Cruise Plan for Walrus Tagging Aboard the P/V Stimson
Bering Sea, April 2004

April 2, 2004

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OVERVIEW

The size and trend of the Pacific walrus population are unknown (U.S. Fish and Wildlife Service 2002). Efforts to survey the population were suspended after 1990 due to unresolved problems with survey methods, which produced population estimates with unacceptably large confidence intervals (Gilbert 1999). In 2000, the U.S. Fish and Wildlife Service (USFWS) and U.S. Geological Survey hosted a workshop to review past efforts to survey the Pacific walrus population and identify research priorities to refine survey methods (Garlich-Miller and Jay 2000). The workshop recommended investigating use of novel digital scanning technology to survey the population in early spring when walruses are distributed primarily on sea ice (Gilbert 1999) and when weather patterns are relatively stable (Garlich-Miller and Jay 2000).

USFWS Marine Mammals Management (MMM) successfully completed trial aerial surveys in 2002 and 2003 of new digital scanner technology (Marc Webber, pers. comm.). Analysis of weather patterns conducted for the workshop (Garlich-Miller and Jay 2000) and the experience of the trial surveys suggest that weather patterns, solar light cycles, and walrus distribution may be most conducive for aerial surveys in March and early April in the northern Bering Sea.

It is essential that an availability correction factor be developed for the aerial survey, because the aerial method prepared by MMM only counts walruses that are available to be seen while hauled out on sea ice. We propose to estimate the correction factor for walrus in the survey area by using telemetry and data-logging devices affixed to walruses in the sea ice just prior to an aerial survey.

We have pursued two approaches to affixing telemetry devices to walrus: capture and remote deployment. We have captured walruses through chemical immobilization techniques, but have found these techniques to be impractical for deploying large numbers of devices on walruses across the proposed aerial survey area (Mulcahy et al 2003). Over the past two years we have made progress in remotely deploying telemetry devices on walruses (Table 1).

Whale biologists have been able to remotely deploy telemetry devices on whales using methods resulting in long retention times (> 6 months, Mads-Peters Heide Jorgensen, Bruce Mate, pers. comm.). In addition to pursuing our line of tag designs, we are consulting with whale biologists to learn from their successes and possibly adapt their methodologies to walruses. Eskimo hunters have developed harpoon head technology that hold walrus fast. We are also collaborating with a knife-maker (John Johnston) with experience in producing harpoon heads for Eskimo marine mammal hunters.

This cruise is a pilot study intended to evaluate the capabilities of newly developed walrus tags and the capabilities of operating from an ice-hardened ship. A secondary objective will be to obtain skin biopsies from live animals for an ongoing genetics study. We will make initial efforts in obtaining data that can be used to account for the proportion of time walruses are unavailable for sighting during a future aerial survey. The sex and age composition of walrus herds will be surveyed in different regions to help evaluate sampling needs.

OVERALL GOAL

Develop a walrus tag that will provide the necessary data to estimate the sighting availability of walruses during an aerial survey.

CRUISE OBJECTIVES

(1) Obtain tagging experience in conditions expected during a future aerial survey.
(2) Deploy a few different tag designs to compare tag retention among designs.
(3) Deploy tags in two different geographic regions to compare estimates of haul-out cycle duration and proportion of time hauled-out between regions.
(4) Assess field sampling protocols for tag deployment.
(5) Assess differences in age and sex classes among geographic regions using age/sex composition surveys.
(6) Obtain tissue biopsies from live animals for ongoing walrus genetic studies.

DATA COLLECTION

Tagging

The route of the cruise will be determined by weather, ice conditions, distribution of walruses, and capabilities of the ship. We will travel from St. Paul Island to the southern ice margins between Nunivak Island, St. Matthew Island, and St. Lawrence Island. An aerial reconnaissance flight conducted the day before departure from St. Paul will direct the general course of the ship to areas of sea ice near the ice margin that are rich in walrus. Additional aerial reconnaissance flights will direct the ship to walrus herds. The ship will maneuver into the ice as far as the ship captain's prudence will permit. Research crews will approach individual walrus herds by skiff. Telemetry tags will be affixed to walruses with a crossbow or air gun. Three different telemetry devices have been built, each with a different transmitter housing and subdermal anchor (Table 2).

The proportion of time spent hauled out on ice may differ among walruses that expend varying times at foraging. A number of factors may affect foraging effort during spring, including regional differences in prey abundance, weather, and animal age, gender, and reproductive status (e.g. pregnant, lactating, non-pregnant, breeding). Potential geographic variation in haul-out times will be measured by deploying an equal number of transmitters (total transmitters = 35) in two regions in a random fashion among animals.

The two regions will be tentatively defined by a single longitudinal line based on existing ice conditions from ice charts available at the beginning of the cruise (eastern region = Area 1, western region = Area2). The boundary line may be adjusted later based on initial reconnaissance information on animal distributions. The first 2-3 days will be used by aerial reconnaissance in Area 1 to identify a few different aggregations of walruses that can be accessed by ship. The ship will transit to these areas and deploy a number of tags that is roughly proportional to the size of the aggregation. Once the ship is positioned within the aggregation, efforts will be made to deploy the transmitters among a few different groups in as random a fashion as possible, possibly allocating the number of transmitters proportional to group size.

Sex/age survey
Sex/age scoring of groups of animals will be conducted when possible after tagging and biopsy work has been completed on a given ice floe of animals. All scoring will be done from the ship, which offers a high vantage point from which to adequately view animals in the group.

Methods for scoring the age and sex of each animal is described in Fay and Kelly (1989). A walrus group is defined as walruses lying within one body length of one another. The ship will approach the group downwind very slowly and scoring will begin at a distance of roughly 500 m and continue until the group is scored or the animals flush from the floe.

Biopsy
Biopsies will be collected from live animals to augment ongoing genetic studies. Biopsies will be collected using crossbows and floating arrows with cutting heads. In some cases, retrieval lines will be attached to the arrows from a fishing reel so that the arrows can be retrieved in instances when the arrow may be difficult to retrieve with a dip net.

Each arrow will be numbered with an indelible marker and the arrow number will be recorded prior to shooting, along with pertinent information on the target animal (i.e. gender, approx. age, etc.). After an arrow is retrieved, the cutting head will be unscrewed from the arrow and placed into a whirl-pack with appropriate labeling. Tissue samples will be extracted from each cutting head after return to the ship and stored in viles pre-filled with tissue preservative.

Our sample needs are based on two ongoing genetic studies, one in which breeding adult males and females are compared between breeding aggregations, and a second in which we are investigating potential relatedness of individuals on ice floes. In the first instance we will want to target adult males and females across groups within regional breeding aggregations, similar to the regions defined for the tagging study (i.e. St. Lawrence Island polynya and Nunivak Island polynya). We will target for a minimum of 30 samples within each sex and region (total = 30x2x2 = 120). In the second instance, we will want to sample what we think might be first and second generation relationships between adult females, young (including calves), and adult males based on their behavior and proximity to one another on an ice floe. We will target a minimum of 30 family groups with potentially 3 animals per group (total = 90 samples).

Biopsy efforts will follow immediately after each tagging effort on a floe and as time permits. Priority will be given to the tagging efforts.

DATA STRUCTURE
See Appendix II and III.

DAILY OPERATIONS
Each day the aerial reconnaissance team will collect walrus and ice information over the prescribed study area. In the evening, the data will be transmitted to the ship over the internet in text format. On the ship, the data will be imported into a GIS database. Each morning, the

reconnaissance information from the previous evening and current weather and ice conditions will be assessed to plan the day's mission.

Two observers will be on duty scanning for walruses and recording incidental marine mammal sightings every day during daylight hours. A new set of observers will rotate on duty every 2 hours. Environmental data will be recorded in a log in the bridge upon commencement of each shift.

The first few days on walruses will be spent for biopsy training and initial tagging by the tagging crew (Chad, Tony, Mikkel, and Anders). A couple different configurations of personnel allocation will be possible (see below). In the first configuration, 4 scientific staff is assigned to each of the two skiffs, with 2 taggers and a set of tagging and biopsy gear in each skiff. The two skiffs can work independently whereby a floe is approached, tags are deployed, and then biopsy samples are collected. The ship will maintain an appropriate distance to avoid disturbance to the animals. In the second configuration, if the aggregation contains a large number of groups of walruses, and after an initial area has been sampled, four personnel from one skiff will board the ship and conduct age/sex scoring while following the other working skiff.

	Configuration 1
ship	none
skiff 1	4 personnel: tagging and biopsying
skiff 2	4 personnel: tagging and biopsying

	Configuration 2
ship	4 personnel: age/sex surveying
skiff 1	4 personnel: tagging and biopsying
skiff 2	none

Table 1. Efforts to develop remote deployment of telemetry devices for walruses in previous years by the Alaska Science Center.

Study Year	***Transmitters Deployed***	***Anchor Types***	***Walrus Substrate***	***Retention Times***
2002	Pop-up data logger with Satellite transmission upon release (n = 5)	Cylindrical toggle with stainless steel tether	Sea ice near Barrow, Alaska	1 to 5 days (n = 4)
2002	Surplus satellite transmitter, no data logging (n = 9)	Cylindrical toggle with reinforced stainless steel tether	Land haul-out in Bristol Bay (Cape Peirce)	0 to 5 days (n = 9)
2003	Satellite transmitter with conductivity data logger (n = 8)	Single barbed post	Land haul-out in Bristol Bay (Round Island)	0-13 days (mean = 6 d, n=5)
2003	Satellite transmitter with conductivity data logger (n = 8)	Twin barbed posts	Land haul-out in Bristol Bay (Cape Seniavin)	5-10 days (mean = 8 d, n=8)

Table 2. Telemetry devices planned for use on 2004 spring cruise.

Transmitter	***Housing***	***Anchor***	***Delivery***
Wildlife Computers (n = 10)	External cylinder attached by tether	Toggling harpoon with cutting head attached to heavy monofilament line.	Air gun
Wildlife Computers (n = 5)	Elongate rectangular box	Partially implantable	Air gun
Telonics (n = 20)	2”-dia. puck with center hole	Toggling harpoon head on single anchor post	Crossbow and air gun

REFERENCES

Fay, F.H. 1985. *Odobenus rosmarus*. Mammalian Species No. 238. *The American Society of Mammalogists*. 7 pp.

Fay, F.H., and B.P. Kelly. 1989. Development of a method for monitoring the productivity, survivorship, and recruitment of the Pacific walrus population. Final Report, OCSEAP Study MMS 89-0012. Minerals Management Service, Anchorage, AK 51 pp.

Garlich-Miller, J.L., and C.V. Jay (eds.). 2000. Proceedings of a workshop concerning walrus survey methods, Anchorage, Alaska, March 27-28, 2000. USFWS Technical Report MMM 00-2. 92 pp.

Gilbert, J. R. 1999. Review of previous Pacific walrus surveys to develop improved survey designs. Pages 75-84. *In:* Garner, G.W., S.C. Amstrup, J.L. Laake, B.F.J. Manly, L.L. McDonald, and D.G. Roberston (Editors). Marine Mammal Survey and Assessment Methods. Balkema, Rotterdam. 287 pp.

Jay, C.V., S.D. Farley, and G.W. Garner. 2001. Summer diving behavior of male walruses in Bristol Bay, Alaska. *Marine Mammal Science* 17(3):617-631.

Mulcahy, D. M., P. A. Tuomi, G. W. Garner, and C. V. Jay. 2003. Immobilization of free–ranging male Pacific walruses (*Odobenus rosmarus divergens*) with carfentanil citrate and naltrexone hydrochloride. *Marine Mammal Science* 19(4):846-850.

U.S. Fish and Wildlife Service. 2002. Pacific Walrus (*Odobenus rosmarus divergens*): Alaska Stock. Anchorage, Alaska. 6 pp.

Appendix I. Scientific staff for April 2004 cruise aboard P/V Stimson.

Field crew for April 2004 cruise aboard P/V Stimson.

Field Crew	***Contact Address***	***Emergency Contact***
Fischbach, Tony	U.S. Geological Survey Alaska Science Center 1011 East Tudor Road Anchorage, Alaska 99503 ph: (907) 786-3686 fax: (907) 786-3636 afischbach@usgs.gov	
Garlich-Miller, Joel	U.S. Fish and Wildlife Service 1011 East Tudor Road Anchorage Alaska 99503 ph: (907) 786-3828 fax: (907) 786-3816 Joel_Garlichmiller@fws.gov	
Jay, Chad	U.S. Geological Survey Alaska Science Center 1011 East Tudor Road Anchorage, Alaska 99503 ph: (907) 786-3856 fax: (907) 786-3636 chad_jay@usgs.gov	
Steven Kazlowski, Volunteer	U.S. Geological Survey Home: 206-706-7632 6201 15th Av NW #501 Seattle, WA 98107 www.lefteyepro.com	
Jensen, Mikkel	Gislingevej 2 Dk-4571 Grevinge Denmark ph: +45 5966 0083 fax: Same mikkelsvaerksted@mail.dk	

Field Crew	***Contact Address***	***Emergency Contact***
Jensen, Anders	P.O. Box 1081 Grand Anse St George's Grenada WI +1 473 443 3749 (home) +1 473 444 4684 (work) +1 473 409 2210 (cell)	
Quakenbush, Lori	Alaska Department of Fish and Game Division of Wildlife Conservation 1300 College Road Fairbanks, AK 99701-1599 ph: (907) 459-7214 fax: (907) 452-6410 lori_quakenbush@fishgame.state.ak.us	
Udevitz, Mark	U.S. Geological Survey Alaska Science Center 1011 East Tudor Road Anchorage, Alaska 99503 ph: (907) 786-3365 fax: (907) 786-3636 mark_udevitz@usgs.gov	
Webber, Marc (Aerial reconnaissance)	U.S. Fish and Wildlife Service 1011 East Tudor Road Anchorage Alaska 99503 ph: (907) 786-3479 fax: (907) 786-3816 Marc_Webber@fws.gov	

Appendix II. Data structure.

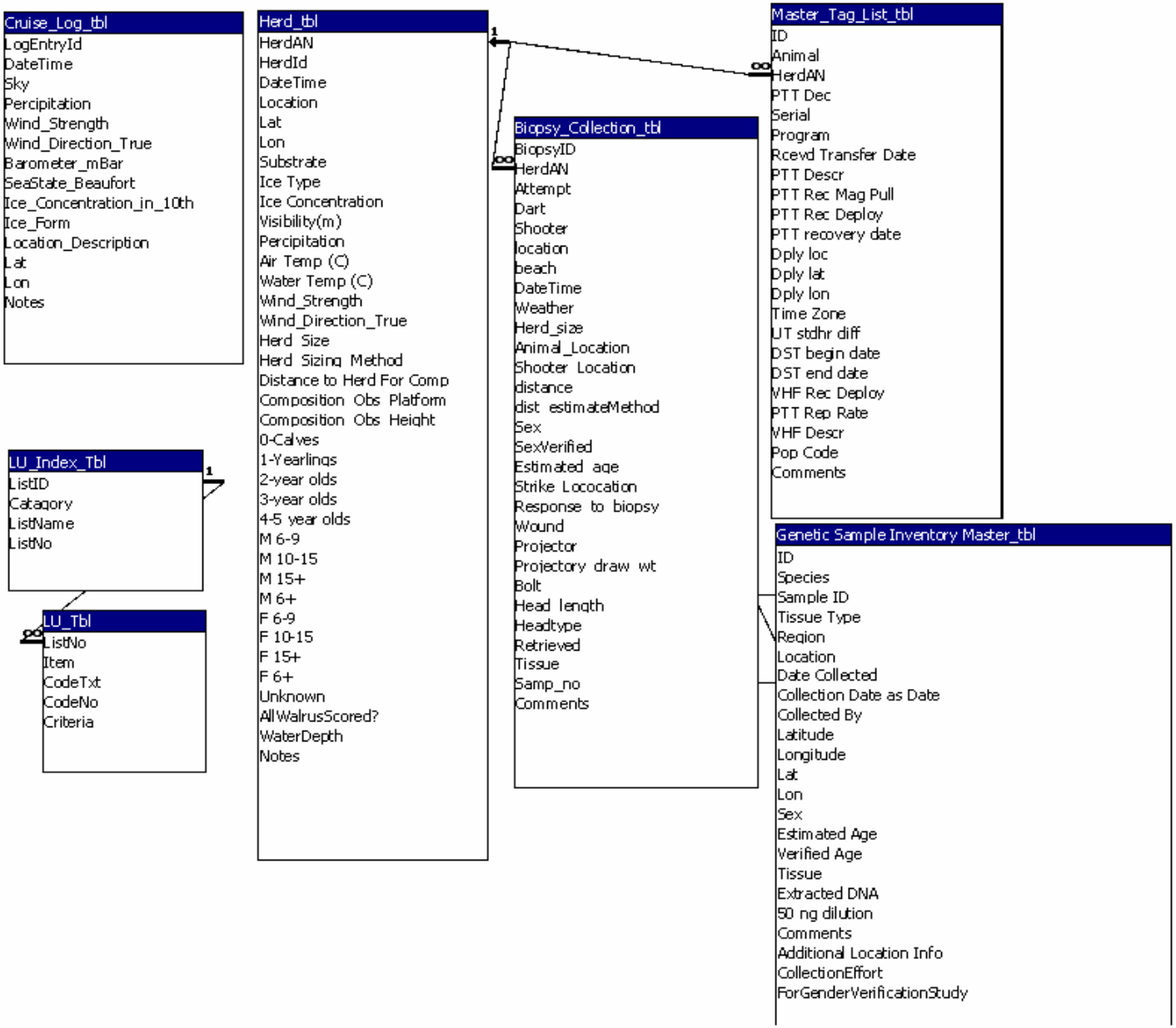


Table: **Cruise_Log_tbl**

Purpose: Provide a running log of the conditions and events occurring during the cruise.

Columns

Name	***Type***	***Size***	***Description***
LogEntryId	Long Integer	4	Auto number field; Primary Key
DateTime	Date/Time	8	
Sky	Text	50	Clear; ptl cloudy; ptl sunny; overcast
Percipitation	Text	50	Mist; rain; snow; sleet
Wind_Strength	Byte	1	In knots
Wind_Direction_True	Long Integer	4	In degrees True
Barometer_mBar	Long Integer	4	In milli-bar
SeaState_Beaufort	Byte	1	0 – 12: See Beaufort Sea State chart
Ice_Concentration_in_10th	Byte	1	Ice Concentrations in 10th
Ice_Form	Text	50	Ice Form from NOAA Ice Observers Guide
Location_Description	Memo	-	General description of location
Lat	Single	4	Latitude in DD WGS84
Lon	Single	4	Longitude in DD WGS84
Notes	Memo	-	Notes

Table: **Herd_tbl**
Purpose: Document observations of walrus herds.

Columns

Name	***Type***	***Size***	***Description***
HerdAN	Long Integer	4	Auto number field; Primary Key
HerdId	Text	50	Unique Id for herd observation: XX-yyyy-mm-dd-nnn where XX = platform code (MS mother ship; S1 = skiff 1; S2...); yyyy = 4-digit year; mm = 2 digit month; dd = 2 digit day of month; nnn = 3 sequential observation number for platform XX.
DateTime	Date/Time	8	
Location	Text	50	General description of location
Lat	Single	4	Latitude in DD WGS84
Lon	Single	4	Longitude in DD WGS84
Substrate	Text	50	Ice; water
Ice Type	Text	50	Ice Form from NOAA Ice Observers Guide
Ice Concentration	Byte	1	Ice concentration in 10th's
Visibility(m)	Integer	2	Visibility in meters
Percipitation	Text	50	None; mist; rain; sleet; snow
Air Temp (C)	Single	4	Air temperature in degrees Celcius
Water Temp (C)	Single	4	Sea water temperature in degrees Celcius
Wind_Strength	Byte	1	Wind strength in knots
Wind_Direction_True	Long Integer	4	Wind direction in degrees true
WaterDepth	Integer	2	Water depth from ??? Sonar or GIS Bathymetery?
Herd_Size	Integer	2	Number of walrus in herd
Herd_Sizing_Method	Text	50	How was herd size measured: estimate or count?
Distance to Herd For Comp	Text	255	Distance to the herd during the composition count
Composition_Obs_Platform	Text	50	Platform used for the composition count
Composition_Obs_Height	Long Integer	4	Height of platform above water
0-Calves	Integer	2	N calves counted
1-Yearlings	Integer	2	N yearlings
2-year olds	Integer	2	N 2-year olds
3-year olds	Integer	2	N 3-year olds
4-5 year olds	Integer	2	N 4-5 year olds
M 6-9	Integer	2	Males 6-9 years old
M 10-15	Integer	2	Males 10-15 years old
M 15+	Integer	2	Males greater than 15 years old
M 6+	Integer	2	Males classed to 6 or greater
F 6-9	Integer	2	Females classed as 6-9
F 10-15	Integer	2	Females classed as 10-15
F 15+	Integer	2	Females classed as greater than 15
F 6+	Integer	2	Females classed as 6 or greater
Unknown	Integer	2	Walrus counted, but not classed because they entered the water.
AllWalrusScored?	Yes/No	1	Were all walrus in this herd scored? (i.e. were there any unknown?)
Notes	Memo	-	

Table: **Biopsy_Collection_tbl**

Purpose: Document each remote biopsy collection attempt

Columns

Name	***Type***	***Size***	***Descriptions***
BiopsyID	Long Integer	4	Auto number field, Primary Key
HerdAN	Long Integer	4	Links to Herd_tbl.HerdAN
Attempt	Integer	2	
Dart	Byte	1	Number written on dart fletching
Shooter	Text	255	Who took the shot?
location	Text	255	Historical field omit for 2004 cruise
beach	Text	255	Historical field omit for 2004 cruise
DateTime	Date/Time	8	
Weather	Text	255	Historical field omit for 2004 cruise
Herd_size	Integer	2	Historical field omit for 2004 cruise
Animal_Location	Text	255	On land, surf, ice, water
Shooter_Location	Text	255	On land, boat, ice
distance	Integer	8	In meters
dist_estimateMethod	Text	255	Ranger finder, estimate
Sex	Text	255	Male, Female, Unknown
SexVerified	Yes/No	1	Was the ventral surface observed?
Estimated_age	Text	255	Use Fay diagram
Strike_Lococation	Text	255	Location of walrus body struck.
Response_to_biopsy	Text	255	How did the walrus respond to being struck?
Wound	Text	255	Type of wound:
Projector	Text	255	Crossbow or Paxarms: Historical field omit for 2004 cruise
Projectory_draw_wt	Byte	1	Draw weight in lbs.
Bolt	Text	255	Carbon fiber or aluminum // tethered or floating
Head_length	Double	8	25mm, 40mm, or 50mm
Headtype	Text	255	Finn Larsen or Wild West
Retrieved	Yes/No	1	Was dart retrieved?
Tissue	Text	255	Tissue collected: usually skin
Samp_no	Text	255	Sample Id: links to Master_Genetics_Sample_tbl.SampelId
Comments	Memo	-	

Table: **Master_Tag_List_tbl**

Purpose: This table is for records of satellite transmitter deployments. ***This table will be refined further.***

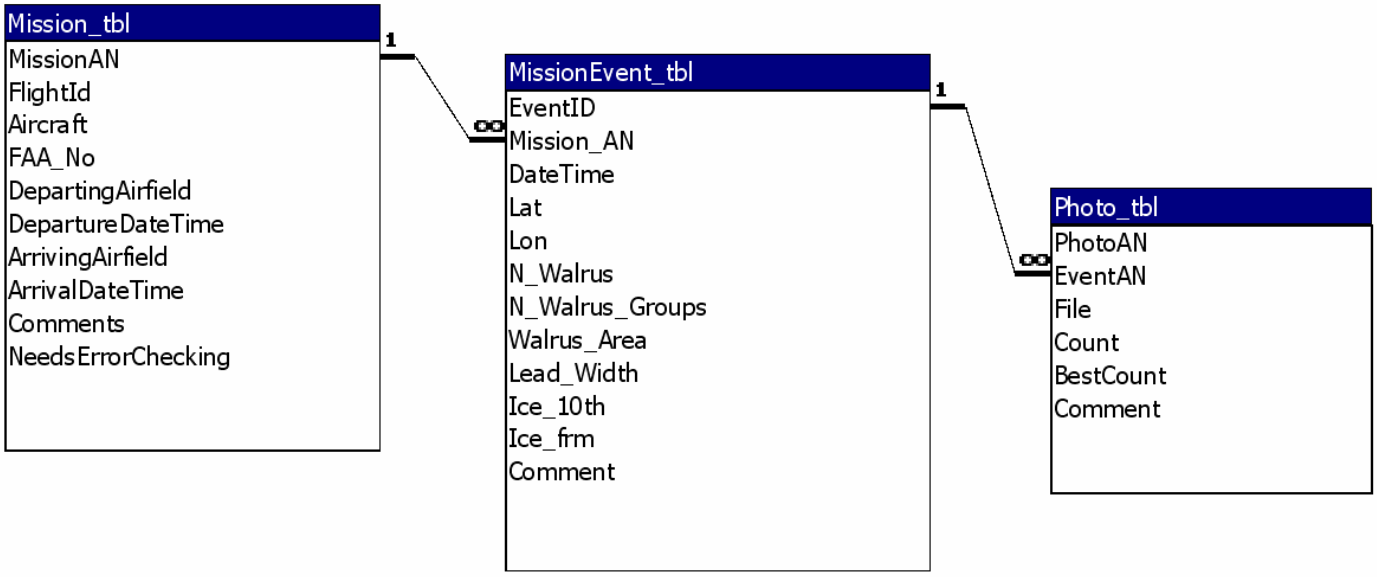
Columns

Name	***Type***	***Size***	***Description***
ID	Long Integer	4	Auto number; Primary Key
Animal	Text	255	
HerdAN	Long Integer	4	Links to Herd_tbl.HerdAN
PTT Dec	Long Integer	4	
Serial	Text	255	
Program	Text	255	
Rcevd Transfer Date	Text	255	
PTT Descr	Text	255	
PTT Rec Mag Pull	Text	255	
PTT Rec Deploy	Text	255	
PTT recovery date	Text	255	
Dply loc	Text	255	
Dply lat	Double	8	
Dply lon	Double	8	
Time Zone	Text	255	
UT stdhr diff	Double	8	
DST begin date	Text	255	
DST end date	Text	255	
VHF Rec Deploy	Text	255	
PTT Rep Rate	Double	8	
VHF Descr	Text	255	
Pop Code	Text	255	
Comments	Text	255	

Appendix III. Aerial reconnaissance data.

Relationships for AerialReconisaince

Monday, March 08, 2004



FLIGHT DATA SHEET 2004 Walrus Study Aerial Recon

FLIGHT: _____
yyyy-mm-dd[A/B]

Air Craft: ***Aero Commander 690*** ***N57096*** Pilot:

Departing: _____ Time:_____ Crew: ***Marc Webber***

Arriving: _____ Time:_____
Flight Summary:

Time	***WP#***	***1-10 Small***	***11-25 Med***	***26-100 Lg***	***>100 V.Lg***	***N V. Lg 1***	***N V. Lg 2***	***Lead Width (nm)***	***10th Ice***	***Comments / Photos***
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Appendix III. Aerial reconnaissance data. Error Checked _____ Page __ of __

Time	***WP#***	***1-10 Small***	***11-25 Med***	***26-100 Lg***	***>100 V.Lg***	***N V. Lg 1***	***N V. Lg 2***	***Lead Width (nm)***	***10th Ice***	***Comments / Photos***
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Appendix III. Aerial reconnaissance data.

Instructions to the Aerial Reconnaissance Crew for Track logging with Garmin GPS units

UPDATED 11 MARCH 2004

DOWNLOADING THE GARMIN TRACKLOG

1. Connect the Garmin to the computer using the serial port cable that fits into the round socket on the back of the Garmin unit
2. Turn the Garmin on by pressing and holding the red button above the rocker pad
3. As the Garmin warms up an icon of a globe will rotate then a text screen will appear that identifies the software and base map versions that are run on the Garmin. Press the ENTER button to get the Garmin to continue (or wait 10 sec and it will continue on its own).
4. The Garmin will now start searching for satellites. Stop it from searching by putting it into 'simulator' mode by (a) bringing up the menu by pressing the MENU button then (b) selecting the menu option START SIMULATOR MODE with the rocker pad and pressing the ENTER button.

MapSource Instructions

1. On the laptop start the MapSource software. Look for the icon of the Globe
2. From the MapSource drop down menu, select FILE → Open From Device (or click on the icon that looks like a Garmin unit with an arrow pointing up)
3. You will get a dialog box that has a check box for all the wonderful items that may be downloaded from the Garmin. Select track log and waypoints, if you wish to download waypoints too.
4. After the track log has been downloaded, select and delete the tracks that do not pertain to the flight of interest.
5. Highlight the tracks that pertain the flight of interest.
6. Save the track log to a text file that may be read by the Access Database. Select FILE → Export. Select track and specify the ..\2004_Tagging\AerialRecon\Tracklogs directory. Name it yyyymmdd.txt e.g. 20000119.txt for January 19, 2000 track log. If there is more than one flight per day, add a letter after the date in the track log name (i.e. 20000119A.txt for the first flight of the day, 20000119B.txt for the second.)
7. Exit the Map Source software.

LOAD AND LINK THE TRACKLOG

1. Begin a flight log entry.
NOTE: It is absolutely essential that you do these steps in this order.

a. In Access open the flight data form
b. Press the "Add New Flight Mission" button to create a new record if you have not done so already.
c. Access will ask you for the date and create a flight id based on the date using the convention yyyy-mm-dd. If there is more than one flight in a day. Add an A or B to the flight id. The flight id that corresponds to the saved track log (i.e. Flight 2000-01-19A corresponds with track log 20000119A.txt).

3. On the Mission form click on the 'Tracklog' tab and click the 'Ingest track' button. Be sure that you have specified the correct GPS download software in the Defaults form.

4. On the flight events tab of the 'Mission' form, enter the flight events with all the information on walrus, lead and ice observations. You may also enter the photo information at this time.

5. Either double click the time field or go to the 'tracklog' tab and click the 'link tracklog to events' button. This will fill in the coordinates for each observation.

Appendix III. Aerial reconnaissance data.

CLEAR THE TRACKLOG FROM THE GARMIN MEMORY

1. If this has all worked, go back to your Garmin unit and clear out the track log so you will be ready for the next flight
    a. On the Garmin press the MENU button twice to get to the main Garmin menu
    b. Track Logging
    c. At the Track Logging screen bring up a menu by pressing the MENU button
    d. Select Clear active log
    e. The memory use indicator should show that you have all your memory available. If it does, go ahead and shut off the Garmin by pressing the red power button.

EXPORT OBSERVATIONS FOR E-MAIL

On the 'Mission' form's 'export' tab, click the 'Export for E-mail' button. This will run the SightingsToExport_qry query and export its results to a coma separated value ASCII file placed in the ..\2004_Tagging\AerialRecon\Exported_csv directory. The file will be named with the same convention used to name the flight file (i.e. yyyy-mm-dd[A/B].csv). Open this file with a text editor. Copy and paste it into your e-mail to send to the ship-based crew.

Appendix IV. Communication Plan.

Field Communications:

Contact	***Numbers***
Stimson Satellite Phone	*DETAILS REMOVED FOR PUBLIC DOCUMENT.*
US Fish and Wildlife Service MMM Satellite Phone on Stimson (Joel Garlich-Miller)	*DETAILS REMOVED FOR PUBLIC DOCUMENT.*
Stimson dockside in Dutch Harbor	*DETAILS REMOVED FOR PUBLIC DOCUMENT.*
Stimson's Dutch Harbor Office	*DETAILS REMOVED FOR PUBLIC DOCUMENT.*
Stimson's Dutch Harbor Office FAX	*DETAILS REMOVED FOR PUBLIC DOCUMENT.*
Stimson's Anchorage Coordinator (Joe Gillas)	*DETAILS REMOVED FOR PUBLIC DOCUMENT.*
Stimson's Inmarsat-C e-mail account NOTE: Text only. E-mails will be billed at $1 per 128 characthers including spaces to Fischbach's credit card.	*DETAILS REMOVED FOR PUBLIC DOCUMENT.*
Stimson's satellite FAX NOTE: Send no cover page. Limit transmissions to 2 pages.	*DETAILS REMOVED FOR PUBLIC DOCUMENT.*
Aerial Reconnaissance e-mail account on the *DETAILS REMOVED FOR PUBLIC DOCUMENT.*	*DETAILS REMOVED FOR PUBLIC DOCUMENT.*
St. Paul Bunkhouse: Main Number Karin Holser, Manager	*DETAILS REMOVED FOR PUBLIC DOCUMENT.*
Lund Rental in Dutch Harbor: Dan Magone	*DETAILS REMOVED FOR PUBLIC DOCUMENT.*
Aviation Radio on board Stimson (range 118.00 – 135.97)	Stimson usually uses 129.00 Chat frequency recommended by Commander NW Ltd 123.45
Marine VHF Radio	Hail on channel 16 (156.800 MHz) Chat on channel 78A (156.925 MHz) Or channel 71 (156.575 MHz)
Alaska Science Center: Front Desk Chad Jay Tony Fischbach	(907) 786-3512 (907) 786-3856 (907) 786-3686
USFWS Marine Mammals Mgt: Front Desk Toll Free Marc Webber Joel Garlich-Miller	(907) 786-3800 1-800-362-5148 (907) 786-3479 (907) 786-3820
Commander96 on board sat phone USFWS Sat Phone on Commander96	*DETAILS REMOVED FOR PUBLIC DOCUMENT.* *DETAILS REMOVED FOR PUBLIC DOCUMENT.*

Communication Plan:

Ship-to-Field Crew upon approach to St. Paul boarding:
The Stimson will contact the field crew at the St. Paul bunk house main number. The field crew will monitor marine VHF channel 16 as the ship's ETA approaches.
Ship-to-Shore Daily safety check:
This will be conducted as per the Stimson's regular communication with the Anchorage coordination office via e-mail, satellite two-way radio phone and satellite phone. Messages may be relayed to the ship via Joe Gillas's office (Ann Porter 269-0389).

Appendix IV. Communication Plan.

Aerial Reconnaissance Crew to Ship:

1) Daily flight observations will be communicated via text e-mailing of flight log data as described in Appendix III.

2) Satellite telephone calls from the reconnaissance crew to the USFWS MMM satellite phone on the ship will facilitate chat discussions. The Stimson's satellite telephone will be used as a back up for this.

3) Marine VHF radios will be used to facilitate in-flight chat discussions between the plane and field crews when the plane is within range of the field crew. Hail on channel 16 (156.800 MHz) and chat on channel 78A (156.925 MHz) or channel 71 (156.575 MHz).

4) If hailing on marine VHF fails, hail on aviation VHF frequency 129.00 or 123.45 for in-flight chat discussions.

Family Messages:

Non-emergency

Pass message to Joe Gillas office (Ann Porter 269-0389)

Emergency (in order of priority)

Joe Gillas office (Ann Porter 269-0389)
Direct dial to Stimson satellite phone: *DETAILS REMOVED FOR PUBLIC DOCUMENT.* (international call)
Fax Stimson directly: (403) 543-8516
Phone Stimson's Dutch Harbor office: (907) 581-1432
Fax Stimson's Dutch Harbor office: (907) 581-1407