



*System Assessment and Validation for Emergency Responders (SAVER)*

# Handheld Underwater Metal Detectors Market Survey Report

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Security**

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**System Assessment and Validation for Emergency Responders**

*Prepared by Space and Naval Warfare Systems Center Atlantic*

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The cover photo and the photo of the Viper Hybrid Trident by Kellyco Metal Detectors were provided by the Space and Naval Warfare Systems Center Atlantic. All other product images included herein are used with permission from the respective vendors.

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## FOREWORD

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The U.S. Department of Homeland Security (DHS) established the System Assessment and Validation for Emergency Responders (SAVER) Program to assist emergency responders making procurement decisions. Located within the Science and Technology Directorate (S&T) of DHS, the SAVER Program conducts objective assessments and validations of commercial equipment and systems and provides those results along with other relevant equipment information to the emergency responder community in an operationally useful form. SAVER focuses primarily on two main questions for the emergency responder community: “What equipment is available?” and “How does it perform?” SAVER provides information on equipment that falls within the categories listed in the DHS Authorized Equipment List (AEL). The SAVER Program mission includes:

- Conducting impartial, practitioner-relevant, operationally oriented assessments and validations of emergency response equipment; and
- Providing information, in the form of knowledge products, that enables decision-makers and responders to better select, procure, use, and maintain emergency response equipment.

SAVER Program knowledge products are shared nationally with the responder community, providing a life- and cost-saving asset to DHS, as well as to Federal, state, and local responders.

The SAVER Program is supported by a network of Technical Agents who perform assessment and validation activities. As a SAVER Program Technical Agent, the Space and Naval Warfare Systems Center (SPAWARSYSCEN) Atlantic has been tasked to provide expertise and analysis on key subject areas, including communications, sensors, security, weapon detection, and surveillance, among others. In support of this tasking, SPAWARSYSCEN Atlantic developed this report to provide emergency responders with information gathered during a market survey of commercially available handheld underwater metal detectors, which fall under AEL reference number 03WA-01-UWMD titled Detector, Metal, Underwater.

Visit the SAVER section of the Responder Knowledge Base (RKB) website at <http://www.rkb.us/saver> for more information on the SAVER Program or to view additional reports on handheld underwater metal detectors or other technologies.

## **POINTS OF CONTACT**

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## **1. INTRODUCTION**

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Handheld underwater metal detectors assist public safety divers with locating metallic objects underwater by providing visual, audible, and/or vibration alerts when these objects are detected. The System Assessment and Validation for Emergency Responders (SAVER) Program conducted a market survey to provide emergency response divers with relevant information on handheld underwater metal detectors.

This market survey report is based on information gathered from February to August 2013 from vendors, Internet searches, industry publications, an emergency responder focus group, and a government issued Request for Information (RFI) that was posted on the Federal Business Opportunities website. For inclusion in this report, the handheld underwater metal detectors had to meet the following criteria:

- The detector must be submersible to a minimum depth of 60 feet;
- The detector must have an audible alert; and
- The detector must alert for ferrous and non-ferrous metals.

Due diligence was performed to develop a report that is representative of products in the marketplace.

## **2. HANDHELD UNDERWATER METAL DETECTORS OVERVIEW**

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Handheld underwater metal detectors generate an electromagnetic field to detect metallic objects in soil or bottom sediment. Electromagnetic signals are created using pulse induction (PI), very low frequency (VLF), and broadband spectrum (BBS) technology. PI detectors typically use one coil to send and receive short electromagnetic pulses. A metallic object located under the coil will increase the duration of the returned pulse, which is sensed by the detector and an alert is provided. PI detectors typically have a low rate of false alerts from salt and ground minerals; therefore, they may be better suited for use in salt water. VLF detectors use two coils to detect metallic objects. The transmit coil creates a continuous, low-power output signal that creates a small magnetic field in metallic objects located under the coil. This magnetic field is detected by the second coil. VLF detectors sometimes react to salt and ground minerals; therefore, they may be better suited for use in fresh water, although some VLF detectors feature controls, such as sensitivity or ground balancing, to reduce false alerts in salt water. Unlike PI or VLF detectors, BBS detectors transmit multiple frequencies simultaneously over a wide frequency band. This is intended to enhance the detector's ability to penetrate soil or bottom sediment as well as detect a wide range of metals. BBS detectors may provide similar performance in both fresh and salt water.

### **2.1 Configuration**

Most handheld underwater metal detectors are comprised of a coil, a shaft, headphones or an earphone, and a control module. Typically, the coil and control module can be removed from the shaft. This enables the control module to be attached to a belt or placed in other locations on the shaft.

Headphones and coils may be hardwired to the control module or detachable by a waterproof connector. Detachable coils with waterproof connectors may be interchangeable with coils of different shapes and sizes. Detectors typically come with an 8- or 10-inch coil. Larger coils can provide better penetration capabilities, which is the ability to detect objects buried at deeper depths, whereas smaller coils have greater sensitivity for detecting smaller objects and are able to fit into smaller places, such as between rocks and debris.

Most handheld underwater metal detectors have a shaft that can be configured for use on land or while diving underwater. Some detectors have an adjustable shaft while others may include separate shafts, one for diving and one for land use. Shafts may extend and collapse or be modular, which requires the user to add or remove pieces of the shaft to achieve the desired configuration.

## **2.2 Controls**

Handheld underwater metal detectors generally have a sensitivity control that allows the user to increase or decrease the detectors response to different types of metals. Increasing sensitivity typically allows a user to detect objects at deeper depths; however, the detector may generate more false alerts due to mineralization in the environment. Detectors with ground balancing controls can be tuned to the environment in which they are being used, thereby minimizing the effects of ground mineralization. While referred to as sensitivity and ground balance throughout this report, there are a wide array of naming conventions for these controls that are vendor specific (e.g., pulse timing, ground tracking).

Some detectors have a discrimination control, sometimes referred to as elimination or rejection. The discrimination control allows the detector to ignore signals from undesirable objects, such as pull-tabs or bottle caps; however, setting discrimination at a high level may cause targets of interest to be ignored by the detector.

Threshold controls, which are commonly found on detectors, allow the user to adjust the level of electronic noise that can be heard through the headphone or earphone. Typically, a minimal threshold setting will enable the user to more easily distinguish between this electronic noise and an object.

## **2.3 Alerts**

Handheld underwater metal detectors primarily use audible alerts or visual alerts. Types of audible alerts can include: (1) a uniform alert that sounds the same regardless of the object being detected and (2) an alert that varies in tone and/or volume depending on the conductivity of the object detected. Visual alerts include LED and needle-style indicators.

## **3. PRODUCT DATA—VENDOR PROVIDED**

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This section identifies 14 handheld underwater metal detectors that range in price from \$679 to \$10,140. None of these detectors feature vibration alerts. Product data presented in this section was obtained directly from vendors and their websites. The information has not been independently verified by the SAVER Program. Features in this product comparison matrix are defined as follows, listed in column order:

**MSRP** refers to the manufacturer's suggested retail price (MSRP) of the detector.

**Coil Size (inches)** refers to the size of the search coil. The diameter is provided for round coils; the length and width are provided for oval coils.

**Warranty (years)** refers to the duration of the warranty.

**Search Technology** refers to the technology that the detector uses to locate objects.

**Submersible Depth (feet)** refers to the maximum depth the detector can be submersed in water and still operate.

**Submersible Headphones** indicates if submersible headphones or an earphone are included with purchase. *Note: Submersible headphones may be available for an additional cost.*

**Sensitivity Control** indicates if the detector has a sensitivity control.

**Discrimination Control** indicates if the detector has a discrimination control.

**Threshold Control** indicates if the detector has a threshold control.

**Ground Balance Control** indicates if the detector has a ground balance control.

**Volume Control** indicates if the detector has a volume control for the audible alerts.

**Battery Type** refers to the type of battery required to power the detector. If more than one battery is required, the quantity is also indicated.

**Battery Runtime (hours)** refers to the amount of time the detector can be continuously operated with the vendor-recommended batteries. Battery runtime is impacted by the environment, battery type, battery chemistry, and how often the detector alerts.

**Operating Temperature** refers to the operating temperature range of the detector.

**Visual Alert** indicates if the detector has a visual alert to notify the user when a metallic object is detected.

**Table 3-1. Product Comparison Matrix–Vendor Provided**

Vendor	Product Name	MSRP	Coil Size (inches)	Warranty (years)	Search Technology	Submersible Depth (feet)	Submersible Headphones	Sensitivity Control	Discrimination Control	Threshold Control	Ground Balance Control	Volume Control	Battery Type	Battery Runtime (hours)	Operating Temperature	Visual Alert
Aquascan International Ltd.	Aquapulse 1B	\$1,899	8	2	PI	328	✓		✓	✓			Not user replaceable	10 to 12	32° to 120°F	
		\$1,955	10													
		\$2,085	15													
CEIA USA	CMD/DW	\$10,140	13.8x5.5	2	VLF	330		✓				✓	C (2)	8	-51° to 158°F	✓
Fisher® Research Labs	1280-X Aquanaut	\$800	8	2	VLF	250	✓	✓	✓			✓	AA (8)	60 to 80	32° to 110°F	✓
		\$830	10													
	CZ-21 QuickSilver	\$1,299	8	2	VLF	250	✓	✓	✓		✓	✓	9 Volt (4)	35 to 55	32° to 110°F	
		\$1,349	10.5													
Garrett Electronics Inc.	Infinium LS™	\$1,250	10x14	2	PI	200			✓	✓	✓		AA (8)	10 to 15	-4° to 140°F	
	Sea Hunter™ Mark II	\$750	8	1	PI	200	✓		✓	✓			AA (8)	18 to 22	-4° to 140°F	
		\$880	8 and 10x14													

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Vendor	Product Name	MSRP	Coil Size (inches)	Warranty (years)	Search Technology	Submersible Depth (feet)	Submersible Headphones	Sensitivity Control	Discrimination Control	Threshold Control	Ground Balance Control	Volume Control	Battery Type	Battery Runtime (hours)	Operating Temperature	Visual Alert
JW Fishers Mfg. Inc.	Pulse 6X	\$1,595 (hardwired coil)	7.5	2	PI	200	✓			✓			Proprietary battery pack <sup>1</sup>	10 to 12	32° to 120°F	✓
		\$1,745 (coil-connector option)														
	Pulse 8X	\$2,150 (hardwired coil)	7.5	2	PI	200	✓	✓		✓			Proprietary battery pack <sup>1</sup>	10 to 12	32° to 120°F	✓
		\$2,300 (coil-connector option)														
Kellyco Metal Detectors <sup>2</sup>	Cobra Beach Magnet	\$1,000	10	5	VLF	132	✓	✓	✓			✓	AA (8)	15 to 20	32° to 120°F	✓
	Viper Hybrid Trident	\$1,000	10	5	VLF	132	✓	✓	✓				9 Volt (1)	6 to 10	32° to 120°F	✓
Minelab Americas Inc.	Excalibur II	\$1,949	8 or 10	1	BBS	200	✓	✓	✓	✓		✓	Proprietary battery pack <sup>1</sup>	14 to 19	32° to 113°F	

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Vendor	Product Name	MSRP	Coil Size (inches)	Warranty (years)	Search Technology	Submersible Depth (feet)	Submersible Headphones	Sensitivity Control	Discrimination Control	Threshold Control	Ground Balance Control	Volume Control	Battery Type	Battery Runtime (hours)	Operating Temperature	Visual Alert
Tesoro Electronics Inc.	Sand Shark	\$679	8	L	PI	200	✓	✓		✓		✓	AA (8)	10 to 20	30° to 100°F	
		\$709	10.5													
	Tiger Shark	\$749	8	L	VLF	200	✓	✓		✓	✓	✓	AA (8)	10 to 20	30° to 100°F	
		\$779	10.5													
White's Electronics Inc.	Surf PI Dual Field	\$895	12	2	PI	100	✓	✓		✓	✓		AA (8)	25 to 35	32° to 158°F	

Notes:

<sup>1</sup>Proprietary battery pack is user replaceable with purchase of a second battery pack.

<sup>2</sup>Kellyco Metal Detectors is the U.S. distributor for the Cobra Beach Magnet and Viper Hybrid Trident detectors.

✓—metal detector has corresponding feature

Blank Cell—metal detector does not have corresponding feature

MSRP—manufacturer's suggested retail price

°F—degrees Fahrenheit

Warranty: Lifetime (L)

Search Technology: Broadband Spectrum (BBS); Pulse Induction (PI); Very Low Frequency (VLF)

Information in this table is based on data gathered from February to August 2013.

### 3.1 Aquascan International Ltd. Aquapulse 1B

The Aquapulse 1B is available with an 8-, 10- or 15-inch coil. The detector with an 8-inch coil costs \$1,899 and includes a 12-inch shaft. The detector with a 10- or 15-inch coil costs \$1,955 and \$2,085, respectively, and includes a shaft that extends from 24 to 40 inches. Purchase includes: a control module; a removable, submersible earphone; a sealed, proprietary rechargeable battery; a battery charger; a control module harness; a belt; a user manual; and a 2-year warranty.



The detector weighs approximately 9 pounds. The control module can attach to a belt. The coil can detach from the shaft and coils are interchangeable. There is no low-battery indicator. The battery is proprietary and requires the entire control module to be sent back to the vendor for battery replacement.

Technical support is available 24 hours a day, 7 days a week. Training is not provided by the vendor.

### 3.2 CEIA USA CMD/DW

The CMD/DW has a 13.8x5.5-inch coil and costs \$10,140. Purchase includes: a control module; removable land-use headphones; a headphones clip; an external speaker; two size C rechargeable batteries; a shaft that extends from 27 to 51 inches; a transport case; a carrying bag; a metal reference sample; a user manual; and a 2-year warranty.

The detector weighs approximately 6 pounds. The control module and coil cannot detach from the shaft. A flashing LED and double beep during operation indicate low batteries.

Technical support is available 24 hours a day, 7 days a week. On-site training is included with purchase.



### 3.3 Fisher® Research Labs 1280-X Aquanaut

The 1280-X Aquanaut is available with an 8-inch coil for \$800 and a 10-inch coil for \$830. Purchase includes: a control module; hardwired, submersible headphones; eight size AA batteries; a shaft that extends from 33 to 50 inches; a belt clip; a user manual; and a 2-year warranty.

The detector weighs approximately 5 pounds. The control module can detach from the shaft and attach to a belt. Although the coil can detach from the shaft, coils are not interchangeable. A faint audible alert and dimly illuminated LED indicate low batteries when a battery check is performed.



Technical support is available Monday through Friday, 8:00 a.m. to 5:00 p.m., Mountain Time. Training is not provided by the vendor.

### 3.4 Fisher Research Labs CZ-21 QuickSilver

The CZ-21 QuickSilver is available with an 8-inch coil for \$1,299 and a 10.5-inch coil for \$1,349. Purchase includes: a control module; hardwired, submersible headphones; a shaft that extends from 33 to 50 inches; a belt clip; cable straps; a user manual; and a 2-year warranty. Batteries are not included.



The detector weighs approximately 6 pounds. The control module can detach from the shaft and attach to a belt. Although the coil can detach from the shaft, coils are not interchangeable. A faint audible alert indicates low batteries when a battery check is performed.

Technical support is available Monday through Friday, 8:00 a.m. to 5:00 p.m., Mountain Time. Training is not provided by the vendor.

### 3.5 Garrett Electronics Inc. Infinium LS™

The Infinium LS has a 10x14-inch Double-D coil and costs \$1,250. Optional 8-inch and 10-inch mono coils are available and cost \$129.95 and \$149.95, respectively. Purchase includes: a control module; removable, land-use headphones; a rechargeable battery pack consisting of eight size AA batteries; an AC battery charger; a 12-volt automobile adapter for battery charging; a modular shaft that adjusts from 28 to 52 inches; a belt; a control module pouch; a user manual; an instructional DVD; and a 2-year warranty.



The detector weighs approximately 6 pounds. The control module can detach from the shaft and be placed in the control module pouch that attaches to a belt. The coil can detach from the shaft and coils are interchangeable. A single beep at startup indicates low batteries.

Technical support is available Monday through Friday, 8:00 a.m. to 4:30 p.m., Central Time. Training videos are available on the vendor's website.

### 3.6 Garrett Electronics Inc. Sea Hunter™ Mark II

The Sea Hunter Mark II is available with an 8-inch mono coil for \$750 or with both an 8-inch and 10x14-inch mono coil for \$880. Purchase includes: a control module; removable, submersible headphones; eight size AA batteries; a modular shaft that adjusts from 28 to 52 inches; a belt; control module mounting hardware; a control module pouch; a user manual; an instructional DVD; and a 1-year warranty.



The detector weighs approximately 5 pounds. The control module can detach from the shaft and be placed in the control module pouch that attaches to a belt. The coil can detach from the shaft and coils are interchangeable. A single beep at startup indicates low batteries.

Technical support is available Monday through Friday, 8:00 a.m. to 4:30 p.m., Central Time. Training videos are available on the vendor's website.

### 3.7 JW Fishers Mfg. Inc. Pulse 6X

The Pulse 6X with a hardwired 7.5-inch coil costs \$1,595, and the Pulse 6X with a coil-connector option costs \$1,745. Optional 5-inch, 10-inch, and 16-inch coils are available and cost \$172, \$202, and \$340, respectively. The 16-inch coil includes a short diver-held handle. Purchase includes: a control module; a removable, submersible earphone; removable, land-use headphones; a proprietary, rechargeable battery pack; AC and DC battery chargers; a land-use shaft that extends from 32 to 54 inches; a 19-inch dive shaft; a belt; spare parts; a carrying bag; an accessories bag; a user manual; and a 2-year warranty.



The detector weighs approximately 6 pounds. The control module can detach from the shaft and attach to a belt; the coil also detaches from the shaft. With the purchase of the coil-connector option, coils are interchangeable. An illuminated LED during operation indicates a low battery.

The Pulse 6X can be upgraded to the Pulse 8X. Technical support is available 24 hours a day, 7 days a week. Training is not provided by the vendor.

### 3.8 JW Fishers Mfg. Inc. Pulse 8X

The Pulse 8X with a hardwired 7.5-inch coil costs \$2,150, and the Pulse 8X with a coil-connector option costs \$2,300. Optional 5-inch, 10-inch, and 16-inch coils are available and cost \$172, \$202, and \$340, respectively. The 16-inch coil includes a short diver-held handle. Purchase includes: a control module; a removable, submersible earphone; removable, land-use headphones; a proprietary, rechargeable battery pack; AC and DC battery chargers; a land-use shaft that extends from 32 to 54 inches; a 19-inch dive shaft; a belt; spare parts; a carrying bag; an accessories bag; a user manual; and a 2-year warranty.



The detector weighs approximately 6 pounds. The control module can detach from the shaft and attach to a belt; the coil also detaches from the shaft. With the purchase of the coil-connector option, coils are interchangeable. A needle-style indicator reading below 0.8 indicates a low battery when a battery check is performed, and an LED illuminates during operation to indicate a leak. The Pulse 8X provides greater sensitivity than that of the Pulse 6X.

Technical support is available 24 hours a day, 7 days a week. Training is not provided by the vendor.

### 3.9 Kellyco Metal Detectors Cobra Beach Magnet

The Cobra Beach Magnet has a 10-inch coil and costs \$1,000. Purchase includes: a control module; hardwired, submersible headphones; a shaft that extends from 37 to 49 inches; a user manual; a carrying bag; and a 5-year warranty. Batteries are not included.

The detector weighs approximately 5 pounds. The control module can detach from the shaft. Although the coil can detach from the shaft, coils are not interchangeable. A faint audible alert and a dim light indicate low batteries when a battery check is performed.

Technical support is available Monday through Friday, 8:00 a.m. to 5:00 p.m., Eastern Time. Training is not provided by the vendor.

### 3.10 Kellyco Metal Detectors Viper Hybrid Trident

The Viper Hybrid Trident has a 10-inch coil and costs \$1,000. Purchase includes: a control module; hardwired, submersible headphones; a 9-volt battery; a shaft that extends from 40 to 46 inches; a user manual; a carrying bag; and a 5-year warranty.



The detector weighs approximately 4 pounds. The control module can detach from the shaft. Although the coil can detach from the shaft, coils are not interchangeable. A continuous audible alert during operation indicates a low battery.

Technical support is available Monday through Friday, 8:00 a.m. to 5:00 p.m., Eastern Time. Training is not provided by the vendor.

### 3.11 Minelab Americas Inc. Excalibur II

The Excalibur II is available with an 8- or 10-inch coil for \$1,949. Purchase includes: a control module; hardwired, submersible headphones; a proprietary, rechargeable battery pack; an AC battery charger; a modular shaft that adjusts from 32 to 36 inches when in dive configuration and from 45 to 48 inches when in land configuration; a hardware pack; a tool pouch; a carrying case; a trash pouch; a skid plate to protect the coil and assist with visibility in the water; a user manual; and a 1-year warranty.



The detector weighs approximately 5 pounds. The control module can detach from the shaft and, with purchase of the hip mount kit, can attach to a belt. Although the coil can detach from the shaft, coils are not interchangeable. A continuous audible alert during operation indicates a low battery.

Technical support is available Monday through Friday, 8:00 a.m. to 5:00 p.m., Eastern Time. Training is not provided by the vendor.

### 3.12 Tesoro Electronics Inc. Sand Shark

The Sand Shark is available with an 8-inch coil for \$679 and a 10.5-inch coil for \$709. Purchase includes: a control module; hardwired, submersible headphones; eight size AA batteries; a modular shaft that adjusts from 45 to 52 inches; silicon grease; cable straps; a user manual; and a lifetime warranty.



The detector weighs approximately 5 pounds. The control module can detach from the shaft and attach to a belt. Although the coil can detach from the shaft, coils are not interchangeable. A single beep indicates low batteries when a battery check is performed.

Technical support is available Monday through Friday, 10:00 a.m. to 4:00 p.m., Mountain Standard Time. Training is not provided by the vendor.

### 3.13 Tesoro Electronics Inc. Tiger Shark

The Tiger Shark is available with an 8-inch coil for \$749 and a 10.5-inch coil for \$779. Purchase includes: a control module; hardwired, submersible headphones; eight size AA batteries; a modular shaft that adjusts from 45 to 52 inches; silicone grease; cable straps; a user manual; and a lifetime warranty.



The detector weighs approximately 5 pounds. The control module can detach from the shaft and attach to a belt. Although the coil can detach from the shaft, coils are not interchangeable. A single beep indicates low batteries when a battery check is performed.

Technical support is available Monday through Friday, 10:00 a.m. to 4:00 p.m., Mountain Standard Time. Training is not provided by the vendor.

### 3.14 White's Electronics Inc. Surf PI Dual Field

The Surf PI Dual Field has a 12-inch coil and costs \$895. Purchase includes: a control module; hardwired, submersible headphones; eight size AA batteries; a shaft that extends from 45 to 50 inches; cable straps; a user manual; a training DVD; and a 2-year warranty.



The detector weighs approximately 5 pounds. The control module can detach from the shaft and attach to a belt. Although the coil can detach from the shaft, coils are not interchangeable. A faint audible alert indicates low batteries when a battery check is performed.

Technical support is available Monday through Friday, 8:00 a.m. to 4:30 p.m., Pacific Time. Training is not provided by the vendor.

#### 4. PRODUCT DATA–RESEARCHED

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This section identifies six additional handheld underwater metal detectors that range in price from \$400 to \$5,338. All of the detectors are powered by 9-volt, user-replaceable batteries and include a submersible earphone/headphones with purchase. Product data presented in this section was obtained from Internet searches and industry publication research. This information has not been confirmed by the vendors or independently verified by the SAVER Program. Features in this product comparison matrix are defined as follows, listed in column order:

**MSRP** refers to the MSRP of the detector.

**Coil Size (inches)** refers to the size of the search coil. The diameter is provided for round coils; the length and width are provided for oval coils.

**Warranty (years)** refers to the duration of the warranty.

**Search Technology** refers to the technology that the detector uses to locate objects.

**Submersible Depth (feet)** refers to the maximum depth the detector can be submersed in water and still operate.

**Battery Runtime (hours)** refers to the amount of time the detector can be continuously operated with the vendor-recommended batteries. Battery runtime is impacted by the environment, battery type, battery chemistry, and how often the detector alerts.

**Battery Indicator** indicates if the detector has a low-battery indicator or battery meter.

**Operating Temperature** refers to the operating temperature range of the detector.

**Visual Alert** indicates if the detector has a visual alert to notify the user when a metallic object is detected.

**Table 4-1. Product Comparison Matrix—Researched**

Vendor	Product Name	MSRP	Coil Size (inches)	Warranty (years)	Search Technology	Submersible Depth (feet)	Battery Runtime (hours)	Battery Indicator	Operating Temperature	Visual Alert
Field Forensics Inc.	UWEX® 722C	\$2,022	7.9	2	PI	328	6 to 25	✓	14° to 131°F	✓
	UWEX 725K	\$5,338	9	2	PI	328	3 to 10	✓	-4° to 140°F	✓
	UWM 40	\$1,699	8.7	2	PI	234	5 to 10	✓	14° to 131°F	
Treasure Cove	TC-7000	\$400	NP	2	NP	130	10	NP	NP	✓
Treasure Hunter	Aqua Vision Pro	\$796	10	5	VLF	132	65	NP	NP	✓
	Sand Shark	\$1,296	10	5	PI	132	65	NP	NP	
<p>Notes:  ✓—metal detector has corresponding feature  NP—information was not provided on the vendor’s website  MSRP—manufacturer’s suggested retail price  °F—degrees Fahrenheit  Search Technology: Pulse Induction (PI); Very Low Frequency (VLF)</p>										

Information in this table is based on data gathered from February to August 2013.

## 5. VENDOR CONTACT INFORMATION

Additional information on the handheld underwater metal detectors included in this market survey report can be obtained from the vendors listed in Table 5-1.

**Table 5-1. Vendor Contact Information**

Vendor	Phone Number	Website/E-Mail Address
Aquascan International Ltd.	+44 1633 841117	<a href="http://www.aquascan.co.uk">http://www.aquascan.co.uk</a>
CEIA USA	(330) 405-3190	<a href="http://www.ceia-usa.com">http://www.ceia-usa.com</a> <a href="mailto:info@ceia-usa.com">info@ceia-usa.com</a>
Field Forensics Inc.	(727) 490-3609	<a href="http://www.fieldforensics.com">http://www.fieldforensics.com</a> <a href="mailto:info@fieldforensics.com">info@fieldforensics.com</a>
Fisher <sup>®</sup> Research Labs	(800) 685-5050	<a href="http://www.fisherlab.com">http://www.fisherlab.com</a> <a href="mailto:info@fisherlab.com">info@fisherlab.com</a>
Garrett Electronics Inc.	(972) 494-6151	<a href="http://www.garrett.com">http://www.garrett.com</a> <a href="mailto:sales@garrett.com">sales@garrett.com</a>
JW Fishers Mfg. Inc.	(508) 822-7330	<a href="http://www.jwfishers.com">http://www.jwfishers.com</a> <a href="mailto:info@jwfishers.com">info@jwfishers.com</a>
Kellyco Metal Detectors	(407) 699-8700	<a href="http://www.kellycodetectors.com">http://www.kellycodetectors.com</a>
Minelab Americas Inc.	(888) 949-6522	<a href="http://www.minelab.com">http://www.minelab.com</a> <a href="mailto:info@minelabamericas.com">info@minelabamericas.com</a>
Tesoro Electronics Inc.	(928) 771-2646	<a href="http://www.tesoro.com">http://www.tesoro.com</a> <a href="mailto:tesorosupport@hotmail.com">tesorosupport@hotmail.com</a>
Treasure Cove	(805) 288-5735	<a href="http://www.treasure-cove.com">http://www.treasure-cove.com</a>
Treasure Hunter	None Provided	<a href="http://www.treasurehunteronline.com">http://www.treasurehunteronline.com</a> <a href="mailto:admin@treasurehunteronline.com">admin@treasurehunteronline.com</a>
White's Electronics Inc.	(800) 547-6911	<a href="http://www.whiteselectronics.com">http://www.whiteselectronics.com</a> <a href="mailto:sales@whiteselectronics.com">sales@whiteselectronics.com</a>

## 6. SUMMARY

This market survey report provides information on 20 handheld underwater metal detectors. An important consideration in the selection of a handheld underwater metal detector is the search technology. PI detectors typically reduce false alerts from salt and ground minerals; therefore, they may be better suited for use in salt water. VLF detectors sometimes react to salt and ground minerals; therefore, they may be better suited for use in fresh water, although some VLF detectors feature controls to reduce false alerts in salt water. BBS detectors may provide similar performance in both fresh and salt water.

In addition to the search technology, the differences between the products relate to cost, warranty duration, coil size, search technology, submersible depth, battery runtime, and the modularity of the control module, shaft, and coil. The majority of these detectors are similar in weight and

come with submersible headphones or an earphone. Most of the detectors are equipped with a sensitivity control, which assists with detecting objects at deeper depths. The majority of the detectors have a low-battery indicator, which may provide battery status at startup, during operation, or when a battery check is performed.

Emergency responder agencies that consider purchasing handheld underwater metal detectors should carefully research each product's overall capabilities and limitations in relation to their agency's operational needs.