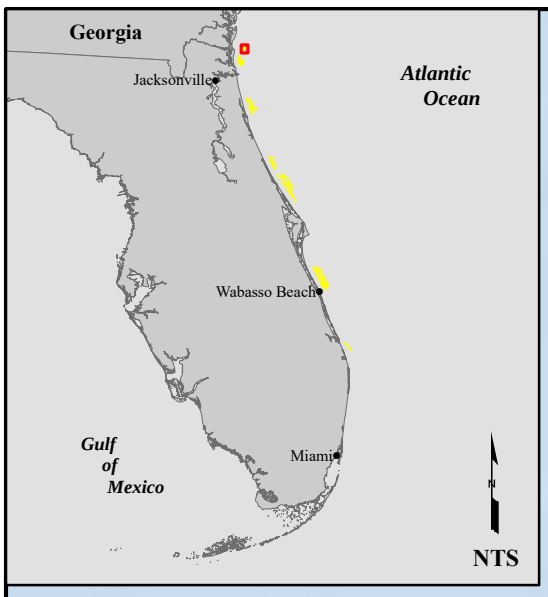
APPENDIX O

Preliminary Borrow Area Design Sediment Thickness Map Series



Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

471000

Georgia

NA9-R010

NA10-R011

3399000

SS30

SS29

NA8-R010

VC28

VC27

VC26

3396000

NA6-R010

3393000

468000

471000

474000

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop

Reconnaissance Geotechnical Samples
- Surface Sample
- Vibracore - Good

- Scattered Hardbottom
- Sand Waves
- St. Marys River Entrance Channel
- Potential Borrow Areas
- NOAA AWOIS
- State Offshore Admin Boundary
- Federal/State Boundary
- USACE/EPA ODMDS

Buffered Sediment Thickness (ft)
- 0-3
- 3-4
- 4-6
- 6-8
- 8-10
- 10-15
- 15-20

N

0 0.5 1

Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Nassau County - NA7-R009

App O: Preliminary Borrow Area Design Sediment Thickness

Figure Number: 01	Comm No.: 6362179972	Date: 04/05/17

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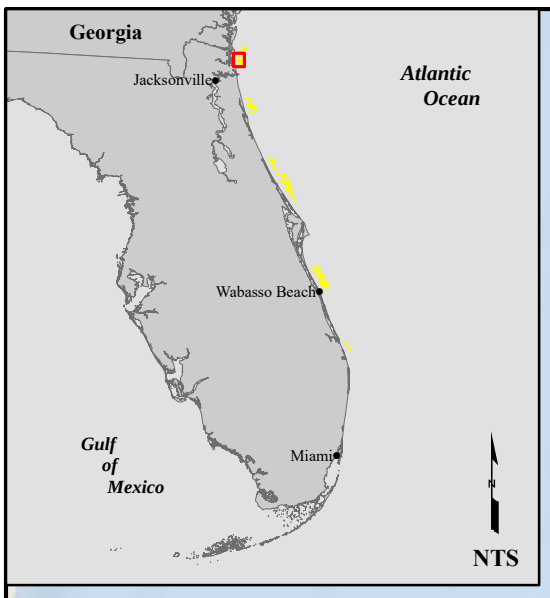

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

465000

3385000

3380000

3375000

460000

470000

VC25

VC24

VC23

VC22

VC21

NA7-R070

NA5-R076

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop

Reconnaissance Geotechnical Samples
- Vibracore - Good
- Vibracore - Bad
- Vibracore - Moderate

- Hardbottom
- Scattered Hardbottom
- Sand Waves
- Potential Debris
- Potential Borrow Areas
- NOAA AWOIS
- Federal/State Boundary
- USACE/EPA ODMDS

Buffered Sediment Thickness (ft)
- 0-3
- 3-4
- 4-6
- 6-8
- 8-10
- 10-15
- 15-20
- 20-25

N

0 0.5 1

Kilometers

Title:

BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Nassau County - NA5-R063

App O: Preliminary Borrow Area Design Sediment Thickness

Figure Number: 02	Comm No.: 6362179972	Date: 04/05/17

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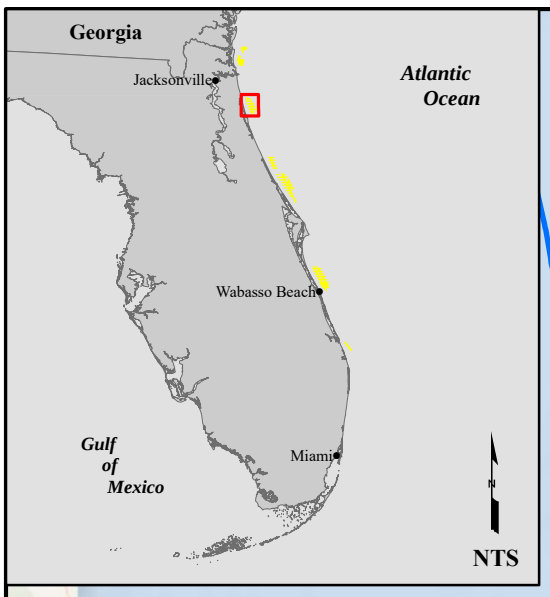

iDocs Document No.; Issue Statement; Ver. 0; 05-Jul2017

475000
480000
485000
3330000
3320000
3310000

SJ7-R093
SS20
VC16
VC17
VC18
VC19

South Ponte Vedra Beach

N
0 1 2
Kilometers

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150
- >150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop
- Potential Rocks
- Potential buried debris

Reconnaissance Geotechnical Samples
- Surface Sample
- Vibracore - Good
- Vibracore - Moderate
- Hardbottom
- Scattered Hardbottom
- Potential Outcrop
- Sand Waves

- Potential Borrow Area
- 8 Nautical Miles
- Federal/State Boundary
- ABA and PBAs

Buffered Sediment Thickness (ft)
- 0-3
- 3-4
- 4-6
- 6-8
- 8-10
- 10-15
- 15-20

Title:
BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

St. Johns County - SJ6-R088

App O: Preliminary Borrow Area Design Sediment Thickness

Figure Number: 03	Comm No.: 6362179972	Date: 04/05/17

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Fax (727) 565-4659
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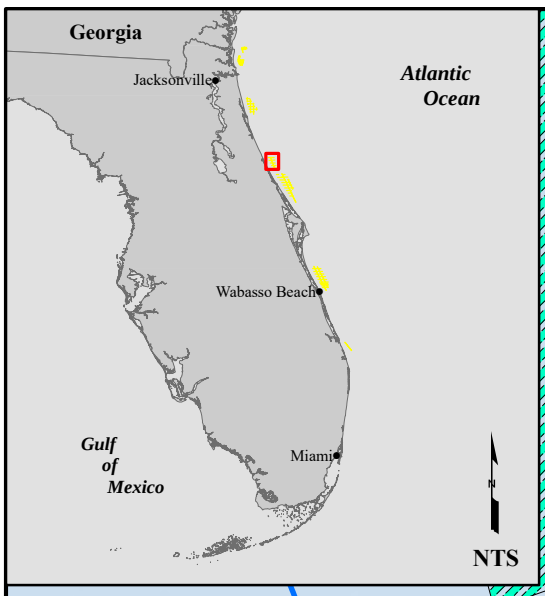
G:\Enterprise\FDEP\6362179972_FDEP_BOEM_ASAP_Processing\maps\Maps_BA_THK_SJ6R088.mxd; Analyst: Heather.Vollmer; Date: 7/5/2017 12:33:52 PM



Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop

Reconnaissance Geotechnical Samples
- Surface Sample
- Vibracore - Good

- Scattered Hardbottom
- Potential Outcrop
- Sand Waves
- Potential Borrow Area
- 8 Nautical Miles
- Federal/State Boundary
- ABA and PBAs

Buffered Sediment Thickness (ft)
- 0-3
- 3-4
- 4-6
- 6-8
- 8-10
- 10-15
- 15-20
- 20-25

N

0 1 2
Kilometers

Title:
BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Volusia County - VO5-R041

App O: Preliminary Borrow Area Design Sediment Thickness

Figure Number: 04	Comm No.: 6362179972	Date: 04/05/17

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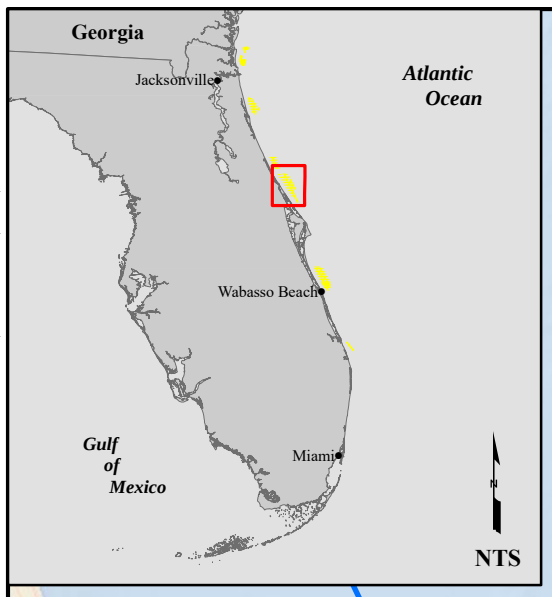

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.
4. ROSSI historic data collected by Coastal Tech in July 2004.

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop

Reconnaissance Geotechnical Samples
- Surface Sample
- Vibracore - Good

- Hardbottom
- Scattered Hardbottom
- Scattered Hardbottom Outcrop
- Outcrop
- Potential Outcrop
- Sand Waves
- Potential Debris
- Potential Mud
- Potential Borrow Areas

- ROSSI Historic Vibracores
- NOAA AWOIS
- Artificial Reefs
- 8 Nautical Miles
- Federal/State Boundary
- ABA and PBAs
- USACE/EPA ODMDS

Buffered Sediment Thickness (ft)
- 0-3
- 3-4
- 4-6
- 6-8
- 8-10
- 10-15
- 15-20
- 20-25

Title:
BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Volusia County - VO6-R153

App O: Preliminary Borrow Area Design Sediment Thickness

Figure Number: 05	Comm No.: 6362179972	Date: 04/05/17

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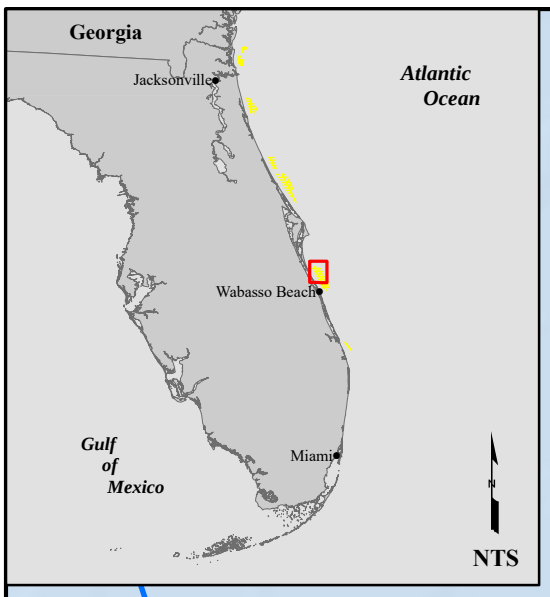

555000
560000
565000
3110000
3100000
3090000
SS06
SS05
BE5-R165
BE8-R210
BE4-R178
BE4-R202
BE8-R210

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris

Reconnaissance Geotechnical Samples
- Surface Sample
- Scattered Hardbottom
- Scattered Hardbottom Outcrop
- Outcrop
- Potential Outcrop
- Sand Waves
- Potential Mud
- Potential Borrow Areas
- 8 Nautical Miles
- Federal/State Boundary
- Cables
- 1km Cable Buffer

Buffered Sediment Thickness (ft)
- 0-3
- 3-4
- 4-6
- 6-8
- 8-10
- 10-15
- 15-20
- 20-25

N
0 1 2
Kilometers

Title:
BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Brevard County - BE7-R166

App O: Preliminary Borrow Area Design Sediment Thickness

Figure Number: 06	Comm No.: 6362179972	Date: 04/05/17

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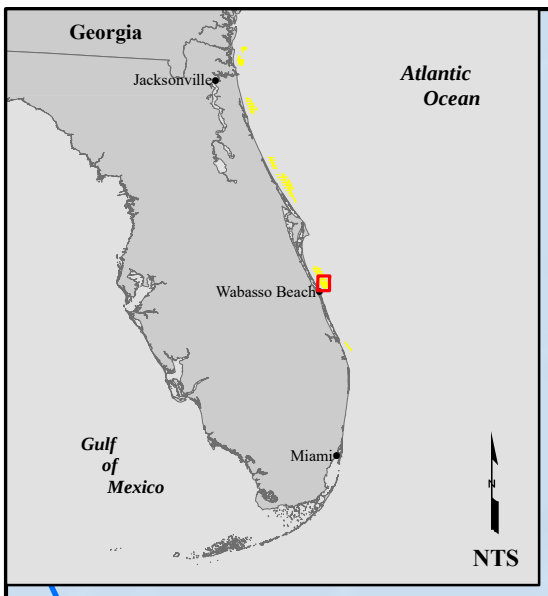

IR7-R214

VC04

VC03

SS07

565000

570000

3090000

3080000

N

0 1 2

Kilometers

Notes:

1. Coordinates are in meters based on the Universal Transverse Mercator (UTM), Zone 17N.
2. Background imagery is the ESRI's World Ocean basemap.
3. Reconnaissance data collected by CB&I between April 2015 and December 2015.

Legend:

Reconnaissance Magnetic Anomalies (gammas)
- <150

Sidescan Sonar Contacts
- Potential Debris
- Potential Outcrop
- Potential cable and/or anchor line.

Reconnaissance Geotechnical Samples
- Surface Sample
- Vibracore - Good
- Hardbottom
- Scattered Hardbottom
- Scattered Hardbottom Outcrop
- Outcrop
- Potential Outcrop
- Sand Waves
- Potential Mud
- Potential Borrow Area
- NOAA AWOIS
- 8 Nautical Miles
- Federal/State Boundary
- Cables
- 1km Cable Buffer

Buffered Sediment Thickness (ft)
- 0-3
- 3-4
- 4-6
- 6-8
- 8-10
- 10-15
- 15-20
- 20-25

Title:
BOEM ASAP Reconnaissance Data Processing and Interpretation for the Florida Department of Environmental Protection

Indian River County - IR6-R002

App O: Preliminary Borrow Area Design Sediment Thickness

Figure Number: 07	Comm No.: 6362179972	Date: 04/05/17

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APPENDIX P

BOEM ASAP Geotechnical Data (Logs, Photographs, Granularmetric Reports, Granularmetric Curves, and gINT files) (Digital Only)

APPENDIX Q

Composite Summary Table

CUMULATIVE PERCENTS AND COMPUTED DISTRIBUTIONS
FDEP BOEM 2015 RECON ASAP PROCESSING

SAMPLE I. D.	ELEVATION (NAVD 88 FT)	DEPTH (FT)	EFFECTIVE LENGTH (FT)	PHI MEDIAN	mm MEDIAN	PHI MEAN	mm MEAN	PHI SORTING	mm SORTING	% SILT	% Carbonate	PHI SIZES -4.25	-4.0	-3.50	-3.0	-2.50	-2.25	-2.0	-1.5	-1.0	-0.5	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	3.75	4.00	PAN
FL-BOEM-2015-VC01 S#1	-77.3	0.7	0.7	3.12	0.12	2.61	0.16	1.24	0.42	6.78	48.00	0	0	0	0.24	0.24	0.3	0.49	0.96	1.77	3.13	5.26	7.71	11.76	15.94	21	24.06	41.81	75.35	88.4	93.22	99.96
FL-BOEM-2015-VC01 S#2	-77.9	1.3	0.6	1.00	0.50	1.02	0.49	1.51	0.35	3.05	76.00	0	0	0	0.16	0.38	0.98	1.64	3.53	8.42	15.57	26.18	36.21	50.08	64.71	72	74.19	83.01	92.35	95.57	96.95	99.95
FL-BOEM-2015-VC01 S#3	-82.2	5.6	4.3	3.10	0.12	2.94	0.13	0.78	0.58	4.01	41.00	0	0	0	0	0.15	0.25	0.25	0.42	0.82	1.21	1.76	2.42	3.34	4.35	5.7	9.15	42.59	81.08	92.36	95.99	99.98
FL-BOEM-2015-VC01 S#4	-86.4	9.8	4.2	3.31	0.10	3.13	0.11	0.73	0.60	6.03	36.00	0	0	0	0	0	0.05	0.05	0.15	0.35	0.78	1.36	1.97	2.82	3.69	4.65	7.12	23.79	66.04	85.98	93.97	99.95
FL-BOEM-2015-VC01 Composite			**9.8**	**3.17**	**0.11**	**2.88**	**0.14**	**1.00**	**0.50**	**5.01**	**41.50**	**0.00**	**0.00**	**0.00**	**0.03**	**0.11**	**0.21**	**0.27**	**0.53**	**1.15**	**2.04**	**3.33**	**4.67**	**6.58**	**8.59**	**10.40**	**13.33**	**36.95**	**74.92**	**89.54**	**94.99**	**99.96**
FL-BOEM-2015-VC02 S#1	-48.5	2.2	2.2	1.17	0.44	1.20	0.44	0.89	0.54	1.63	85.00	0	0	0	0	0	0	0	0.1	0.44	1.61	6.73	18.68	40.71	67.76	86.1	91.58	92.39	95.34	97.63	98.37	99.87
FL-BOEM-2015-VC02 S#2	-49.9	3.6	1.4	2.26	0.21	2.10	0.23	1.36	0.39	3.81	61.00	0	0	0	0	0.09	0.18	0.42	1.07	1.96	4.26	7.72	12.57	20.01	30.6	44.52	55.02	58.95	78.23	91.58	96.19	99.88
FL-BOEM-2015-VC02 S#3	-51.0	4.7	1.1	3.18	0.11	3.04	0.12	0.64	0.64	3.72	18.00	0	0	0	0	0	0	0	0.16	0.31	0.59	0.91	1.48	2.32	3.59	4.78	5.96	32.41	81.73	93.03	96.28	99.97
FL-BOEM-2015-VC02 S#2	-51.5	5.2	0.5	2.26	0.21	2.10	0.23	1.36	0.39	3.81	61.00	0	0	0	0	0.09	0.18	0.42	1.07	1.96	4.26	7.72	12.57	20.01	30.6	44.52	55.02	58.95	78.23	91.58	96.19	99.88
FL-BOEM-2015-VC02 S#4	-51.5	5.5	0.3	1.33	0.40	1.29	0.41	1.05	0.48	1.59	81.00	0	0	0.47	0.47	0.63	0.67	0.81	1.09	2.03	4.26	8.7	16.45	31.52	59.63	83	88.9	90.21	95.9	97.87	98.41	100.00
FL-BOEM-2015-VC02 S#5	-51.8	6.0	0.5	1.43	0.37	1.42	0.37	0.98	0.51	1.72	82.00	0	0	0	0	0	0	0	0.22	0.89	2.88	7.22	14.85	29.72	53.46	76.8	86.89	89.31	95.81	97.57	98.28	100.00
FL-BOEM-2015-VC02 S#6	-52.3	8.1	2.1	3.01	0.12	2.25	0.21	1.36	0.39	4.09	57.00	0	0	0	0	0.08	0.13	0.29	0.59	1.11	2.71	5.72	10.86	19.7	32.48	42.33	46.22	49.37	73	90.19	95.91	99.94
FL-BOEM-2015-VC02 S#7	-54.4	13.5	5.4	3.29	0.10	3.24	0.11	0.36	0.78	6.58	16.00	0	0	0	0	0	0	0	0.01	0.02	0.03	0.07	0.1	0.15	0.29	0.48	0.97	18.87	72.71	87	93.42	99.96
FL-BOEM-2015-VC02 Composite			**13.5**	**3.05**	**0.12**	**2.45**	**0.22**	**1.21**	**0.43**	**4.48**	**44.01**	**0.00**	**0.00**	**0.01**	**0.01**	**0.04**	**0.06**	**0.12**	**0.31**	**0.63**	**1.54**	**3.64**	**7.58**	**14.57**	**24.12**	**32.15**	**35.92**	**46.53**	**79.33**	**91.00**	**95.53**	**99.93**
FL-BOEM-2015-VC03 S#1	-43.6	2.5	2.5	0.89	0.54	0.39	0.76	1.56	0.34	1.75	85.00	0	0	7.04	8.29	10.31	10.58	11.52	12.7	13.93	16.29	21.46	32.9	55.01	82.23	95.24	97.65	98.11	98.2	98.24	98.25	99.94
FL-BOEM-2015-VC03 S#2	-49.2	8.1	5.6	0.07	0.95	-0.29	1.22	1.61	0.33	4.21	89.00	0	0	3.14	7.52	11.92	14.07	18	22.89	29.2	37.63	48.22	60.27	73.44	85.32	91.92	94.16	95.07	95.48	95.65	95.79	99.95
FL-BOEM-2015-VC03 S#3	-56.4	15.3	7.2	1.54	0.34	1.34	0.40	0.93	0.52	1.81	65.00	0	0	0	0.49	0.49	0.58	0.71	0.91	1.82	3.82	8.43	15.15	26.23	47.84	78.58	93.61	96.8	97.48	97.89	98.19	99.99
FL-BOEM-2015-VC03 S#4	-59.0	17.9	2.6	1.53	0.35	1.23	0.43	1.11	0.46	2.13	73.00	0	0	0.99	0.99	1.08	1.21	1.38	2.23	4.5	6.83	12.14	19.25	31.17	48.07	76.06	93.31	97.09	97.59	97.77	97.87	100.00
FL-BOEM-2015-VC03 Composite			**17.9**	**1.11**	**0.46**	**0.69**	**0.62**	**1.48**	**0.36**	**2.60**	**76.46**	**0.00**	**0.00**	**2.11**	**3.85**	**5.52**	**6.29**	**7.73**	**9.62**	**12.47**	**16.58**	**23.24**	**32.34**	**45.74**	**64.40**	**84.71**	**94.30**	**96.48**	**96.97**	**97.22**	**97.40**	**99.97**
FL-BOEM-2015-VC04 S#1	-59.0	4.5	4.5	1.11	0.46	0.9	0.54	0.96	0.51	2.06	48.00	0	0	0	0.21	0.68	1.02	1.17	2.06	2.98	6.94	18.43	30.66	44.52	70.24	91.43	96.76	97.68	97.84	97.9	97.94	99.98
FL-BOEM-2015-VC04 S#2		7.5	3.0	0.93	0.52	0.81	0.57	0.89	0.54	1.99	57.00	0	0	0	0	0	0.07	0.26	0.88	1.98	6.43	19.94	35.4	52.23	75.34	91.82	96.71	97.68	97.91	97.97	98.01	99.98
FL-BOEM-2015-VC04 S#3		12.3	4.8	1.07	0.48	0.92	0.53	0.94	0.52	1.65	52.00	0	0	0	0.19	0.19	0.19	0.31	0.77	1.62	5.97	18.6	32.75	46.91	67.93	88.36	96.19	97.82	98.17	98.27	98.35	99.97
FL-BOEM-2015-VC04 S#4	-61.3	14.6	2.3	1.76	0.30	1.63	0.32	0.85	0.55	6.16	78.00	0	0	0	0	0	0	0.02	0.09	0.39	1	3.06	8.63	21.03	38.81	60.21	80.03	90.91	92.92	93.5	93.84	99.94
FL-BOEM-2015-VC04 Composite			**14.6**	**1.15**	**0.45**	**1.00**	**0.50**	**1.15**	**0.45**	**2.56**	**55.89**	**0.00**	**0.00**	**0.00**	**0.13**	**0.27**	**0.39**	**0.52**	**1.08**	**1.92**	**5.58**	**16.37**	**28.85**	**43.19**	**65.58**	**85.58**	**93.93**	**96.66**	**97.19**	**97.34**	**97.44**	**99.97**
FL-BOEM-2015-VC08 S#1	-66.2	5.2	5.2	2.24	0.21	2.12	0.23	0.71	0.61	1.29	8.00	0	0	0	0.32	0.32	0.32	0.37	0.67	1.22	1.99	2.62	3.31	4.49	7.76	21.76	81.79	96.59	98.33	98.61	98.71	100.00
FL-BOEM-2015-VC08 S#2	-68.0	7.0	1.8	2.38	0.19	2.33	0.20	0.57	0.67	4.05	7.00	0	0	0	0	0.11	0.11	0.11	0.25	0.42	0.79	1.25	1.6	2.19	3.71	11.71	62.48	91.86	94.99	95.73	95.95	99.96
FL-BOEM-2015-VC08 S#3	-71.7	10.7	3.7	2.37	0.19	2.27	0.21	0.8	0.57	7.74	10.00	0	0	0	0	0.69	0.69	0.87	1.16	1.69	2.25	2.82	3.31	3.92	5.14	10.14	63.33	86.91	91.04	91.85	92.26	100.00
FL-BOEM-2015-VC08 Composite			**10.7**	**2.30**	**0.20**	**3.98**	**0.22**	**0.69**	**0.62**	**2.21**	**8.52**	**0.00**	**0.00**	**0.00**	**0.16**	**0.41**	**0.41**	**0.50**	**0.77**	**1.25**	**1.88**	**2.46**	**3.02**	**3.91**	**6.17**	**16.05**	**72.16**	**92.45**	**95.25**	**95.79**	**96.02**	**99.99**
FL-BOEM-2015-VC10 S#1	-61.6	0.7	0.7	2.34	0.20	2.32	0.20	0.54	0.69	1.74	25.00	0	0	0.49	0.49	0.88	1.15	1.53	2.77	5.04	6.82	9.6	12.74	17.85	26.29	47.19	81.19	96.98	98.41	98.64	98.7	99.95
FL-BOEM-2015-VC10 S#2	-64.9	4.0	3.3	2.25	0.21	2.19	0.22	0.61	0.66	1.86	15.00	0	0	0	0	0.5	0.56	0.72	0.93	1.78	2.64	4.18	5.91	9.01	15.08	33.65	76.86	94.9	97.92	98.42	98.53	99.90
FL-BOEM-2015-VC10 S#3	-65.8	4.9	0.9	2.60	0.16	2.18	0.22	1.29	0.41	4.95	9.00	0	0	0	0	0	0	0.05	0.12	0.21	0.42	0.84	1.33	2.29	4.24	15.97	65.3	93.16	97.52	98.12	98.26	99.99
FL-BOEM-2015-VC10 S#4	-67.4	6.5	1.6	2.02	0.25	1.13	0.46	1.81	0.29	4.51	12.00	0	0	0	0	0	0	0	0.01	0.24	0.64	1.48	2.45	4.16	7.64	22.77	76.6	93.53	97.44	97.98	98.14	100.00
FL-BOEM-2015-VC10 S#5	-69.1	8.2	1.7	2.87	0.14	2.60	0.16	1.00	0.50	11.23	22.00	0	0	0.7	1.58	1.82	1.92	2.27	2.72	4.2	5.67	7.66	9.35	11.65	14.07	19.93	41.79	83.73	92.08	94.14	95.05	100.00
FL-BOEM-2015-VC10 S#6	-69.5	8.6	0.4	1.34	0.40	0.77	0.59	1.67	0.31	1.30	46.00	0	0	0	1.71	3.93	5.88	7.57	11.7	16.7	21.53	26.96	30.98	35.85	41.16	49.32	68.73	89.4	94.34	95.2	95.49	99.88
FL-BOEM-2015-VC10 Composite			**8.6**	**2.27**	**0.21**	**2.04**	**0.24**	**1.02**	**0.49**	**2.39**	**17.45**	**0.00**	**0.00**	**0.18**	**0.43**	**0.81**	**0.96**	**1.21**	**1.68**	**2.77**	**3.85**	**5.52**	**7.19**	**9.89**	**14.49**	**28.89**	**68.64**	**92.17**	**96.51**	**97.33**	**97.61**	**99.95**
FL-BOEM-2015-VC15 S#1	-61.4	0.7	0.7	1.34	0.40	0.77	0.59	1.67	0.31	1.30	48.00	0	0.54	1.96	3.73	6.6	8.25	9.7	12.8	16.27	20.84	26.14	32.52	40.67	54.3	73.34	92.85	98.15	98.62	98.68	98.7	99.89
FL-BOEM-2015-VC15 S#2	-62.4	1.7	1.0	1.92	0.26	1.54	0.34	1.15	0.45	1.60	34.00	0	0	0	0.29	0.71	1.25	1.95	3	4.45	7.29	10.64	15.88	22.33	32.46	53.15	88.32	97.32	98.2	98.32	98.4	99.92
FL-BOEM-2015-VC15 S#3	-62.7	2.0	0.3	1.54	0.34	1.06	0.48	1.41	0.38	1.18	47.00	0	0	0	0.65	2.17	2.76	3.5	6.58	10.36	16.22	22.79	29.8	37.15	48.75	66.58	90.31	97.91	98.66	98.79	98.82	100.00
FL-BOEM-2015-VC15 S#4	-64.4	3.7	1.7	2.2	0.22	2.05	0.24	0.77	0.59	1.19	18.00	0	0	0	0	0	0.06	0.06	0.31	0.69	1.77	3.16	5.16	8.07	14.36	32.63	76.06	95.01	98.33	98.75	98.81	99.98
FL-BOEM-2015-VC15 S#5	-65.8	5.1	1.4	2.17	0.22	1.93	0.26	0.91	0.53	2.05	23.00	0	0	0	0	0.39	0.53	0.75	1.22	1.81	2.99	4.95	7.36	11.14	17.77	34.99	80.37	94.96	97.35	97.73	97.95	99.93
FL-BOEM-2015-VC15 S#6	-68.4	7.7	2.6	1.95	0.26	1.51	0.35	1.19	0.44	2.37	38.00	0	0	0	0.27	0.27	0.85	1.36	2.73	4.97	8.67	12.94	17.84	23.93	33.58	51.88	86.09	95.27	97.18	97.47	97.63	99.95
FL-BOEM-2015-VC15 S#8	-68.8	8.1	0.4	2.34	0.20	2.22	0.21	0.73	0.60	4.93	59.00	0	0	0	0	0	0	0.1	0.26	0.61	1.35	2.34	3.54	5.6	9.64	20.39	64.1	89.4	94.14	94.88	95.07	99.98
FL-BOEM-2015-VC15 S#7	-69.5	8.8	0.7	1.61	0.33	1.07	0.48	1.62	0.33	3.63	20.00	0	0	0.81	2.27	3.64	5.03	5.98	8.43	12.31	17.22	22.88	29.4	37.31	47.31	59.63	80.84	92.59	95.56	96.14	96.37	99.91
FL-BOEM-2015-VC15 S#8	-70.5	9.8	1.0	2.34	0.20	2.22	0.21	0.73	0.60	4.93	59.00	0	0	0	0	0	0	0.1	0.26	0.61	1.35	2.34	3.54	5.6	9.64	20.39	64.1	89.4	94.14	94.88	95.07	99.98
FL-BOEM-2015-VC15 S#9	-72.3	11.6	1.8	2.38	0.19	2.21	0.22	0.87	0.55	6.23	22.00	0	0	0	0	0.56	0.63	0.63	0.85	1.41	2.27	3.43	4.73	6.68	10.08	18.08	60.32	86.52	92.48	93.38	93.77	99.98
FL-BOEM-2015-VC15 Composite			**11.6**	**2.13**	**0.23**	**1.75**	**0.30**	**1.17**	**0.44**	**2.98**	**32.72**	**0.00**	**0.03**	**0.17**	**0.46**	**0.93**	**1.34**	**1.72**	**2.68**	**4.10**	**6.42**	**9.24**	**12.68**	**17.19**	**24.69**	**40.23**	**77.67**	**93.39**	**96.39**	**96.84**	**97.02**	**99.95**
FL-BOEM-2015-VC16 S#1	-60.0	6.0	6.0	2.36	0.19	2.31	0.20	0.56	0.68	1.97	6.00	0	0	0	0	0	0	0	0.03	0.07	0.15	0.3	0.66	2.1	6.88	23.27	59.95	92.48	97.18	97.87	98.03	99.93
FL-BOEM-2015-VC16 S#2	-63.4	9.4	3.4	2.55	0.17	2.47	0.18	0.60	0.66	2.49	10.00	0	0	0	0	0.08	0.08	0.08	0.16	0.3	0.39	0.57	0.99	1.96	4.71	13.94	46.25	85.06	95.76	96.9	97.51	99.93
FL-BOEM-2015-VC16 S#3	-63.8	9.8	0.4	2.71	0.15	2.53	0.17	0.64	0.64	15.92	12.00	0	0	0	0	0	0	0	0.02	0.05	0.17	0.34	0.75	1.94	4.59	11.41	39.89	63.93	81.42	83.36	84.08	99.93
FL-BOEM-2015-VC16 S#4	-64.2	10.2	0.4	1.88	0.27	1.52	0.35	1.41	0.38	2.72	20.00	0	0	0.89	2.01	2.71	3.21	3.89	5.49	6.93	8.5	10.6	14.53	25.28	38.26	53.86	74.99	90.33	96.07	96.96	97.28	99.92
FL-BOEM-2015-VC16 S#5	-68.6	14.6	4.4	2.54	0.17	2.43	0.19	0.90	0.54	4.32	11.00	0	0	0.91	0.91	1.29	1.29	1.33	1.51	1.63	1.75	1.92	2.15	2.73	4.35	9.68	47.53	80.29	93.56	95.17	95.68	99.98
FL-BOEM-2015-VC16 S#6	-69.0	15.0	0.4	2.76	0.15	2.57	0.17	0.80	0.57	7.97	14.00	0	0	0	0	0.06	0.14	0.25	0.62	0.75	1.12	1.62	2.48	4.26	6.44	11.76	31.92	66.89	88.53	91.21	92.03	99.86
FL-BOEM-2015-VC16 S#7	-70.5	16.5	1.5	0.85	0.55	0.83	0.56	1.47	0.36	5.60	31.00	0	0	0.56	1.36	3.34	3.77	4.5	6.13	9.12	13.76	22.93	36.77	55.46	63.97	71.17	80.09	89.01	93.57	94.19	94.4	99.98
FL-BOEM-2015-VC16 S#8	-71.3	17.3	0.8	2.75	0.15	2.33	0.20	1.15	0.45	7.56	21.00	0	0	0	0	0.31	0.41	0.43	0.83	1.75	3.37	6.05	8.82	13.33	16.58	21.8	34.22	66.34	88.74	91.66	92.44	99.98
FL-BOEM-2015-VC16 Composite			**17.3**	**2.44**	**0.18**	**2.24**	**0.21**	**0.95**	**0.52**	**3.75**	**11.57**	**0.00**	**0.00**	**0.30**	**0.40**	**0.71**	**0.77**	**0.86**	**1.14**	**1.55**	**2.15**	**3.26**	**4.98**	**7.96**	**11.87**	**22.23**	**53.89**	**85.11**	**94.69**	**95.88**	**96.28**	**99.95**
FL-BOEM-2015-VC17 S#1	-55.8	1.6	1.6	2.33	0.20	2.14	0.23	0.98	0.51	1.74	9.00	0	0	0	0.43	0.78	1.02	1.23	2.02	2.91	3.8	4.73	5.71	7.51	10.6	22.41	63.77	93.09	97.44	98.06	98.26	99.97
FL-BOEM-2015-VC17 S#2	-56.7	2.5	0.9	2.43	0.19	2.26	0.21	0.86	0.55	2.57	9.00	0	0	0	0	0.22	0.28	0.57	1.39	2.1	2.81	3.72	4.61	6.13	8.56	16.15	55.14	92.66	96.48	97.15	97.43	99.95
FL-BOEM-2015-VC17 Composite			**2.5**	**2.37**	**0.19**	**2.18**	**0.22**	**0.94**	**0.52**	**2.04**	**9.00**	**0.00**	**0.00**	**0.00**	**0.28**	**0.58**	**0.75**	**0.99**	**1.79**	**2.62**	**3.44**	**4.37**	**5.31**	**7.01**	**9.87**	**20.16**	**60.66**	**92.94**	**97.09**	**97.73**	**97.96**	**99.96**
FL-BOEM-2015-VC18 S#1	-60.6	3.3	3.3	2.09	0.23	1.79	0.29	1.02	0.49	1.43	14.00	0	0	0	0	0.52	0.6	0.76	1.38	2.4	3.65	5.75	8.85	19.67	29.16	44.33	75.34	95.51	98.22	98.47	98.57	99.99
FL-BOEM-2015-VC18 S#2	-64.4	7.1	3.8	2.63	0.16	2.54	0.17	0.61	0.66	2.31	8.00	0	0	0	0	0.13	0.13	0.13	0.2	0.32	0.6	0.89	1.33	2.29	3.8	9.56	38.09	82.8	96.1	97.36	97.69	99.97
FL-BOEM-2015-VC18 S#3	-67.8	10.5	3.4	2.62	0.16	2.52	0.17	0.59	0.66	3.24	8.00	0	0	0	0	0	0	0	0.07	0.24	0.54	0.87	1.21	1.82	3.76	10.68	39.63	83.36	94.94	96.34	96.76	100.00
FL-BOEM-2015-VC18 S#4	-70.7	13.4	2.9	2.83	0.14	2.69	0.15	0.74	0.60	5.37	10.00	0	0	0	0	0	0.15	0.15	0.47	0.98	1.54	1.96	2.32	2.84	4.15	7.95	20.9	64.99	91.6	94.05	94.63	99.94
FL-BOEM-2015-VC18 Composite			**13.4**	**2.58**	**0.17**	**2.38**	**0.19**	**0.83**	**0.56**	**2.99**	**9.91**	**0.00**	**0.00**	**0.00**	**0.00**	**0.16**	**0.22**	**0.26**	**0.52**	**0.95**	**1.54**	**2.31**	**3.37**	**6.57**	**10.11**	**18.06**	**43.93**	**82.22**	**95.35**	**96.66**	**97.01**	**99.98**

SAMPLE I. D.	ELEVATION (NAVD 88 FT)	DEPTH (FT)	EFFECTIVE LENGTH (FT)	PHI MEDIAN	mm MEDIAN	PHI MEAN	mm MEAN	PHI SORTING	mm SORTING	% SILT	% Carbonate	PHI SIZES -4.25	-4.0	-3.50	-3.0	-2.50	-2.25	-2.0	-1.5	-1.0	-0.5	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	3.75	4.00	PAN
FL-BOEM-2015-VC19 S#1	-53.7	4.1	4.1	2.32	0.20	2.24	0.21	0.62	0.65	1.35	5.00	0	0	0	0	0	0	0.03	0.25	0.55	0.9	1.64	2.53	4.08	6.71	18.61	68.31	96.55	98.41	98.58	98.65	100.00
FL-BOEM-2015-VC19 S#2	-54.2	4.6	0.5	2.03	0.24	1.13	0.46	1.82	0.28	1.45	31.00	0	0	0.26	1.2	6.51	8.83	11.1	14.05	18.55	21.24	24.53	28	32.28	36.85	47.91	78.65	96.65	98.24	98.45	98.55	99.99
FL-BOEM-2015-VC19 S#1	-56.6	7.0	2.4	2.32	0.20	2.24	0.21	0.62	0.65	1.35	5.00	0	0	0	0	0	0	0.03	0.25	0.55	0.9	1.64	2.53	4.08	6.71	18.61	68.31	96.55	98.41	98.58	98.65	100.00
FL-BOEM-2015-VC19 S#3	-58.8	9.2	2.2	2.43	0.19	2.34	0.20	0.71	0.61	2.66	6.00	0	0	0	0	0.17	0.28	0.37	0.87	1.42	1.96	2.32	2.74	3.37	4.37	10.52	56.66	93.67	96.76	97.17	97.34	99.96
FL-BOEM-2015-VC19 S#2	-59.3	9.7	0.5	2.03	0.24	1.13	0.46	1.82	0.28	1.45	31.00	0	0	0.26	1.2	6.51	8.83	11.1	14.05	18.55	21.24	24.53	28	32.28	36.85	47.91	78.65	96.65	98.24	98.45	98.55	99.99
FL-BOEM-2015-VC19 S#1	**-62.4**	12.8	3.1	2.32	0.20	2.24	0.21	0.62	0.65	1.35	5.00	0	0	0	0	0	0	0.03	0.25	0.55	0.9	1.64	2.53	4.08	6.71	18.61	68.31	96.55	98.41	98.58	98.65	100.0
FL-BOEM-2015-VC19 Composite			**12.8**	**2.32**	**0.20**	**2.17**	**0.22**	**0.85**	**0.55**	**1.58**	**7.20**	**0.00**	**0.00**	**0.02**	**0.09**	**0.54**	**0.74**	**0.95**	**1.43**	**2.11**	**2.67**	**3.55**	**4.56**	**6.16**	**8.66**	**19.51**	**67.12**	**96.06**	**98.11**	**98.33**	**98.42**	**99.99**
FL-BOEM-2015-VC23 S#1	-50.8	4.8	4.8	2.24	0.21	2.12	0.23	0.74	0.60	1.38	7.00	0	0	0	0	0.46	0.63	0.7	1.15	1.68	2.38	2.94	3.36	4.14	6.74	21.06	82.02	95.77	98.25	98.49	98.62	99.93
FL-BOEM-2015-VC23 S#2	-53.7	7.7	2.9	2.41	0.19	2.41	0.19	0.68	0.62	3.01	6.00	0	0	0	0	0.08	0.17	0.22	0.45	0.96	1.44	1.88	2.21	2.6	3.57	7.89	59.32	83.68	95.22	96.51	96.99	99.97
FL-BOEM-2015-VC23 Composite			**7.7**	**2.30**	**0.20**	**2.23**	**0.21**	**0.74**	**0.60**	**1.99**	**6.62**	**0.00**	**0.00**	**0.00**	**0.00**	**0.32**	**0.46**	**0.52**	**0.89**	**1.41**	**2.03**	**2.54**	**2.93**	**3.56**	**5.55**	**16.10**	**73.47**	**91.22**	**97.11**	**97.74**	**98.01**	**99.95**
FL-BOEM-2015-VC25 S#1	-48.7	2.8	2.8	2.29	0.20	2.22	0.21	0.62	0.65	2.17	5.00	0	0	0	0	0	0.05	0.11	0.42	0.76	1.13	1.64	2.16	3.21	6.34	17.97	73.99	94.14	97.34	97.68	97.83	100.00
FL-BOEM-2015-VC25 S#2	-49.9	4.0	1.2	2.59	0.17	2.37	0.19	0.87	0.55	8.29	9.00	0	0	0	0	0.26	0.39	0.5	1.12	1.72	2.34	3.01	3.8	5.16	7.82	13.27	42.95	81.83	89.62	90.85	91.71	99.97
FL-BOEM-2015-VC25 Composite			**4.0**	**2.35**	**0.20**	**2.26**	**0.21**	**0.70**	**0.62**	**4.03**	**6.21**	**0.00**	**0.00**	**0.00**	**0.00**	**0.08**	**0.15**	**0.23**	**0.63**	**1.05**	**1.50**	**2.06**	**2.66**	**3.80**	**6.79**	**16.54**	**64.57**	**90.40**	**95.00**	**95.61**	**95.97**	**99.99**
FL-BOEM-2015-VC26 S#1	-47.1	5.0	5.0	2.67	0.16	2.54	0.17	0.67	0.63	1.52	5.00	0	0	0	0	0.14	0.17	0.29	0.41	0.75	1.25	1.73	2.25	2.79	3.98	8	31.9	86.41	97.64	98.31	98.48	99.90
FL-BOEM-2015-VC26 S#2	-48.1	6.0	1.0	2.18	0.22	1.83	0.28	1.17	0.44	1.53	21.00	0	0	0	0	0.27	0.47	0.71	1.5	3.05	6.05	9.73	13.94	18.58	28.84	41.77	64.18	92.21	97.97	98.26	98.47	99.89
FL-BOEM-2015-VC26 S#1	-52.1	10.0	4.0	2.67	0.16	2.54	0.17	0.67	0.63	1.52	5.00	0	0	0	0	0.14	0.17	0.29	0.41	0.75	1.25	1.73	2.25	2.79	3.98	8	31.9	86.41	97.64	98.31	98.48	99.90
FL-BOEM-2015-VC26 S#3	-54.2	12.1	2.1	2.79	0.14	2.66	0.16	0.76	0.59	3.33	8.00	0	0	0	0.26	0.36	0.36	0.36	0.52	0.89	1.35	1.9	2.68	3.53	4.78	7.35	19.24	72.42	94.79	96.23	96.67	99.91
FL-BOEM-2015-VC26 S#4	-55.3	13.2	1.1	2.8	0.14	2.55	0.17	1.11	0.46	3.87	11.00	0	0	0.38	0.68	1.02	1.45	1.85	2.31	3.13	4.05	5.19	5.87	6.72	7.74	9.66	17.45	70.89	93.95	95.6	96.13	99.96
FL-BOEM-2015-VC26 S#5	-56.3	14.2	1.0	2.06	0.24	1.16	0.45	2.03	0.24	3.06	42.00	0	0	2.68	4.15	6.41	7.4	8.98	12.56	16.63	22.63	28.98	33.44	40.36	46.46	49.31	54.71	80.03	95.46	96.55	96.94	99.93
FL-BOEM-2015-VC26 S#6	-59.1	17.0	2.8	3.09	0.12	2.87	0.14	0.83	0.56	7.1	7.00	0	0	0	0.19	0.31	0.51	0.64	0.84	1.17	1.61	2.08	2.62	3.51	4.42	5.78	10.55	41.42	88.1	91.84	92.9	99.99
FL-BOEM-2015-VC26 Composite			**17.0**	**2.72**	**0.15**	**2.48**	**0.18**	**0.99**	**0.50**	**2.91**	**9.21**	**0.00**	**0.00**	**0.18**	**0.35**	**0.63**	**0.78**	**0.99**	**1.40**	**2.06**	**3.04**	**4.11**	**5.12**	**6.39**	**8.36**	**12.08**	**29.13**	**76.23**	**95.37**	**96.71**	**97.09**	**99.92**
FL-BOEM-2015-VC27 S#1	-48.4	4.0	4.0	2.37	0.19	2.27	0.21	0.74	0.60	1.36	6.00	0	0	0	0	0.24	0.24	0.24	0.67	1.1	1.76	2.54	3.43	4.92	7.82	15.11	62.56	93.21	98.13	98.48	98.64	100.00
FL-BOEM-2015-VC27 S#2	-49.6	5.2	1.2	2.52	0.17	2.15	0.23	1.17	0.44	2	13.00	0	0	0	0.3	0.52	0.78	1.16	2.45	4.06	5.81	7.5	9.03	11.38	15.55	23.75	48.89	85.55	96.9	97.76	98	100.00
FL-BOEM-2015-VC27 S#3	-52.2	7.8	2.6	2.57	0.17	2.4	0.19	0.86	0.55	1.96	9.00	0	0	0	0	0.16	0.3	0.4	1.16	1.99	2.93	3.68	4.33	5.22	6.62	9.88	43.88	87.14	96.78	97.65	98.04	100.00
FL-BOEM-2015-VC27 S#4	-53.0	8.6	0.8	2.47	0.18	2.28	0.21	0.94	0.52	5.07	9.00	0	0	0	0	0.48	0.48	0.69	1.38	2.06	3.06	4.1	5.32	7.14	9.63	14.41	52.2	84.28	93.73	94.58	94.93	99.91
FL-BOEM-2015-VC27 S#5	-53.7	9.3	0.7	2.63	0.16	2.47	0.18	0.82	0.57	1.83	9.00	0	0	0	0	0	0	0.12	0.3	0.73	1.49	2.2	3.07	3.76	4.95	6.64	10.38	38.12	82.32	97.03	97.92	98.17	99.95
FL-BOEM-2015-VC27 S#6	-54.5	10.1	0.8	2.39	0.19	1.88	0.27	1.51	0.35	1.76	24.00	0	0	0	0.46	2.17	2.94	4.01	6.29	9.01	11.29	13.7	15.64	18.27	20.93	25.21	57.28	85.09	97.2	97.99	98.24	99.99
FL-BOEM-2015-VC27 S#7	-55.7	11.3	1.2	2.09	0.23	1.53	0.35	1.51	0.35	4.38	16.00	0	0	0	0.58	1.45	1.97	2.66	3.64	5.03	7.53	13.49	25.95	40.63	46.55	48.69	55.69	79.4	94.17	95.05	95.62	99.90
FL-BOEM-2015-VC27 Composite			**11.3**	**2.45**	**0.18**	**2.20**	**0.22**	**1.04**	**0.49**	**2.21**	**10.17**	**0.00**	**0.00**	**0.00**	**0.13**	**0.52**	**0.70**	**0.93**	**1.74**	**2.69**	**3.87**	**5.43**	**7.64**	**10.57**	**13.46**	**18.76**	**53.46**	**87.65**	**96.82**	**97.50**	**97.79**	**99.98**
FL-BOEM-2015-VC28 S#1	-52.0	8.0	8.0	2.41	0.19	2.26	0.21	0.88	0.54	1.6	9.00	0	0	0	0	0.15	0.18	0.26	0.82	1.44	2.69	4.18	5.68	7.57	10.18	15.93	57.7	89.37	97.34	98.07	98.4	99.95
FL-BOEM-2015-VC28 S#2	-53.3	9.3	1.3	0.99	0.50	0.89	0.54	1.5	0.35	5.32	31.00	0	0	0.33	0.55	1.97	2.76	3.57	7.03	10.84	16.6	24.84	35.58	50.21	60.85	67.56	78.23	89.98	93.98	94.47	94.68	99.98
FL-BOEM-2015-VC28 S#3	-53.7	9.7	0.4	2.73	0.15	2.53	0.17	0.86	0.55	6.07	9.00	0	0	0	0	0.24	0.36	0.59	1.2	1.74	2.32	2.91	3.66	4.74	5.98	8.38	27.35	77.1	91.79	93.25	93.93	99.97
FL-BOEM-2015-VC28 S#4	-54.0	10.0	0.3	2.68	0.16	2.21	0.22	1.44	0.37	4.05	17.00	0	0	0.51	1.45	2.76	3.12	3.73	4.89	6.03	7.35	8.54	10.39	12.45	14.73	18.42	37.45	72.57	93.92	95.22	95.95	99.78
FL-BOEM-2015-VC28 S#5	-54.4	10.4	0.4	2.47	0.18	0.98	0.51	2.44	0.18	6.9	38.00	0	2.7	8.02	10.83	12.6	14.84	16.47	20.53	23.68	26.75	29.58	32.64	35.9	38.09	40.75	50.5	76.98	90.67	92.41	93.1	99.99
FL-BOEM-2015-VC28 Composite			**10.4**	**2.38**	**0.19**	**2.05**	**0.24**	**1.19**	**0.44**	**2.51**	**13.10**	**0.00**	**0.10**	**0.36**	**0.53**	**0.94**	**1.16**	**1.41**	**2.49**	**3.61**	**5.47**	**7.82**	**10.51**	**14.02**	**17.56**	**23.12**	**58.24**	**88.01**	**96.35**	**97.13**	**97.49**	**99.95**
B13-3 S#1	-50.3	1.9	1.9	1.81	0.29	1.62	0.33	0.95	0.52	0.16	24.50	0	0	0.25	0.25	0.54	0.54	1.08	1.84	2.69	4.24	6.29	9.29	16.39	31.34	61.26	90.82	98.95	99.71	99.83	99.84	99.9
B13-3 S#2		4.7	2.8	2.00	0.25	1.78	0.29	0.89	0.54	0.38	15.50	0	0	0	0.1	0.24	0.24	0.54	1.24	2.01	3.32	4.86	7.29	12.86	25.63	49.96	87.95	97.4	99.22	99.48	99.62	99.8
B13-3 S#3		7.9	3.3	1.81	0.29	1.59	0.33	1.02	0.49	0.46	21.80	0	0	0	0.14	0.49	0.49	1.53	2.24	3.3	5.03	7.39	10.75	18.59	34.59	59.33	88.36	98.03	99.18	99.46	99.54	99.82
B13-3 S#4		10.4	2.5	2.12	0.23	1.97	0.26	0.75	0.59	0.55	14.50	0	0	0	0	0.08	0.08	0.2	0.5	0.81	1.66	2.63	4.09	7.81	18.43	39.39	82.33	97.08	98.85	99.2	99.45	99.89
B13-3 S#5		11.3	0.9	2.22	0.21	1.94	0.26	1.04	0.49	0.64	18.70	0	0	0	0	0.16	0.16	0.68	1.51	2.64	4.75	7.13	9.65	13.73	20.92	34.47	69.28	95.45	98.54	99.15	99.36	99.91
B13-3 Composite			**11.3**	**1.98**	**0.25**	**1.76**	**0.30**	**0.93**	**0.52**	**0.44**	**18.86**	**0.00**	**0.00**	**0.04**	**0.11**	**0.32**	**0.32**	**0.85**	**1.49**	**2.28**	**3.71**	**5.52**	**8.10**	**14.05**	**27.20**	**50.98**	**85.82**	**97.62**	**99.15**	**99.44**	**99.58**	**99.85**
B13-4 S#1	-55.1	2.2	2.2	2.29	0.20	2.21	0.22	0.75	0.59	0.10	7.1.	0	0	0.28	0.45	0.74	0.74	0.85	1.23	1.52	1.93	2.49	3.05	3.79	5.27	11.56	78.65	97.22	99.57	99.82	99.9	99.95
B13-4 S#2		5	2.9	2.41	0.19	2.22	0.21	0.96	0.51	1.29	8.90	0	0	0	0	0.42	0.42	0.73	1.14	2.19	3.81	5.27	6.61	8.02	10.4	19.15	56.49	89.86	97.08	98.33	98.71	99.87
B13-4 Composite			**5.0**	**2.34**	**0.20**	**2.22**	**0.21**	**0.88**	**0.54**	**0.78**	**5.07**	**0.00**	**0.00**	**0.12**	**0.19**	**0.56**	**0.56**	**0.78**	**1.18**	**1.90**	**3.00**	**4.07**	**5.08**	**6.20**	**8.19**	**15.89**	**66.02**	**93.02**	**98.15**	**98.97**	**99.22**	**99.90**
FL-BOEM-2015-VC27			11.3	2.45	0.18	2.20	0.22	1.04	0.49	2.21	10.17	0.00	0.00	0.00	0.13	0.52	0.70	0.93	1.74	2.69	3.87	5.43	7.64	10.57	13.46	18.76	53.46	87.65	96.82	97.50	97.79	99.98
FL-BOEM-2015-VC28			10.4	2.38	0.19	2.05	0.24	1.19	0.44	2.51	13.10	0.00	0.10	0.36	0.53	0.94	1.16	1.41	2.49	3.61	5.47	7.82	10.51	14.02	17.56	23.12	58.24	88.01	96.35	97.13	97.49	99.95
NA8-R010 Composite			**21.7**	**2.42**	**0.19**	**2.13**	**0.23**	**1.12**	**0.46**	**2.35**	**11.57**	**0.00**	**0.05**	**0.17**	**0.32**	**0.72**	**0.92**	**1.16**	**2.10**	**3.13**	**4.64**	**6.57**	**9.02**	**12.22**	**15.42**	**20.85**	**55.75**	**87.82**	**96.60**	**97.33**	**97.65**	**99.97**
FL-BOEM-2015-VC16			17.3	2.44	0.18	2.24	0.21	0.95	0.52	3.75	11.57	0.00	0.00	0.30	0.40	0.71	0.77	0.86	1.14	1.55	2.15	3.26	4.98	7.96	11.87	22.23	53.89	85.11	94.69	95.88	96.28	99.95
FL-BOEM-2015-VC17			2.5	2.37	0.19	2.18	0.22	0.94	0.52	2.04	9.00	0.00	0.00	0.00	0.28	0.58	0.75	0.99	1.79	2.62	3.44	4.37	5.31	7.01	9.87	20.16	60.66	92.94	97.09	97.73	97.96	99.96
FL-BOEM-2015-VC18			13.4	2.58	0.17	2.38	0.19	0.83	0.56	2.99	9.91	0.00	0.00	0.00	0.00	0.16	0.22	0.26	0.52	0.95	1.54	2.31	3.37	6.57	10.11	18.06	43.93	82.22	95.35	96.66	97.01	99.98
FL-BOEM-2015-VC19			12.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.20	0.00	0.00	0.02	0.09	0.54	0.74	0.95	1.43	2.11	2.67	3.55	4.56	6.16	8.66	19.51	67.12	96.06	98.11	98.33	98.42	99.99
SJ7-R093 Composite			**46.0**	**2.43**	**0.19**	**2.26**	**0.21**	**0.89**	**0.54**	**2.82**	**9.73**	**0.00**	**0.00**	**0.12**	**0.19**	**0.50**	**0.60**	**0.72**	**1.07**	**1.59**	**2.19**	**3.12**	**4.41**	**7.00**	**10.36**	**20.15**	**55.04**	**87.74**	**95.97**	**96.89**	**97.18**	**99.97**
B13-3			11.3	1.98	0.25	1.76	0.30	0.93	0.52	0.44	18.86	0.00	0.00	0.04	0.11	0.32	0.32	0.85	1.49	2.28	3.71	5.52	8.10	14.05	27.20	50.98	85.82	97.62	99.15	99.44	99.58	99.85
B13-4			5.0	2.34	0.20	2.22	0.21	0.88	0.54	0.78	5.07	0.00	0.00	0.12	0.19	0.56	0.56	0.78	1.18	1.90	3.00	4.07	5.08	6.20	8.19	15.89	66.02	93.02	98.15	98.97	99.22	99.90
VO6-R179 Composite			**16.3**	**2.12**	**0.23**	**1.90**	**0.27**	**0.94**	**0.52**	**0.53**	**14.63**	**0.00**	**0.00**	**0.07**	**0.13**	**0.39**	**0.39**	**0.83**	**1.39**	**2.16**	**3.49**	**5.07**	**7.17**	**11.64**	**21.37**	**40.22**	**79.75**	**96.21**	**98.85**	**99.30**	**99.47**	**99.87**
FL-BOEM-2015-VC03			17.9	1.11	0.46	0.69	0.62	1.48	0.36	2.60	76.46	0.00	0.00	2.11	3.85	5.52	6.29	7.73	9.62	12.47	16.58	23.24	32.34	45.74	64.40	84.71	94.30	96.48	96.97	97.22	97.40	99.97
FL-BOEM-2015-VC04			14.6	1.15	0.45	1.00	0.50	1.15	0.45	2.56	55.89	0.00	0.00	0.00	0.13	0.27	0.39	0.52	1.08	1.92	5.58	16.37	28.85	43.19	65.58	85.58	93.93	96.66	97.19	97.34	97.44	99.97
IR7-R214 Composite			**32.5**	**1.13**	**0.5**	**0.83**	**0.56**	**1.29**	**0.41**	**2.58**	**67.22**	**0.00**	**0.00**	**1.16**	**2.18**	**3.16**	**3.64**	**4.49**	**5.79**	**7.73**	**11.64**	**20.15**	**30.77**	**44.59**	**64.93**	**85.10**	**94.13**	**96.56**	**97.07**	**97.28**	**97.42**	**99.97**

APPENDIX R

Study Area and Preliminary Borrow Area Shapefile for ROSSI (Digital Only)