

# Boat Smart, Update Your Charts

by Ken Cirillo, Senior Business Development Executive

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You're on an evening cruise, and as you approach an unfamiliar harbor, you suddenly notice that the NavAid lights you see out of the pilothouse window don't match up with what you see on your vessel's chart plotter. A glance at the echosounder shows the bottom quickly shoaling, and you're forced to make a quick decision about which way to steer to find deeper water. Hard to port. No, starboard. Wait, you think, it's got to be to port.

Unfortunately, your guess doesn't work out. You pull back on the throttle, then try to reverse your boat to a stop. But it's too late. You wince as you hear that horrible sound and feel the boat shudder and grind its way to a humiliating halt. Your mind is flooded with feelings of embarrassment, until you suddenly realize that you may have real flooding or other serious damage to contend with.



Don't go bump  
In the night!

## Grounded in Truth

The above scenario is more than just a compelling example of a boating misfortune. It's an all-too-common occurrence that might have been avoided if this boater just kept his electronic navigation charts up to date. The Alliance for Safe Navigation partners strongly suggest that updated paper charts — coupled with updated electronic charts and proper attention to the surroundings — are the best approach to safe navigation. The Alliance is a combined government/marine industry task force formed in 2009 to address boating safety issues and includes representatives from OceanGrafix® (print-on-demand nautical chart provider), Jeppesen (formerly C-MAP), United States Power Squadrons®, BOAT/US and the SeaTow® Safe Boating Foundation, United States Coast Guard Auxiliary®, with sponsorship support from NOAA. The U.S. recently saw a 12.8 percent increase in boating-related fatalities, with 758 deaths in 2011 (versus 672 in 2010) and a fatality rate of 6.2 deaths per 100,000 registered boaters, up 14.8 percent from 2010! While boating is generally a safe activity, the enormity of the United States' navigable waters and the popularity of the sport make mishaps inevitable.

"The more we've delved into this issue, the more apparent the need to raise awareness among boaters about how important updated charts can be," said OceanGrafix President David DeGree. "Whether paper or electronic, the tools are there and readily available in the form of updated charts. Yet, our own ASN surveys have shown that a majority of boaters are unaware or, at the least uneducated as to the importance of up-to-date navigational tools," added DeGree.

According to the latest published U.S. Coast Guard Statistics, collisions with fixed objects were the third-highest cause of boating accidents, with 460 accidents in 2011, resulting in \$4,391,494 in damages.<sup>2</sup> Both of these figures represent increases from 2010. This includes the striking of any fixed object above or below the water. Groundings (running aground or striking or pounding on rocks, reefs or shoals) accounted for 338 additional accidents.<sup>2</sup> Collisions with a submerged object (which include fixed objects below the surface of the water) accounted for an additional 196 accidents in 2011, up from 169 the previous year.<sup>2</sup>

Combined, these three categories accounted for 994 accidents and more than \$10.9 million

<sup>1</sup> U.S. Coast Guard Recreational Boating Statistics 2011, Pg. 6.

<sup>2</sup> U.S. Coast Guard Recreational Boating Statistics 2011, Pg. 35.

## Fast Facts

- The U.S. has 500,000 square nautical miles of navigationally significant areas and 95,000 miles of shoreline.
- There were 12,173,935 boats registered in 2011<sup>5</sup>
- States with the most registered boats include:<sup>6</sup> Florida (889,895), California (855,243)\*, Minnesota (808,783), Michigan (803,391)

\*California boat registrations grew more than 15,000 in 2011 to jump from #4 to #2.



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in property damage. Even though the overall number of reported boating accidents in 2011 decreased to 4,588<sup>3</sup> from 4,604 in 2010, the number caused by these three factors grew from 954 to 994. In 2011, these three types of boating accidents also resulted in 94 deaths (out of 758) and 652 injuries (out of 3,081).<sup>4</sup>

These figures are notable because they represent hazards frequently shown on up-to-date navigation charts, and are therefore potentially avoidable.

These statistics, though staggering, represent only those incidents that are reported to authorities. Industry experts are well aware that the actual number of incidents is much higher — with collisions with fixed objects and groundings the most likely accidents to go unreported.

This paper addresses the importance and need for boaters to keep their navigation charts up to date, whether they are paper (print on demand or regular NOAA charts), raster or vector electronic charts.

For the purpose of this paper, we are not referring to chart books or cruising guides, even though all include chart data that changes and should be updated.

In today's technology-driven society, consumers have come to expect the most up-to-date data possible, whether it's computer software, virus-protection or Web browsers. We turn on our car's GPS and drive away, confident we have up-to-date street and Points of Interest (POI) data. On occasions where the road we're being routed on isn't there, we continue on. Frustrated, perhaps, but we usually don't take the turn if the road's not there!

So why don't the majority of boaters take advantage of updated chart data when it's available? The reasons may be multifold, ranging from a perceived lack of need or lack of awareness regarding the ease of acquiring updates and the relative low cost compared to groundings and other accidents. We'll examine this in further detail.

## The Old Adage: The Only Constant is Change

From the bayous of Louisiana to the shoals of Rudee Inlet and everywhere in between, the nation's waterways are always changing. Changes both natural and manmade provide a gauntlet of both visible and subsurface obstacles to safe passage. Boaters must contend with things like underwater hazards, shifting sandbars or changes to NavAids, not to mention the rising and falling tides that can affect safe vessel clearance above and below the waterline.

On land, the forces of nature work slowly and visibly. At sea, these forces are constantly changing and shaping the environment in which we travel by boat. Over time, these forces can even alter shoreline features. However, much of this change takes place beneath the surface. These things may not be visible, but they can affect safe passage by vessel. Navigating with up-to-date charts is often the only way boaters can be made aware of these changes.

An introductory paragraph on a NOAA website page "How a Chart is Updated" sums it up pretty well: "The coastal waters of the U.S. are in a constant state of change. Channels

2 U.S. Coast Guard Recreational Boating Statistics 2011, Pg. 35.  
3 U.S. Coast Guard Recreational Boating Statistics 2011, Pg. 17.  
4 U.S. Coast Guard Recreational Boating Statistics 2011, Pg. 35.

5 U.S. Coast Guard Recreational Boating Statistics 2011, Pg. 6.  
6 U.S. Coast Guard Recreational Boating Statistics 2011, Pg. 67.

are dredged and sometimes re-routed; new aids to navigation are established or deleted; new wrecks or obstructions are discovered; natural shoaling occurs in many areas; and new berthing facilities are built along the shoreline. In order for the mariner to transit safely, it is imperative that these changes be reflected on nautical charts as soon as practicable.”

## Who Is Responsible for Managing This Changing Information?

Because the changes that take place on our navigable waterways are constant, so is the task of bringing this information to the boating public. Nine U.S. Coast Guard districts issue weekly Local Notice to Mariner reports (known as LNMs or local NTMs) containing information on sunken vessels, buoy changes, obstructions, changes in channel markers, navigation aids that are missing or non-operational and others. Additional updated data also comes through the National Geospatial Intelligence Agency’s (NGA) Notice to Mariners and, for the Great Lakes and St. Lawrence Seaway, the Canadian Coast Guard Notice to Mariners.

These NTMs provide hundreds of updates per week for official NOAA charts, and when it deems necessary, the administration issues a new chart edition that contains all changes since the previous edition. Of the 1,019 NOAA nautical charts available for U.S. waters, only about 100 of these receive new editions annually.

Great strides have been made to gather this information and make it available to the boating public. For example, since 2000, mariners have been able to obtain print-on-demand (POD) NOAA nautical charts through OceanGrafix (with changes and corrections updated daily). Private electronic chart producers have also implemented a variety of ways to bring updated charts to boaters. Yet studies have shown that the majority of boaters are sailing with out-of-date charts. When they do so, they are placing themselves and their vessels in unnecessary peril. As stated in an NOAA report, “when charted information becomes obsolete, further use of the chart for navigation may be dangerous. Natural and artificial changes, many of them critical, are occurring constantly.”

When you consider this, it’s easy to understand how up-to-date charts can help navigators steer clear of trouble in many forms. It’s logical to expect that by increasing the number of recreational boaters using up-to-date paper, raster or vector charts, we should be able to improve safety, reduce property damage and financial loss, and create more confident boaters.

The situation is much the same with regard to digital charts used with chart plotters or PC-based navigation systems. Many recreational mariners who depend on these electronic systems are navigating with outdated electronic charts. By doing so, they are not only putting their vessels at unnecessary risk, they are missing out on one of the inherent advantages of electronic charting. Unlike traditional printed charts, digital charts can easily be upgraded or traded in for updated versions (depending on the format), delivering not only Notice-to-Mariner corrections, but also additional data that can improve the system’s functionality.

A 2010 survey of more than 7,500 boaters by the Alliance for Safe Navigation revealed an unfortunate lack of concern among boaters regarding the accuracy of the data (both electronic and paper) used for navigation.

Consider these telling facts:

- Only 36 percent of boaters are concerned about the accuracy of the data they use for navigation and update regularly.
- A full 25 percent of boaters (the next largest group) said they’re not very concerned, because “they don’t boat too far from shore or in unfamiliar waters.”
- Another 14 percent responded that they’re “concerned, but don’t know how to go about obtaining updates.”

When asked how often they purchase updates for their electronic charts:

- The largest group of boaters who responded (29 percent) replied “never.”
- The next large group (25 percent) updated electronic charts once every two-to-three years.
- Only 19 percent of boaters updated their electronic charts once or twice per year (as recommended).



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Photo courtesy of Sea Tow

Roughly 25 percent of ASN Survey respondents reported running aground in the last five years.



Photo courtesy of Sea Tow

The latest fall 2011 ASN Survey added some additional eye-opening facts. Out of 2,040 survey participants, 528 people (more than 25 percent) had their boat run aground in the last five years.

What do these “telling” facts tell us? For a variety of reasons, a majority of boaters simply don’t update their navigational data often enough.

### Feature Dependent/Feature Rich Electronic Charts Require Routine Updating

Electronic charts are dynamic, interactive and “smart,” allowing manufacturers to enable the navigation system to greatly enhance the boater’s situational awareness. For example, electronic charts allow mariners to access aerial imagery, view NavAids on the chart that flash the same color and sequence as what’s found out the pilothouse window, look at 3D representations, and receive warnings of dangerous waters ahead with anti-grounding features. When you consider the potential value of these features to the navigator (and the ability to enhance/expand upon them with newly added data), it’s even more important for users of digital charts to keep their charts updated.

Digital chart manufacturers place much emphasis on collecting, maintaining and distributing electronic charts to boaters. Just as important is making this updated electronic information accessible and affordable to recreational mariners. The industry as a whole has demonstrated an ongoing commitment to improving its chart updating processes and distribution systems.

Making changes and adding features to the chart database is an ongoing job. Most digital chart manufacturers offer inexpensive updates either annually or semi-annually by providing replacement chart cards, dealer-direct updating while you wait, or by downloading updates direct from the manufacturer’s website. Jeppesen, for example, releases updated versions of its C-MAP 4D, MAX and NT+ charts three times each year, and has focused on innovative ways to get updated charts into boaters’ hands — via an online updating service for C-MAP 4D.

Boaters who believe that their older electronic charts are “close enough” to being accurate would be wise to consider some recent representative statistics. The latest fall 2012 release of Jeppesen’s C-MAP MAX cartography included thousands of Notice to Mariner and other changes on most of its chart titles. One MegaWide MAX chart title experienced 12,690 NTM changes, along with 4,527 updated charts and 130 new charts contained within its boundaries. Even a typical Wide MAX chart can see thousands of changes from one edition to the next. For example, the newest MAX chart for the U.S. East Coast and Bahamas was brought up-to-date with 8,039 NTM changes, 2,785 updated charts and 99 new charts. While many of these changes would be considered “minor” and represent no danger to safe navigation, when you’re talking about change on this scale, it’s easy to see the potential for dozens of critical changes on each electronic chart.

### Bringing Technology From Commercial Shipping to Recreational Boating

Professional mariners have long been required by law to carry and use up-to-date paper charts whenever and wherever they navigate. Accurate and up-to-date electronic charts also play a key role in the safety of professional mariners around the world — and this role will become even more prominent beginning this year. The International Maritime Organization (IMO) recently approved amendments to the International Convention for the Safety of Life at Sea (SOLAS), mandating that all large passenger tanker and cargo ships be required to carry approved Electronic Chart Display and Information Systems (ECDIS). These vessels will be obliged to fit ECDIS on a rolling timetable that began in July 2012.

The basis for these electronic charts’ accuracy is their ability to be updated on demand. Whether in paper or electronic form, commercial mariners always sail with the latest available chart data at their disposal. They are required by law and commanded by common sense to do so, because lives and livelihoods depend on it.

No such rules exist for recreational vessels — even though they arguably have as much at

risk. Any boater, whether he's piloting a 20-foot center console or a 45-foot sportfisher, needs to be sailing with up-to-date charts. It's too *easy*, too *inexpensive* and too *important* not to.

"Why do we permit recreational boaters to sail with outdated paper or electronic charts — or no charts at all?," asks Ken Cirillo, senior business development executive for Jeppesen. "This is a hard question to answer, especially when you consider that we produce and maintain these digital charts under exacting standards for accuracy and consistency," Cirillo added. For example, Jeppesen's marine cartography carries a variety of international quality standard certificates, including ISO 9001 (Chart Production Process Certification), Det Norske Veritas (DNV) Certification and ISO 16739 (Standards for Database Quality). "Still, all of this is for naught if a boater is unaware that an important channel marker has been moved and he's navigating by what he sees on his old charts," added Cirillo.

## Keeping Up With a Changing Marine Environment

"Ask a recreational boater the date on his or her electronic charts — typically their chart information is three to five years out of date," said Bob Sweet, past national education officer, United States Power Squadrons. "There is really no reason for this, given today's technology and the availability of up-to-date chart data. The consequences of sailing with old charts can be magnified for recreational boaters, as they explore unfamiliar areas and venture into shallow waters. These are precisely the types of scenarios where out-of-date chart information can lead pleasure boaters into trouble," further explained Sweet.

As noted earlier, the marine environment is dynamic and constantly changing. The changes that occur in any one boating area can average several each a week, dozens in a month and hundreds over the course of a year. When you consider that this is occurring all the time, all over the country and around the world, the need for boaters to always sail with updated charts is clear.

When it comes to digital chart updating, the industry has been working to close the gap between professional mariners and recreational boaters. Jeppesen's C-MAP cartography is based on the concept of constant improvement and enhancement, and allows boaters to purchase the chart data they need, then update it and add to it as new information becomes available. Information such as new bathymetric charts, a comprehensive wrecks database and "Value Added Data" for fishing are examples of this new information. Boaters can easily update and get additions to their charts online.

The evolution of "crowd sourcing" allows the boating community itself to note and share navigational information and experiences via the Internet. One company, ActiveCaptain, has led this growing phenomenon, providing a way for boaters to update charts with experience-based information, ranging from missing navigation marker reports, to shoaling, to details and comments on safe anchorages and marina services. This information is added to charts as a layer, where other boaters can use and benefit from it. With today's increasingly interactive society, this trend is sure to grow as boaters and navigation companies find new ways to work together to mutual benefit.

## "Is Your Chart Plotter Ready to Go Out of the Box?" — Think Again

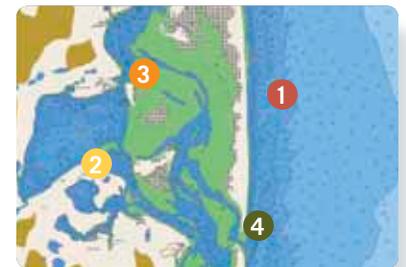
The majority of existing chart plotters operate with digital charts contained on cartridges or embedded into the plotter. Chart plotters with embedded chart data should also be updatable; this is an important point when selecting a new plotter. A typical chart plotter may have been shipped from the manufacturer at least six months before it was purchased, not to mention the time it might sit on the retailer's shelf. The NTM changes that can occur from the time these embedded charts were first programmed into the chart plotter to the time it is installed on your boat can easily number in the hundreds, if not thousands, depending on the geographic size of your boating area. In this situation, your "new" plotter is technically outdated. This can make a venturing out in the fog, darkness, bad weather or even low tide conditions a dangerous proposition.

Natural and artificial changes, many of them critical, are occurring constantly.

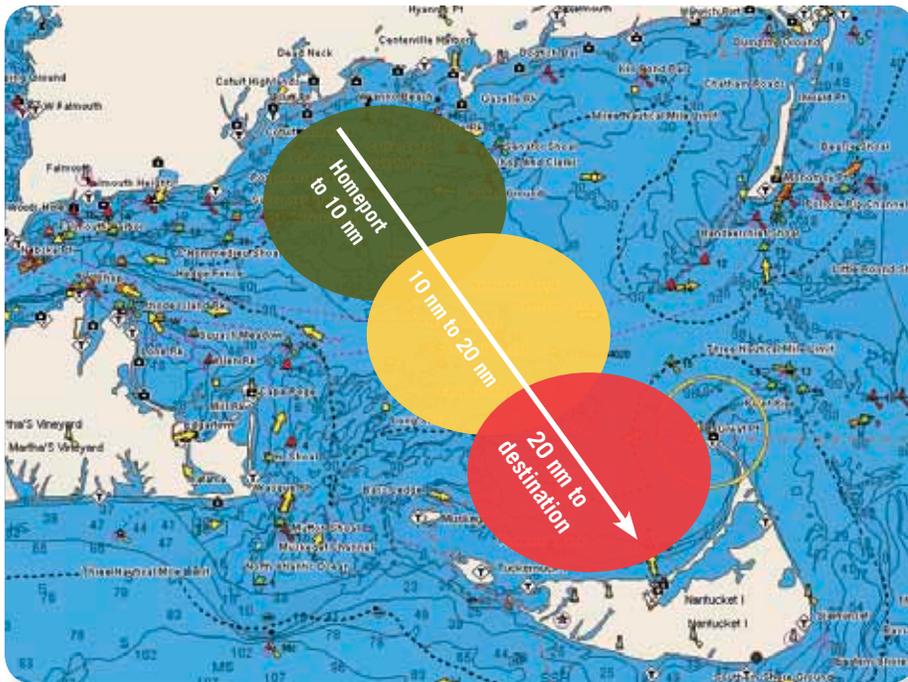
Spring 2012



Fall 2012



- 1 Depth contour lines changed
- 2 Navigational aids removed
- 3 Channel narrowed by expanded intertidal areas
- 4 New break in outer beach



“Zone of Confidence”... as one travels further from their homeport, their confidence or “local knowledge” of the navigational information decreases proportionally to the distance away from it.

### There’s More at Stake Than NTM Changes

The more advanced today’s chart plotters become, the more important it is to keep their digital charts up to date. Safety is a primary reason, of course, but regular updating also ensures that boaters have access to the latest “value added” content, new features and expanded coverage areas. In addition to official notices and corrections, for example, digital chart manufacturers have the ability to add a wide range of useful data and information. This can include information to enhance the boating experience for specific user groups, such as preferred anchorages or popular dive spots for cruisers, or the location of wrecks, reefs and “local expert” fishing spots for anglers.

Information about and boundaries for local “no-go” zones can also be added to keep boaters safe and on the right side of the law, ranging from manatee-protection areas to coral reef “no-anchor” zones. Another example of this is the constantly evolving situation with marine protected areas (MPAs) along the entire length of the California coast. Networks of no-take reserves and restricted state marine reserves are being put in place, and it is the boater’s responsibility to know where he is fishing and what the rules are. The most recent of these took effect in January 2012, closing or restricting a total of 15 percent of coastal

and island waters off Southern California. The consequences of not knowing can be costly fines and a misdemeanor infraction on the boater’s record.

Updated digital charts can also show boaters a variety of exclusion zones put in place for national security reasons or areas with restricted boating access for safety/ environmental reasons.

### A Concerted Effort to Improve Navigation Safety

To help increase the number of boaters using updated charts, the industry is building awareness by educating boaters on the need for regular updating. Another area of focus is overcoming obstacles to updating and making the process more convenient, accessible and affordable for recreational boaters.

The Alliance for Safe Navigation is working to increase awareness of chart updating through the Internet, printed educational materials, boating news media, trade and consumer shows and more. This level of cooperative effort is yet another indicator of how important up-to-date chart information — whether printed or electronic — is to improving safety of recreational mariners.

Making recreational boaters aware of the need to update is one important step. Motivating them to take action is another. “Changes are happening — daily, weekly and monthly — and you will be surprised how important one little buoy can be,” said Cirillo. Consumers need to see a strong perceived value to invest in updated charts, especially in today’s tough economy. Electronic chart manufacturers have the ability to add features and value to the product, along with NTM corrections and other chart changes. A boater who is sailing with two- or three-year-old digital charts might be missing out on more than a shifted channel entrance that could cost him his expensive running gear. He is also likely to miss out on new nav reference photos, updated marina information and the latest fishing regulations and catch limits.

“Too many boaters think that the chart or chart chip they got when they purchased the boat is good forever,” said Joe Frohnhofer III, chief operating officer, Sea Tow. “They don’t realize that buoys get moved or renumbered,

shoals shift and new navigational hazards are continuously appearing. Safe navigation begins with accurate charts, which when used correctly, help keep boaters in the channel and away from the shallows, rocks, sandbars, shoals and more. Boaters who have, understand and use up-to-date charts are more confident — and that leads to an overall better boating experience,” added Frohnhoefer.

In addition to creating a better product, chart manufacturers have focused on ways to make the process easier. Club Jeppesen has been developed over many years to make the updating process automatic and affordable, while providing a variety of other benefits and discounts. For club dues that are less than the cost of a single updated chart, C-MAP by Jeppesen chart owners automatically receive an annual update, sent at the time and place of their choosing. Thousands of members have signed up for this service and continue on for the life of their plotter.

Membership in the club also provides boaters with a range of programs and benefits designed to save them money and increase satisfaction with their plotter brand. More importantly, according to Cirillo, it also reinforces the message that the industry cares about their navigational safety.

## Are Updated Boaters Safer Boaters?

In the insurance industry, preferential rates have always been offered to people who are better risks. Discounts are given for completion of safe boating classes, meeting requirements for vessel safety check, years of boating experience, etc. Can a link be drawn between updated navigation charts and improved boating safety? Based on the program of at least one leading marine insurer, the answer is yes. Sea Insure™, the insurance division of leading nationwide marine assistance provider (and Alliance member) SeaTow, offers significant discounts on premiums to Club Jeppesen members. This is due in part to the fact that club members will always have recently

updated charts at their disposal. Navigating with annually updated charts makes these mariners less likely to encounter dangerous navigational situations. Having accurate chart information is key to avoiding some of the most common causes of boating accidents.

## An Ounce of Prevention

The old saying “an ounce of prevention is worth a pound of cure” certainly applies to navigation. The latest up-to-date navigation charts — and the confidence that comes with them — should be an essential item on every boater’s commissioning checklist. Most chart manufacturers provide updates annually, and updating your charts annually makes you an informed boater as well as a safer one.

“We’ve all heard this argument before, or perhaps are even guilty of saying it ourselves,” said Cirillo. “Why bother updating my charts — nothing ever changes in my boating area. Coast Guard NTM bulletins are irrefutable proof that changes do occur constantly — in your own ‘boating backyard’ as well as outside of it,” added Cirillo.

## In Conclusion

Out-of-date charts, whether paper or electronic, put you, your boat and your crew in danger. With a concerted marine industry effort to make updated charts easy to get, affordable and beneficial to use, there is simply no excuse for any navigator to put himself in harm’s way because of outdated charts. The best available chart data is out there and readily accessible for recreational boaters, just as it is for professional mariners.

For boaters navigating with electronic charts, the process starts by checking their existing charts to determine the edition date. Chart cartridges should be clearly marked with a date; chart plotters should provide the data source/date for embedded charts. Check with your electronic chart supplier/or chart plotter manufacturer for more information.

## Boat Smart. Update Your Charts.



## Resources For Additional Information:

### Alliance for Safe Navigation

[allianceforsafenavigation.org](http://allianceforsafenavigation.org)

### Jeppesen Marine

[jeppesen.com/lightmarine](http://jeppesen.com/lightmarine)

### NOAA Chart Updating Info

[nauticalcharts.noaa.gov/mcd/learn\\_chartupdate.html](http://nauticalcharts.noaa.gov/mcd/learn_chartupdate.html)

### OceanGrafix

[oceangrafix.com](http://oceangrafix.com)

### Sea Tow Foundation for Safe Boating Education

[boatingsafety.com](http://boatingsafety.com)

### United States Coast Guard Auxiliary

[cgaux.org](http://cgaux.org)

### United States Power Squadrons

[usps.org](http://usps.org)

### Jeppesen Marine Video on Chart Updating

[jeppesen.com/marine/lightmarine/video.jsp#update](http://jeppesen.com/marine/lightmarine/video.jsp#update)