Pre-Departure Equipment Checklist

I. Scanning Equipment

1. Humminbird control head (900 or 1100 series)
    a. Extra SD Memory Cards
2. GPS (Garmin GPS Map 76 series or other)
    a. Extra AA Batteries (unit requires 2)
3. Stopwatch (Seiko SO57-4000)
    a. Time adjustment chart (Table 1)
4. Transducer mount
5. "All weather" field notebook and pencil
6. Field data sheets
6. Digital GPS camera
    a. DC charging station
7. Trimble Recon (QA/QC- map accuracy assessment work only)

II. Boat Equipment

1. Fuel (non-ethanol if possible)
    a. tank full
    b. spare 5 gal per boat
2. Spare charged 12v deep cycle marine battery
3. Ballast
    a. Cooler
    b. Cement blocks/defunct batteries
4. Boat cushions
5. Toolbox
6. Anchor
7. Lifejackets (1 per person)
8. Paddles (2)
9. Fire Extinguisher
10. Bucket
11. Survival Kit- Food, Water, Sunblock, Raingear, Sunglasses, Hat, Cell phone, Maps, etc.

IV. Post-Survey Data Download Equipment

1. Laptop computer
2. DVD burner drive
3. DVD's
4. External hard drive
5. Memory card USB reader
6. GPS USB connector

Launch/survey start checklist:

I. Boat

1. Propeller condition - good
2. Lower unit condition - good
3. Engine oil – good

4. Boat plug in

II. Control Head

1. <Active side> set to <**Both**>
2. <Sharpness> set to <**Off**>
3. <Sensitivity> set to approx. <**8**>*
4. <Contrast> set to approx. <**11** to 13>*
5. <Chart speed> set to <4>* or <**5**>*
6. <Beam select> set to <**200 kHz**>
7. <Side view frequency> set to <**455 kHz**>
8. <Screen snapshot> to <**On**>
9. <NMEA Output> to <**On**>.

*These settings are dependent upon individual site conditions, and should be adjusted to maximize image quality. Settings used should be noted in the field data sheet. **Bolded** values are GDNR standard for river surveys.

III. GPS unit

1. Track Log is turned on
2. Previous tracklog is cleared
3. <Interface> <Serial Data Format> set to <NMEA In/NMEA Out>

Table 1: Time to clear (seconds) for scroll rates 4 and 5 at range settings of 75-205 feet using an 1197c controller head. These numbers represent absolute clear time, so allow for a 2-3 second buffer when setting an interval time from the chart below. For example, for a scroll rate of 5 and a range of 105, the interval timer would be set to 18 or 19 seconds to ensure images overlap. It is good practice to track objects on the screen to ensure that an object identified at the very top of the screen during image capture, is still visible at the bottom of the screen when capturing the next image.

Range Setting (ft)	Scroll rate 4 (sec)	Scroll rate 5 (sec)
75	N/A	15.4
85	21.7	17.2
95	24.0	19.4
105	26.6	21.3
115	29.2	23.4
125	31.7	25.3
135	34.1	27.1
145	36.7	29.0
155	39.1	30.9
165	41.6	33.1
175	43.2	35.0
185	46.0	37.3
195	48.6	39.2
205	51.9	41.1

Sonar Survey

I. Starting a segment

a. Motor upstream about 75-100 yards from where you wish to take your first image, and put the transducer in the water if it is not already. Pause, with the bow of the boat facing upriver and the engine in idle. Allow for any wake generated by the upriver travel to dissipate.
b. Turn the boat to face downstream and begin motoring 4-6 mph. The sonar image should begin to appear on the Humminbird screen.
c. Wait until there is a complete and good quality image on the screen, and start the timer
d. Press the <MARK> button on the Humminbird control head after three beeps and the beginning of the main alarm, and record the waypoint number in the "Start" section on the Daily Field Sheet. This is the first image you have recorded for this survey. Press <MARK> for each alarm that sounds

II. Ending a Segment

a. When you wish to stop or pause the survey for a break, lunch, or to change settings, record the waypoint of the last image you take before you stop onto the Daily Field Sheet next to "Stop". This will help you identify segments in post-survey processing.

Post-Survey

These steps should be performed at the end of each survey before the end of the day to ensure all collected data is backed-up onto a hard drive as a hard copy.

I. Export "Nav-Data"

At the end of the survey, before you power off the GPS, press the MENU button twice on the Humminbird control head and navigate to the diamond shape tab that displays the letters "NAV". Scroll down until you reach the "Export Nav-Data" option and push the right arrow. Confirm the export by pushing the right arrow again, and now the data from the control head is stored in the external SD for post-processing.

II. Download Raw Trackpoints

See "Transferring Survey Route Coordinates" in the Sonar Image Processing Workbook for more detail.

a. Plug in the GPS to the USB port on the computer. Turn the GPS unit on.
b. Open the DNRGarmin program and make sure the bottom left box on the window reads "Connected"
c. Click the "Track" menu and select "Download".
d. Once the trackpoints are downloaded, click File->Save To->File, and save as a .dbf or .txt file into an easy to find designated folder

MISC. Stopwatch Setup and Humminbird Memory Full Procedures

I. Stopwatch operation:

a. Use the timing chart (Table 1) to identify how long of an interval is required between image captures. This depends on your range settings and scroll rate, and 3 seconds should be added to provide room for error.
b. Press any button to turn on the stopwatch
c. Press the <Mode> button on the bottom right corner of the stop watch until the screen displays <TIMER> in the top row.
d. Press and hold the middle <RECALL> button until the first set of numbers begins to flash.

    You may have to press the left most button (LAP/SPLIT RESET) once before you hold down <RECALL> to get the numbers to flash, as the time needs to be reset to start in order for adjustments to be made.
e. Press the right most <START/STOP> button twice or until the small right most number set begins to flash.
f. Press the left most <LAP/SPLIT RESET> button to set the correct number of seconds required for your determined interval (plus about 3 seconds).
g. When you reach the desired seconds, press the <RECALL> button once so the numbers stop flashing
h. The top column of the display should read: 000/--- in order for the interval to automatically restarted after the alarm. If there are numbers in the right side of the hash mark instead of dashes, you must change this. Hold down the <RECALL> button to make the numbers flash. Navigate to the area that needs to be changed with the right most <START/STOP> button. Once you have the desired field flashing, use the <LAP/SPLIT RESET> button to change the field. The right side of the hash (/---) in the upper column will display the dashes after 099 and before 001.
i. Test the timer. Once it ticks down to 3 seconds, a short series of 3 consecutive beeps will sound before the 0 second alarm, and the seconds should automatically reset and begin to count down again immediately and before the alarm is finished sounding.

II. Humminbird Memory Full

a. Export all NAV data to the SD card.
    1. Press <MENU> twice and navigate to the diamond shape <NAV> tab.
    2. Press the down arrow until you reach <Export NAV data> and push the right arrow to export. Once prompted to save the data, hit the right arrow button again to confirm the export.

b. Delete all NAV data
    1. Navigate to the <NAV> tab and select <Delete all NAV data> and press the right arrow to select. Since you just exported all the data, it is okay to delete the waypoints on the controller head. Press the right arrow button to confirm.

c. Insert new, blank SD card into control head to resume survey. This card cannot contain any NAV data on it (stored in the Matrix folder), otherwise NAV data

contents of card will be uploaded to the control head possibly filling the memory once again.