

# SHORE STEWARDS NEWS

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*This issue was written by Scott Chase, Shore Stewards Coordinator in Island County*

*“And the rockets’ red glare, the bombs bursting in air...”* Few can deny the beauty of a brilliant fireworks display on the 4<sup>th</sup> of July. Watching the colorful glitter and sparkles reflecting off the waters of a lake or Puget Sound is a perfect way to celebrate our country’s birthday. Outside of the cardboard and plastic debris that need to be picked up off the beaches in the days following the event, there appears to be little damage done in shooting the fireworks out over our bodies of water. But there may be more left behind in the water than we realize.

## A Kaleidoscope of Colors



Fireworks can be bought in a number of locations in the days before Independence Day, whether at “safe and sane” fireworks stands, or at the local Reservation. Wherever you buy them, you are probably looking at how much dazzle you can get for your money. This could include the colors the firework emits, the sparkle effect, how high it flies, whether it whistles or explodes, etc. Each of these effects is produced by a different chemical or metal, and many of these are toxic. Glittering greens are made by using barium nitrate, and blazing reds use lithium or strontium compounds. Brilliant whites result from use of aluminum, and blues are created by using copper compounds. Other ingredients may include nitric oxide, potassium nitrate, sulphur dioxide, nitrogen dioxide, antimony sulfide, and perchlorates. Unlike most other consumer products that are regulated by our government agencies, the ingredients of your typical

firework are not listed on the package. Fireworks are generally produced in China, and those that are bought “illegally” on Reservations have little regulation as to what ingredients they contain. And there aren’t many of us who ask the operator of the stand what chemicals are in their fireworks.

Our police and fire departments, as well as local governments, prefer “safe and sane” fireworks to be used in a location that will not create a fire hazard, and ask that the debris be cleaned up afterwards. The reality of the situation can be seen and heard by anyone: the use of fireworks begins at least a week before the 4<sup>th</sup> of July, with the majority used that evening. Those who live around lakes and the Sound typically shoot them off over the water, both to lessen the chance of starting a fire and to enjoy the extra color from the reflection off the water.

When these fireworks explode over a body of water, or fall into the water as duds or spent casings, some of these toxic chemicals and heavy metals are released into the water. Those fireworks that are ignited on roads further inland, a common location for many neighborhood displays, can also have their chemical residue carried into the water bodies through stormwater runoff. The rains following the 4<sup>th</sup> of July celebration wash the chemicals into the storm drains, which carry the contaminants into the streams and rivers, then into the Sound or ocean.

## The Controversy over Contaminants

Other than small celebrations on New Years Eve, the majority of fireworks in our country are used during the 4<sup>th</sup> of July and to a lesser extent during the few days beforehand. Many feel that this short timeframe means that the amount of chemicals released into the water is insignificant. Others argue that the amount of toxins, particularly heavy metals like lead or mercury, can accumulate over a number of years. There have not been a large number of studies done regarding this, but some efforts are now being made to see if fireworks are indeed causing harmful pollution.

In 2006, SeaWorld in San Diego halted their nightly display of fireworks due to a threatened lawsuit by San Diego Coastkeeper, an environmental group. The displays had been held nightly during the summer since 1985, and Coastkeeper felt that the studies of water quality near SeaWorld were insufficient. Tests of the water were taken twice a year: in May, before the displays began, and in October, a month after the displays ended. Samples of bottom sediment in that location tested for 23 heavy metals. With one exception, testing revealed levels to be in the normal range. After halting the displays, SeaWorld officials stated they would apply for a discharge permit from the San Diego Regional Water Quality Control Board, part of the statewide regulatory system for water pollution. Aerial fireworks shows are not usually regulated by the various federal and state clean air and water quality agencies. The fireworks show resumed in 2007, after an agreement between SeaWorld and the Coastkeepers. Coastkeepers said they would not file suit if SeaWorld applied for a clean water permit, and cleaned up the debris left in the water after each show.

## Perchlorates and Water Quality

One of the biggest concerns regarding potential firework contaminants is the harmful effect of perchlorates, which are largely used to propel the fireworks into the sky. Ammonium perchlorate is a chlorine compound used in the solid rocket boosters that lift the space shuttle into orbit, and in military rockets. Potassium perchlorate is often used in the production of aerial fireworks. The Environmental Protection Agency lists it as a contaminant of concern because it is very water soluble and can remain in water for a long period of time. Perchlorates can harmfully affect thyroid function in fish and animals, and elevated concentrations have been found in lakes and groundwater following fireworks demonstrations. An Oklahoma study of surface water locations near fireworks displays from 2004 – 2006 found that within 14 hours after the displays, concentrations of perchlorates spiked to values ranging from 24 to 1028 times the normal baseline value. These concentrations dropped to the baseline value within 20 – 80 days after the event, depending on water temperature. The Massachusetts Department of Environmental Protection did several studies of fireworks and perchlorates, and in 2006 became the first state to require most public water systems to test for perchlorates, with a standard of 2 parts per billion.

Fireworks displays are a very important event on many military bases during Independence Day. A memo dated May 21, 2009, from the Under Secretary of Defense to the Assistant Secretaries of the Army, Navy and Air Force, had the subject line heading: “Best Management Practices (BMPs) for Fireworks to Minimize Perchlorate Releases.” This 4 page memo detailed what perchlorates are, how they are found in aerial fireworks, and how fireworks should be displayed responsibly. From the report, it was advised that “The location of fireworks must be made to minimize risk to drinking water sources. Department of Defense personnel and the contractor should be aware of the existence of surrounding drinking water supplies and keep fireworks displays as far away from them as possible. Of particular concern are fireworks displays near surface waters used for drinking water supplies and within the recharge areas of public drinking water supply wells.”

## The “Greening” of Fireworks

Scientists around the world are now looking into more environmentally-friendly alternatives to the traditional chemicals and metals used in fireworks, and are reformulating how they are used. One way in which they seek to reduce the use of perchlorates is to get that energy to propel the firework skywards from a higher nitrogen content in the formulation. By using less perchlorate, you produce less smoke, which also means less need for heavy metal coloring agents: barium, copper and strontium, to name a few. Use of nitrocellulose is another alternative to perchlorates. According to Darren Naud of DMD Systems, "Nitrocellulose is probably one of the best low-smoke ingredients. It burns with little smoke, and there's no fallout or residual combustion by-products that are nasty. There's just [carbon dioxide], water and nitrogen."

Many of the large amusement parks around the world use nightly fireworks displays as a big draw for customers. Few are as well known as Disneyland, who are on the forefront of clean fireworks technology. At Disneyland in California, they have eliminated the use of perchlorates altogether, relying instead on compressed air to propel the 361 colorful devices skyward. The system is not without problems, but over a 12 year period researchers obtained 7 patents in developing this system. Using “off-the-shelf” products that are easily obtained, Disney plans to donate the patents to a non-profit group that can license the technology for use worldwide. Other innovations being looked at by scientists include alternative compounds to the current chemicals and metals to provide the color and effects without the large quantities of smoke. Whether these technologies will make it down to the consumer level, where fireworks are mass produced cheaply in China and other Asian countries, remains to be seen. But even in China, where some of the world’s largest fireworks displays are held, some concern about the pollution from fireworks is beginning to surface.

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## Events/Activities

**Digging for Dinner, June 20<sup>th</sup>** - Learn how to do it the right way! Join WSU Island County Beach Watcher, Eugene Thrasher, to learn how to responsibly dig for clams. You'll gain an understanding of the importance of filling the holes you dig, how to determine the various limits, all about the Washington State rules and guidelines, and lots of clam lore. You'll need your own clamming license (sold at most hardware stores), and clothing/footwear that can get wet and sandy. Don't forget your shoveling tool and bucket! Demonstration begins at 8:30 am in Freeland. Cost: by donation. To register and receive driving directions/parking instructions, call 240-5558 or e-mail [n.zaretzke@co.island.wa.us](mailto:n.zaretzke@co.island.wa.us)

**Harvesting and Cooking Shellfish, June 24<sup>th</sup>** - Learn techniques of how to properly harvest and cook the shellfish you collect on the beach. This includes a cooking demonstration of different shellfish. Presenters are WSU Beach Watchers: Bill Griffith, Tom Perry, Pete Domoto and Duane Hoekstra. This demonstration is free and will take place at 7:00 pm on Wednesday, June 24th, at the Camano Community Center, 141 N. E. Camano Drive, Camano Island. Questions or directions: (360) 387-3443, ext. 258

**Composting 101, June 24<sup>th</sup>** - Is your yard waste out of control? It must be time to start a compost pile or improve your existing one! Composting is a great way to dispose of your and kitchen wastes, lowering garbage bills and saving valuable landfill space while providing a wonderful mulch or soil amendment for your garden. This class will cover everything you need to know in order to begin or improve a functional composting system in your back yard. You'll also learn the safe way to use animal manures in your garden. This class is held 7:00 – 8:00 pm, Wednesday, June 24<sup>th</sup>, at the Good Cheer Community Garden in Bayview. Cost: by donation. To register and receive driving directions/parking instructions, call 240-5558 or e-mail [n.zaretzke@co.island.wa.us](mailto:n.zaretzke@co.island.wa.us)

**Rain Barrel Construction, June 25<sup>th</sup>** - Save the rain for a sunny day! Come by the WSU Extension display at the Oak Harbor Outdoor Market and learn how you can construct your own rain barrel, which can be attached to your downspouts to capture runoff from the roof. You can provide your indoor and garden plants with naturally soft water they will love! Learn about the different methods of making your own rain barrel, what materials to buy, and where to get them. Making your own barrel is quick and easy, at a fraction of the cost of buying one already constructed. A rain barrel display and handout materials will be available, and demonstrations will be given at 4 pm, 5 pm, and 6 pm. Cost: by donation. Questions will also be answered by the presenter, Scott Chase, Shore Stewards coordinator for Island County. Questions or directions: (360) 387-3443, ext. 258

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*To view archived copies of past Island County Shore Stewards Newsletters, go to [www.shorestewards.org/island/newsletter/](http://www.shorestewards.org/island/newsletter/)*

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