

## APPENDIX B: INSTRUCTIONS FOR USE OF BAD ELF WITH THE SHOREWATCHAPP

## Bad Elf Surveyor



Fig 1. Bad Elf Surveyor. [Bad-elf.com/pages/be-gps-3300-detail](http://Bad-elf.com/pages/be-gps-3300-detail)

## Bad Elf Flex



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Fig 2. Bad Elf Flex. Bad Elf Flex™ User Manual V2.1, 2021. Bad Elf, LLC.

## CONNECTING TO BAD ELF SURVEYOR

Turn on the Bad Elf Surveyor by holding the Power Button on the unit for 3 seconds (Fig 1). Allow Bad Elf Surveyor a minute or two to power on.


When the Bad Elf Surveyor is on, navigate to Bluetooth settings on your mobile device and connect to: **Bad Elf GPS #011835**

Press the Bluetooth Button on the Bad Elf Surveyor until you see the BLUETOOTH screen on the LCD display.

- Status should appear as ON next to the Bluetooth symbol
- Connected Devices 1

Press the GPS Button until you see the SATELLITES screen on the LCD display. This shows the number of satellites that are acquired out of the possible satellites in view. Once a lock is acquired, the LCD display shows speed, heading, altitude and accuracy.

While we recommend having ~9 acquired satellites for best accuracy, this is not always possible due to interference from cloud cover, overhanging trees, etc. Check accuracy status on the LCD display of the Bad Elf Surveyor ensure that accuracy is acceptable (< 2 m).

In Field Maps, on the Home Screen, tap the User Profile Icon  to open the Profile screen. Under the Location section, select Provider to open the Location Providers screen.

Note: Integrated is the mobile device's internal GPS that would be utilized if you are not using a Bad Elf or other external GPS unit. It is the default provider in Field Maps.

If the Bad Elf unit does not appear as an option on the Location Providers screen, tap Add to open the Add Provider screen and select Bad Elf, LLC #011835. The indicated Antenna height (ht) should be set at 2 m. To change the Antenna ht (height), tap the blue information icon, set Antenna height (m) to 2, and hit done.

Ensure that Bad Elf, LLC #011835 is selected, signified by the blue check mark (Fig 3).

Hit < Back to return to Profile screen. Hit Done.

The Bad Elf Surveyor will now be used for GPS locations on your map.

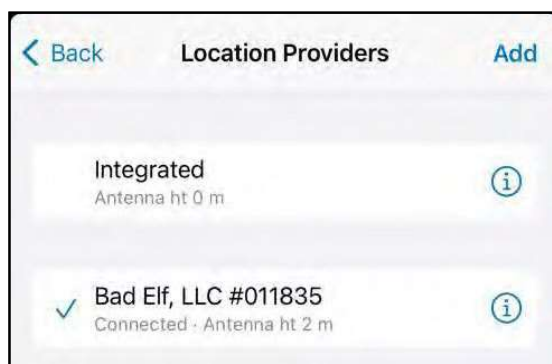


Fig 3. Field Maps Location Provides set to Bad Elf Surveyor

## USING BAD ELF SURVEYOR IN THE FIELD

The GPS accuracy of the Bad Elf Surveyor relies on direct access to the sky. When delineating features in the field, the unit should be held at least at breast height or above. Try to hold the unit with the front (screen) uncovered, facing the sky while collecting GPS points (Fig 4). If possible, you can attach the unit a hat or on your upper body, with the screen facing outward.

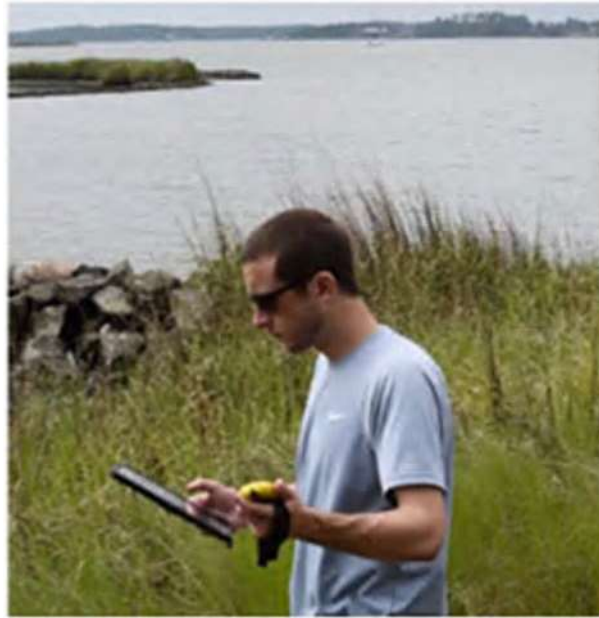


Fig 4. Using Bad Elf Surveyor in the field.

## BAD ELF FLEX

Turn on the Bad Elf Flex by holding the Power Button on the unit for 3 seconds (Fig 2). Allow Bad Elf Flex approximately 20 seconds to power on. The three status LED's below the LCD screen will cycle until the unit turns on. Once turned on, the Bad Elf Flex will begin searching for satellites.

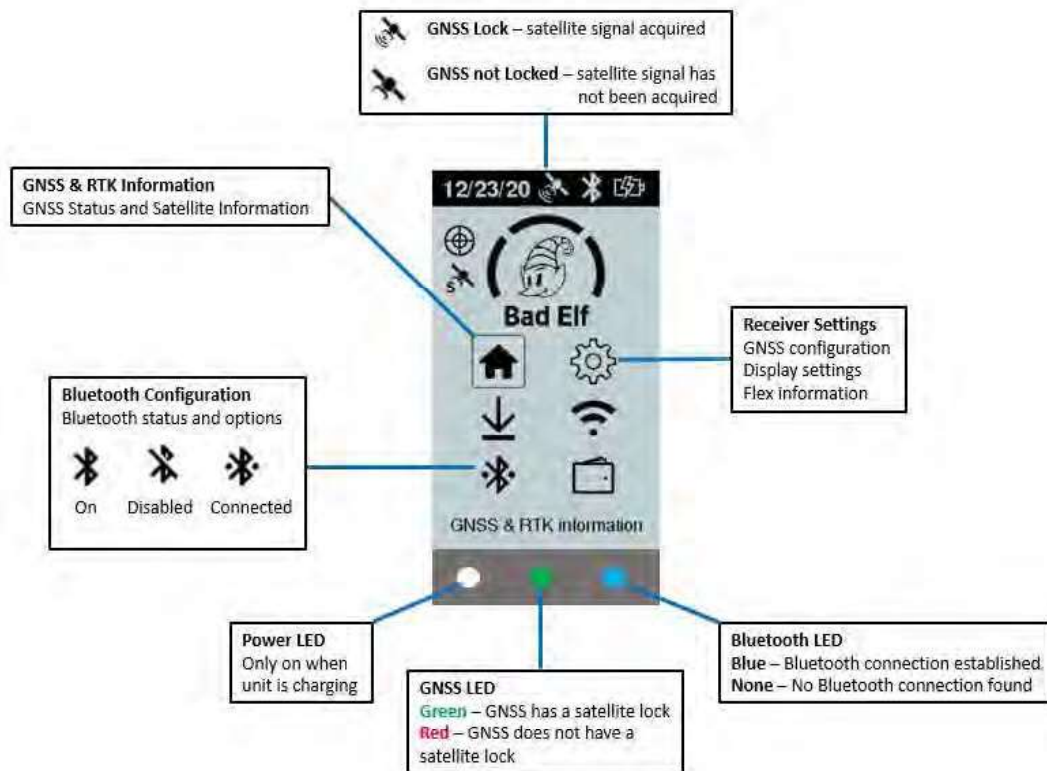


Fig 5. Bad Elf Flex Home Screen. Bad Elf Flex™ User Manual V2.1, 2021. Bad Elf, LLC.

When the Bad Elf Flex is on, navigate to Bluetooth settings on your mobile device and connect to: **Bad Elf Flex #153293**. When connecting for the first time, a prompt may appear on your device asking to pair with Bad Elf Flex #153293. Accept the prompt.

A message will open on the Bad Elf Flex screen prompting you to pair with your mobile device. Press the Enter on the Bad Elf Flex to accept Bluetooth pairing.

When Bad Elf Flex is connected to mobile device, the Bluetooth LED light will turn solid blue (Fig 5).

You may also be prompted on your device to download the Bad Elf App. While this app is not required to use the Bad Elf Flex for the purposes of ShoreWatch, it is necessary to download if you plan to use Tokens for enhanced accuracy in the future. The Bad Elf App is free and can be downloaded at any time.

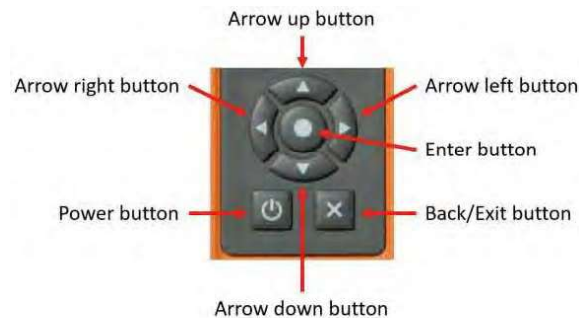


Fig 6. Bad Elf Flex buttons. Bad Elf Flex™ User Manual V2.1, 2021. Bad Elf, LLC.

Use the arrow keys to navigate to the GNSS & RTK Information icon and press the Enter button to bring up the GNSS Information pages (Fig 6). Use the left and right arrow keys to navigate between pages. On the Primary GNSS Status Page, ensure that Horizontal accuracy is within the desired range ( $< 1\text{ m}$ ) (Fig 7). Horizontal accuracy will change as you move with the flex. Depending on satellite coverage, you may have to stand in place for about 30 seconds for accuracy to achieve the desired range again.

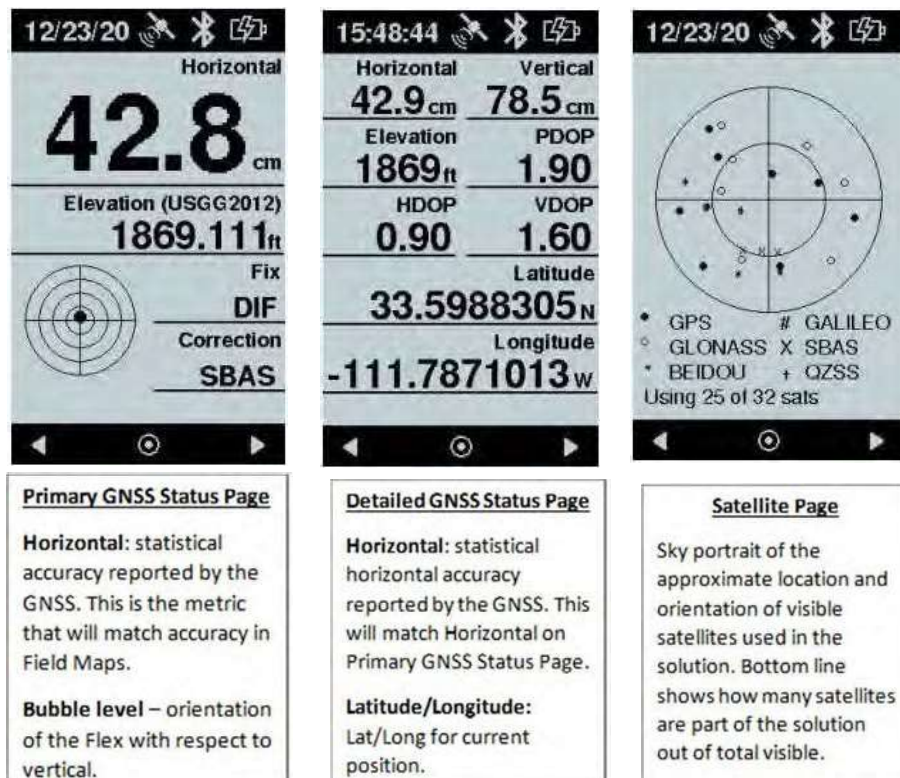


Fig 7. Bad Elf Flex screens. Bad Elf Flex™ User Manual V2.1, 2021. Bad Elf, LLC.

While we recommend having ~9 acquired satellites for best accuracy, this is not always possible due to interference from cloud cover, overhanging trees, etc. Check the Horizontal accuracy status on the Primary GNSS Status Page and ensure that accuracy is acceptable (< 1 m).

In Field Maps, on the Home Screen, tap the User Profile Icon  to open the Profile screen.

Under the Location section, select Provider to open the Location Providers screen.

Note: Integrated is the mobile device's internal GPS that would be utilized if you are not using a Bad Elf or other external GPS unit. It is the default provider in Field Maps.

If the Bad Elf unit does not appear as an option on the Location Providers screen, tap Add to open the Add Provider screen and select Bad Elf, LLC #011835. The indicated Antenna height (ht) should be set at 2 m. To change the Antenna ht (height), tap the blue information icon, set Antenna height (m) to 2, and hit done.

Ensure that Bad Elf, LLC #153293 is selected, signified by the blue check mark (Fig 8).

Hit < Back to return to Profile screen. Hit Done.

The Bad Elf Flex will now be used for GPS locations on your map.

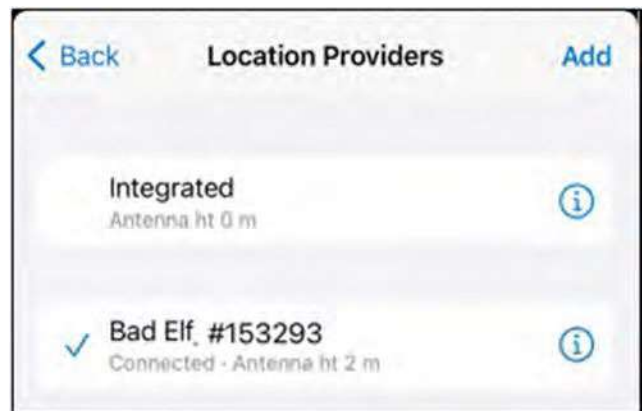


Fig 8. Field Maps Location Provides set to Bad Elf Flex

#### USING BAD ELF FLEX IN THE FIELD

The GPS antenna is located at the top of the Bad Elf Flex. The GPS accuracy will rely on the unit being upright, with the top of the unit having direct access to the sky. When delineating features in the field, the unit should be held at least at breast height or above. With the top of the unit uncovered while collecting GPS points. It is recommended to attach the Bad Elf Flex to the extendable survey pole for added stability.