Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:

AFSC/RACE/GAP/McConnaughey: Dabob Bay USBL planned survey line

1.2. Summary description of the data:

The trials were conducted in Dabob Bay, Washington, in May 1998. The main objective of these trials was to determine an accurate and reliable system to track a fishing trawl. Three USBL vendors were invited and agreed to participate in the trials. Nautronix Ltd. (Nautronix) provided their ATS II system, Simrad Subsea A/S (Simrad) provided their ITI system, and Ocean Research Equipment, Inc. (ORE) submitted their Trackpoint II Plus system. A local ORE distributor, MECCO, Inc. (MECCO), provided and operated the Trackpoint II Plus system. The U.S. Navy?s fixed, underwater tracking range in Dabob Bay, operated by the Naval Undersea Warfare Center (NUWC) Division ? Keyport, Washington, was also used in these trials. The range was used to provide simultaneous sub-sea positioning of the fishing trawl and to serve as a benchmark for system evaluations. The U.S. Navy also provided surface navigation support for the fishing vessel during these trials. The vessel selected by AFSC to conduct these trawls was the F/V Vesteraalen. It is 124 feet long, has a beam of 32 feet, and a draft of 18 feet. The F/V VESTERAALEN has a single, fixed-pitch propeller with a nozzle. By design, the vessel is like most in-shore trawlers and has, in fact, operated in Alaska in the past. The tests were conducted using NMFS otter trawls, typically used in Alaskan waters. A trial schedule was developed that would provide each vendor with three days to mobilize and test their systems. Each vendor?s equipment was attached to the fishing trawl, along with the U.S. Navy tracking gear. Both the U.S. Navy and the USBL vendor collected simultaneous trawl position data as determined by their respective equipment, with the trawl being dragged on the bottom along a predetermined track. The main objective of these trials was to assess the accuracy of each vendor?s equipment. This was accomplished using a statistical comparison between each vendor?s data and the U. S. Navy?s data that were observed simultaneously. This report details the results of these trials and summarizes the comparison results. It also contains details of the equipment and the methodologies used to collect and analyze the data. As a result of the data analysis, conclusions were drawn and recommendations have been included in this report.

1.3. Is this a one-time data collection, or an ongoing series of measurements?
One-time data collection

1.4. Actual or planned temporal coverage of the data:
1998-05-20 to 1998-05-30

1.5. Actual or planned geographic coverage of the data:
W: -122.845964, E: -122.842347, N: 47.755749, S: 47.745937

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)
Map (digital)

1.7. Data collection method(s):
(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:
Steve Intelmann

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:

2.4. E-mail address:
steve.intelmann@noaa.gov

2.5. Phone number:
(206) 526-4157

3. Responsible Party for Data Management
Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:
Bob McConnaughey

3.2. Title:

Data Steward

4. Resources

Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

No

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

Unknown

5. Data Lineage and Quality

NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible

(describe or provide URL of description):

Process Steps:

- 1998-05-20 00:00:00 - The U.S. Navy also provided a shipboard DGPS system and differential corrections during these trials. To supplement this UHF differential correction source, RTCM (as it is termed by the Radio Telecommunication Committee Marine) Coast Guard differential corrections were available from Coast Guard beacon 274. Due to the fact that the U.S. Navy corrections were not initially received at the vessel, Coast Guard corrections were used for the entire test, which did not degrade the accuracy of the navigation. The RTCM data were input into a GPS receiver which, in turn, output differentially corrected positions to a personal computer (PC) running a navigation software package called PC Range Graphics (PCRG), supplied by the U.S. Navy. PCRG provided the navigational data necessary for the helmsman to steer the vessel along the desired track. It also showed the trawl track, as determined by the U.S. Navy?s 75kHz pinger. The U.S. Navy also provided two-way radios, which permitted communication between the vessel and the range personnel on the beach. These personnel were responsible for controlling the range and logged the range data. The accuracy of a differentially corrected position, as provided by the U.S. Navy, was 3 meters. Differentially corrected positions (NMEA GGA messages) and UTC time stamps (NMEA ZDA messages) were output from the GPS receiver to each vendor?s equipment in the equipment room. In addition, the stepper output from the Sperry MK37 gyro was sent from the bridge to a Lehmkuhl digital gyro repeater located in the equipment room. The purpose of this repeater was to convert the gyro data to a serial message that could be easily read by PC hardware. A Lehmkuhl LR40 repeater was initially installed, but it kept losing synchronization with the gyro and was later replaced with the newer Lehmkuhl LR60 repeater, provided by the U.S. Navy.
- 1998-05-20 00:00:00 - Auxiliary gear was attached to the trawl according to standard practice. Scanmar acoustic net mensuration gear provided real-time

information on net width and height, operating at 42.631 kHz (C2 spread), 42.024 kHz (C5 spread), 41.417 kHz (C2 height), and/or 41.690 kHz (C5 height) with a power rating of 185-186 dB reference 1 ?pa at 1 meter. A mechanical bottom contact sensor was attached to the footrope to identify on-bottom/off-bottom locations for determination of area swept by the trawl. A micro-bathythermograph was also attached to the trawl to record actual water temperature profiles.
- 2008-05-20 00:00:00 - A gyro calibration was conducted at the pier, prior to the commencement of any trawls. The gyro was calibrated by comparing observed gyro readings with the known azimuth of the dock. This calibration was later confirmed using the U.S. Navy?s DGPS system. Two points along the dock, 11.4m apart, were chosen as the baseline. The perpendicular distances from these points to the centerline of the vessel were measured at the same time the gyro was observed. A gyro correction of -4.7? was calculated. The first and second vendor applied this correction during their trawls, while the third vendor used a value of -0.5?. This value (-0.5?) was determined by comparing the observed vessel track and observed gyro heading, while the vessel steamed from the dock to the underwater tracking range. Despite the fact that the correction of -4.7? was confirmed on three separate days, a value of -0.9? was calculated on the fourth day. At the time, it was thought that this value was erroneous and was caused by a rapidly changing vessel heading, due to currents around the dock. The use of a repeater did not effect the calibration value, as it was the gyro that was calibrated not the repeater. After calibration, the repeater was adjusted to read the same heading as the gyro. The correction was applied to the USBL equipment; the gyro itself was not adjusted.
- 2008-05-20 00:00:00 - Two areas were initially selected as potential trawl sites for the purposes of these trials. They were selected, because they were thought to be similar to the areas in the Bering Sea, where the trawling impact studies would later be conducted. (See Figure 3) The main selection criteria were depth, slope, length of trawl, and absence of debris, such as boulders. The proposed primary area was rejected due to a gully in the center and the proposed secondary area was rejected due to boulders throughout much of the area. The area ultimately selected for the actual trawl did have a portion that was not covered by either Acoustic Array 01 or 02. However, there were no other alternatives and coverage was better than the theoretical range circles indicated. This area was characterized by hard, irregular bottom, which resulted in frequent damage to the trawl. All trawls were conducted within the indicated area in a southerly direction. While trawling, the helmsman attempted to steer the vessel along a straight line. When the locations of boulders were discovered the vessel was steered from its straight path on subsequent trawls to avoid these areas. The curved path of the trawl (See Appendix A) is due to these deviations and the natural track of the doors on the sloped bottom. The drag of the trawl also effected the path of the vessel making it difficult to follow a straight line.
- 2008-05-20 00:00:00 - Trawling began on May 19, 1998, with vendor number one, Nautronix. Several untracked trawls were initially made within the primary and secondary areas, described above, in an attempt to find an acceptable test area.

Next, underwater equipment was tested individually during a trawl. The first trawl was aborted before data could be recorded. Although the second trawl was recorded and was considered the vendor?s first trawl, the U.S. Navy system did not track well during this run. Initially, the U.S. Navy?s beacon was oriented to project down as it was thought that the trawls would be made in different directions. It was reoriented to project horizontally towards their hydrophones at the end of the first day. This improved the U.S. Navy?s data and the first accepted Nautronix trawl (number 2) was not processed, but is included in this report. Trawling continued on May 20 with the first vendor. It was noted that the gyro repeater differed from the gyro and had to be checked and adjusted for each trawl. Seven more acceptable trawls, numbered Trawl 3 through Trawl 9 were made for vendor number one. The ATS II was not affected by the ship?s echo sounder equipment. On May 21, the gyro repeater was replaced and equipment from the second vendor, Simrad, was mobilized. Trawling commenced and was completed on May 22. Eight trawls, numbered Trawl 14 through Trawl 21, were accepted for analysis. On the first trawl of the day, it was discovered that the depth sensor was not functioning. Since none of the other beacons were equipped with depth sensors, manual depths were entered for all subsequent trawls. The equipment of the third vendor, ORE, was mobilized on May 26. After mobilization, it was found that some interference in the USBL system was caused by the vessel?s echo sounders. The vessel had three echo sounders: Skipper CS116 operating at 50 kHz Simrad EQ155 operating at either 38 kHz or 50 kHz Simrad CF100/ED100 operating at 38 kHz All three produced some false returns in the Trackpoint II Plus system. The Skipper produced the most, while the Simrad EQ155 (operating at 50 kHz on the 40-fathom range) produced the least. Only the Simrad EQ155 (operating at 50 kHz on the 40-fathom range) was used during the trials. Eight trawls, numbered Trawl 28 through Trawl 35, were accepted for analysis. The sea state for all three vendors was calm with little wind and mild temperatures.

- 2008-05-20 00:00:00 - As mentioned previously, two sets of beacons were attached to the trawl during every trial run. The U.S. Navy?s, 75kHz beacon was always fixed to the trawl, while each vendor would also attach their beacon to the trawl during only their portion of the trials. The locations of all beacons used in these trials are indicated in Figure 2. The Nautronix beacon was moved after Trawl 2 from 4.6m aft of the U.S. Navy beacon to 5.2m aft. The Trackpoint II beacons were moved after Trawl 29 from 1.8 meters on either side of the U.S. Navy beacon to 4.6 meters on either side. The U.S. Navy beacon was mounted on a nylon board, such that its transducer projected horizontally towards the fixed acoustic range. The assembly was inserted into a pocket of net material, which was then sewn onto the top of the net. Additional nylon cord was used to tighten the pocket, which kept the assembly from twisting. The ATS II and Trackpoint II beacons are both cylindrical in shape. These were laid flat on top of the net with the transducer element pointing towards the vessel. A piece of netting was sewn tightly over the beacon to form a pocket. The ITI beacons are roughly rectangular in shape and are designed to attach to a trawl. These were attached to the head rope with shackles. Both

Nautronix and ORE moved their respective beacons after initial test runs to see if this improved tracking, there was no apparent change. At the end of the first day, U. S. Navy personnel also tilted their beacon to improve performance. The second ORE beacon was placed on the net in case the first failed.
- 2008-05-20 00:00:00 - The information below provides a brief description of each of the three USBL systems used in these trials. Although every effort has been made to preserve accuracy of data, this information is not intended to be a substitute for the manufacturer?s manuals and the reader is directed to the manufacturer for complete details. Nautronix provided their ATS II USBL system. It consisted of a master control unit, an omni-directional transducer head, a vertical reference unit, and a high-powered beacon. Spare beacons were also provided. These beacons also provided depth data using a telemetry string.The head of the ATS II system was calibrated at the dock in a static mode. This was accomplished through a comparison of calculated beacon positions with those measured locally. A beacon was lowered fore, aft, and port of the transducer and observations were compared on the control unit with the measured offsets. Pitch and roll corrections were also determined and applied for the hydrophone and for the vertical reference unit.The control unit was interfaced to the hydrophone, vertical reference unit, gyro (digital input), and integrated navigation software, WinFrog. WinFrog was used to combine the vessel position, gyro, and USBL data to produce the latitude and longitude of the beacon. The speed of sound, determined by vendor personnel from the U.S. Navy?s CTD data, was entered into the control unit. All raw data were logged. Simrad provided their Integrated Trawl Instrumentation (ITI) for these trials. It consisted of a control and display unit, a transducer head, and three net-mounted sensors. Each net sensor can be used to measure a range and bearing. Additionally, one or two other options can be selected from a list of approximately 12 features and added to the sensor when ordering. The three net sensors provided for the trial could measure depth, height, or catch in addition to the standard range and bearing. The transducer head had three transducers and covered an area of 100? horizontally and 40? vertically down from the horizontal. No head alignment calibration was conducted on the Simrad ITI. The monitor and control units were interfaced to the hydrophone, gyro (analog input), NMEA vessel position, and the Electronic Chart Company?s data-logging program, Globe. WinFrog was used to output the NMEA position of the hydrophone to the control unit using the U.S. Navy? s antenna position, because the ITI does not allow for antenna/hydrophone offsets. The ITI does not accept a sound velocity entry, but rather uses an operator-entered water temperature to determine its own velocity. Water temperatures were obtained from the CTD data. Prior to conducting official trawl tests, some test data were collected. These data contained the trawl position in NMEA GLL format, but lacked time. Furthermore, coordinates were recorded to only two decimal points of a minute of longitude and latitude. This represents a resolution of approximately 20 meters and caused problems in subsequent data processing. These problems could not be corrected in the field, but have since been addressed by the manufacturer. ORE provided their Trackpoint II Plus system, consisting of a

command and display module, a vertical reference unit, an omni-directional transducer head, and a high-powered beacon. Spare beacons were also provided. These beacons also provided depth data, using a telemetry string. The transducer head was calibrated at the dock in a static mode by a comparison of calculated beacon positions with those measured locally. The calibration was conducted by lowering a beacon fore, aft, and port of the transducer and comparing the observations on the control unit with the measured offsets. Pitch and roll corrections were also determined and applied for the hydrophone and the vertical reference unit. The control unit was interfaced to the hydrophone, vertical reference unit, gyro (analog input), flux gate compass (backup), and integra
- 2008-05-20 00:00:00 - The information below describes the research trawl and the trawl mensuration gear provided by the NMFS-AFSC. These items are standard gear and will be used in the upcoming experimental study of bottom trawl impacts on seafloor habitat. The NMFS-AFSC standard 83/112 Eastern bottom trawl was used for this study (RACEBASE gear code 44 - See Figure 1). This bottom trawl has been used for groundfish surveys in the eastern Bering Sea since 1982. Specific details concerning materials and dimensions are described below. The standard trawl was modified to improve capture efficiency and retention of smaller organisms, according to the research plan for the trawling impact study. These modifications (RACEBASE accessories code 122) included adding a tickler chain (half-inch, grade 30, polished proof coil chain), a hula skirt covering the footrope setback, and a 1.5? fine-mesh liner covering the entire bottom body, both bottom wings, and complete coverage of the intermediate and cod end.
- 2008-05-20 00:00:00 - A single hydrophone pole, to be used by all vendors, was designed and fabricated for the purpose of these trials. The final design was such that the hydrophone was situated two meters below the hull of the vessel. The pole was actually comprised of two sections, each constructed from schedule 80 steel. The top section was eight inches in diameter, pivoted approximately two meters from the top, and extended to the bottom of the hull. The bottom section was four inches in diameter and two meters long. Three bottom sections were constructed to accommodate each vendor?s hydrophone. Additionally, a semi-circular brace was welded to the hull of the vessel, just below the water line. A flange, which permitted the bolting of the pole to the gunnel, was located at the top of the pole. A faring, constructed of an ultra-high molecular weight (UHMW) polymer, was placed around the pole. The pole was bolted at the pivot point and no guy wire was used in the case of the first two vendors, Nautronix and Simrad. By the time the third vendor used the pole, it was found to knock steadily against the brace below the water line when travelling at 3 knots. Although the knocking occurred intermittently before, it was not considered serious enough by the first two vendors to warrant action. In the case of the third vendor, a guy wire was run forward and rubber was installed to make the pole fit snuggly into the brace. This eliminated all noticeable vibration.

5.1.1. If data at different stages of the workflow, or products derived from these

data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):
unknown

6. Data Documentation
The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?
No

6.1.1. If metadata are non-existent or non-compliant, please explain:
Missing/invalid information:
- 1.7. Data collection method(s)

6.2. Name of organization or facility providing metadata hosting:
NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:
https://www.fisheries.noaa.gov/inport/item/28015

6.4. Process for producing and maintaining metadata
(describe or provide URL of description):
Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf

7. Data Access
NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?
No

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

No

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

None

7.2. Name of organization of facility providing data access:

Alaska Fisheries Science Center (AFSC)

7.2.1. If data hosting service is needed, please indicate:

Yes

7.2.2. URL of data access service, if known:

https://access.afsc.noaa.gov/data-zips/32336_GAP_1998_USBL_proof_of_concept_Trawlex_98-other.zip

7.3. Data access methods or services offered:

unknown

7.4. Approximate delay between data collection and dissemination:

unknown

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

No delay

8. Data Preservation and Protection

The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:

(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

NCEI_MD

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):

Alaska Fisheries Science Center - Seattle, WA

8.3. Approximate delay between data collection and submission to an archive facility:

unknown

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

Discuss data back-up, disaster recovery/contingency planning, and off-site data storage

relevant to the data collection

IT Security and Contingency Plan for the system establishes procedures and applies to the functions, operations, and resources necessary to recover and restore data as hosted in the Western Regional Support Center in Seattle, Washington, following a disruption.

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.