



ITRC PROJECT PROPOSAL:

Breaking Barriers to the Use of

Innovative Technologies

To Find and Remove Underwater Ordnance

Contaminating Fresh Drinking Water Supplies

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Call for Proposals Topical Area

- Munitions constituents (MUNI)
Technologies and approaches for identifying, characterizing, removing, and/or remediating unexploded ordnance and other munitions constituents.

Problem Statement (why is this project necessary and relevant to ITRC's purpose & mission¹?)

This project is necessary and relevant to ITRC's purpose and mission because it will develop information resources regarding a significant environmental challenge. The project will develop and analyze innovative technology to solve the problem of locating and removing underwater ordnance, eliminating the threat of contaminants to drinking water. The team will be state led and consist of diverse professionals from the military, private industry and the scientific community. New, patented robotic equipment for removing munitions will be examined along with other suggested technology for identifying munitions constituents in drinking water and newer technology for locating munitions underwater.

¹ **ITRC Purpose:** To advance innovative environmental decision making
ITRC Mission: Develop information resources and help break down barriers to the acceptance and use of technically sound innovative solutions to environmental challenges through an active network of diverse professionals.



Positioning a new technology robotic grapple to grab a 500 pound bomb



Robotic Recovery Unit with a MK82
500 pound practice bomb in its grasp

Proposed Scope to Address Problem (what is the approach for this project?)

This Project will identify some examples of major Fresh Water Bodies used or likely to be used as drinking water sources and which have underwater ordnance that poses a risk of contamination through corrosion. The project will identify Historic Records to Review and suggest Innovative Technologies for removing the source of the water contamination. This Project will identify sensitive detection technologies for monitoring the fate of munitions constituents at these sites. The project will not address safety issues that unexploded underwater ordnance on the bottom poses for boaters dropping anchors. Bombs for example are thin skinned and often float once enough metal has corroded away.

Targeted Users (who will use products generated by this project?)

Any State that has communities which draw drinking water from fresh water bodies will have a need to use the report to identify Historic Records for Research and if underwater ordnance sites are found, consider the remediation technologies. Military commands charged with cleaning up underwater ordnance will also benefit from the work.



Broken off torpedo warhead in Lake Michigan



Old style 1000 pound bomb in Lake Michigan

At least 36 States are expected to face water shortages within the next five years, according to U.S. government estimates. Available freshwater supplies are dwindling across the country due to rising temperatures and droughts, while increasing sprawl, population and inefficient resource usage are leading to rising demand. Yet, many potential bodies of fresh water are contaminated with explosive compounds such as TNT, RDX and perchlorates leaching from underwater ordnance.

There are 25 million acres of land and water ranges in this country. According to a 1943 Training Manual on Ammunition Destruction, the traditional way of disposing of ammunition was to dump in water or bury near water.

Specifically much ordnance is deposited in the Great Lakes.

Lake Michigan: Fort Sheridan is approximately 30 miles north of the Sears Tower in downtown Chicago, and 15 miles south of the State line for Wisconsin.

A report on Fort Sheridan suggests as many as 100,000 unexploded anti aircraft rounds are abandoned on the floor of Lake Michigan. Since no detailed survey is available, this figure was arrived at by using a 10% dud ratio, calculated against an estimated one million rounds known to have been fired there for training during the course of WWII. As you can see from the current nautical chart, there are indeed a number of municipal fresh water intake cribs (or "straws") in the immediate vicinity...

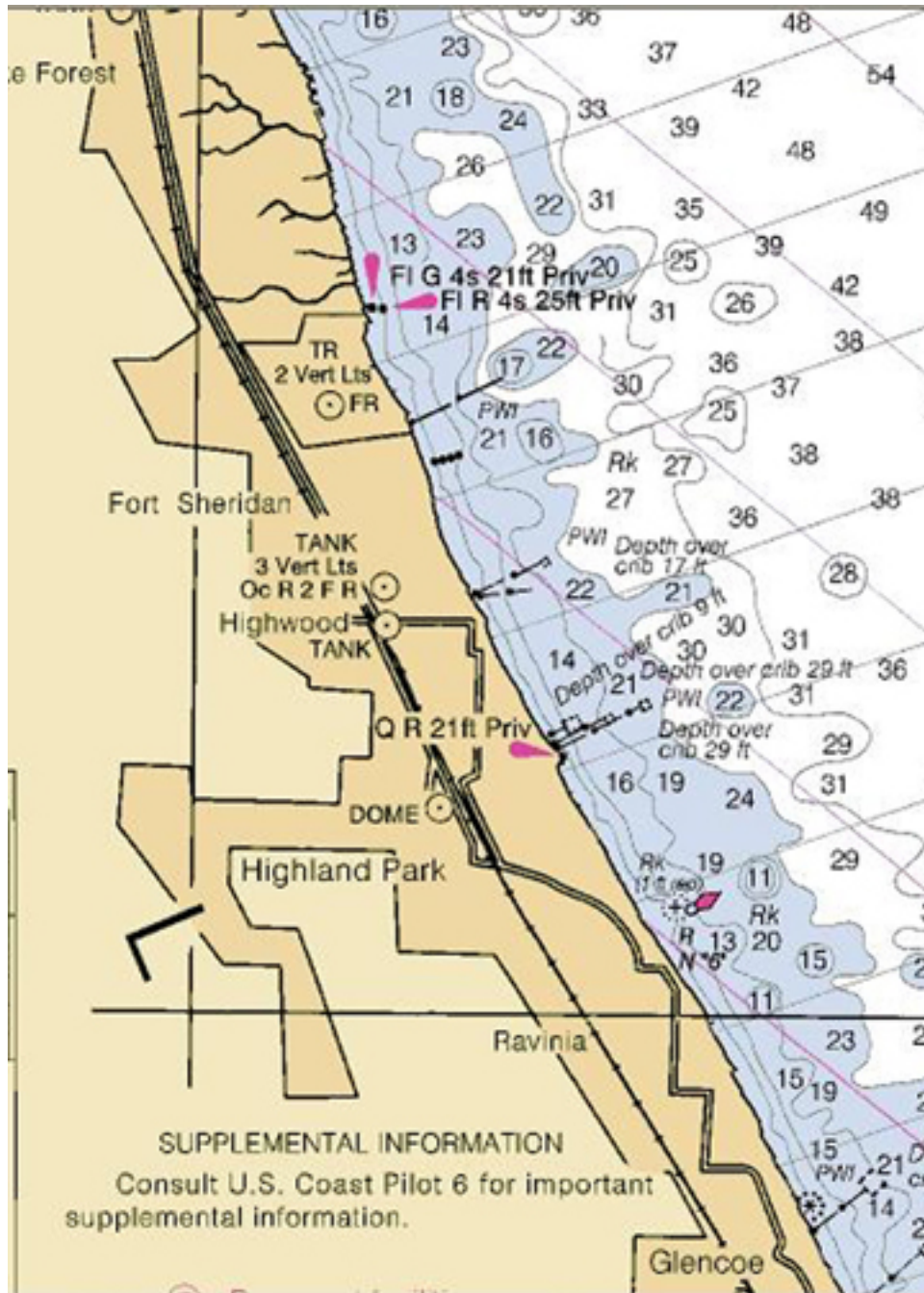


Chart showing drinking water intakes along Ft. Sheridan adjacent to UXO locations.

This site is not unique, as several other locations can be identified along the shores of the Great Lakes, where similar activities took place (on both the US and Canadian sides). At least two more such sites (but expected to be smaller) can be found up the shoreline *before you reach the Wisconsin state line*.

Lake Huron: Initial research into defense wastes abandoned in Lake Huron, indicates that the tonnage of unexploded munitions found there could exceed *one half million tons*. This resulted from large scale bombing strikes, the firing of medium caliber projectiles, and dumping activities.

Lake Superior: The US ACOE has admitted it dumped no less than 1100 55 Gallon drums of defense wastes from the “Twin Cities Army Ammunition Plant” into Lake Superior (under cover of darkness so the Russians couldn’t see) in the 1959-1962 time period. The contents of these barrels have been described as being “once classified” sub munitions, fuses, grenades, and rocket warheads. Additionally, up to 250 tons of crated “phosphorous tipped” munitions were discarded.

Lake Ontario: the US Army Corps of Engineers Buffalo District has secured funding and is launching a new project to complete a focused archival investigation regarding munitions handling operations at the former Lake Ontario Ordnance Works (LOOW) Site during and after World War II.

Team members will of course suggest other case study sites and make the ultimate selections.

Summary of Deliverables (primary project product(s))

Deliverables will include selection of two or more case studies where underwater ordnance is known to exist in bodies of fresh water from historic records review.

Deliverables will include showcasing new innovative technologies for finding and removing underwater ordnance.

The ultimate deliverable will be a technical and regulatory guidance document.

Impact (how will this project result in more effective environmental decision making?)

This product will be used by the entire environmental community involved with drinking water, because even well water can have explosive residues. This product will especially be used by those states and communities that draw some of their drinking water from bodies of fresh water. This product will be used by the EPA since it will alert that agency to a growing threat. The ITRC will benefit from this product by once again being at the forefront of bringing a problem to everyone’s attention and then including plausible solutions/actions.

Project Schedule

Through a group of various professionals likely including members of the Perchlorate Team and Unexploded Ordnance Team the team will identify several case studies where underwater ordnance has been identified and where actual or potential drinking water is likely to be drawn.

The Team will list potential conventional ordnance compounds but will not indicate at what levels they may be of concern.

The Team will then identify various technologies for locating and removing the ordnance.

Proposed Personnel

Potential Team Membership/Needs

I have no proposed team leader in mind.

However, ITRC is supposed to be state led. Analysis of two recent publications on munitions or munitions constituents by two different ITRC teams shows a minority of state members compared to the number of federal or federal contractor members. I think the majority of team members should be from states, territories and/or tribes.

The states that I think would be most interested are those that have drinking water shortages and may be drawing some of their drinking water from rivers and lakes. Certainly states bordering the Great Lakes and rivers like the Colorado, Potomac and Mississippi, which are known to have been impacted by munitions dumps, should be involved.

State and federal personnel, private contractors, together with current and former military personnel having expertise in cleaning up underwater ordnance would be especially helpful.

Proposed In-Kind/Direct Project Funding

None identified but stimulus funds may be available for CERCLA NPL related site cleanup.

If additional resources (financial or in-kind personnel support) have been committed or may be available from outside entities, please contact ITRC Director Anna Willett at awillett@sso.org and reference this proposal. Information is not being requested in proposals so that proposals may be evaluated on content vs. solely on funding commitments.

Related Work:

Pechlorate Remediation, Historic Records Review and Geophysical Prove-Outs are three ITRC technical guideline subjects that have already been written and are related to the proposed study.