Issue #2, Spring 2009

The Lookout

Manifest

A Quarterly Newsletter

Published by:

Northern Atlantic Dive Expeditions, Inc.

http://www.northernatlanticdive.com

info@northernatlanticdive.com

Editors-in-Chief:

Heather Knowles

David Caldwell

Copy & Layout Editors:

Roman Ptashka

Scott Tomlinson

Kristen Tomlinson

A Message From The Wheelhouse

Hello Divers –

Thanks for reading Issue #2 of our newsletter, The Lookout. Our first issue, distributed in January, kicked off what we hope will be an interesting and informative quarterly newsletter, and we need your feedback and input to continue to make this type of newsletter possible. The next issue will be published in July 2009. If you have ideas or suggestions – please let us know!

In this issue, we have a diverse line-up of articles. It includes a historical piece profiling two shipwrecks – one old and one new – in Massachusetts Bay, as well as a piece on an important issue that affects all of us, both within and outside of diving — an article on the Massachusetts Ocean Plan. We also have included part 2 of the "Approaches to Mixed OC/CCR Diving" article where we discuss our procedures and methods for dealing with gas management strategies as well as emergencies / contingencies. Finally, read up on a recap of some of Gauntlet's winter diving highlights, as well as the March dive shows – Boston Sea Rovers and Beneath the Sea.

As we embark up on the 2009 dive season, we're looking forward to many great adventures. Here's to a safe and exciting upcoming season! See you all on the water!

Heather & Dave

The SS Romance and F/V Miss Sonya: Shipwrecks as a Depiction of Historic and Modern Coastal Vessel Activity in Massachusetts Bay

The SS Romance

Many shipwrecks found in Massachusetts Bay are historic representations of the types of activity that occurred within the region. For example, the numerous coal schooner and schooner barge shipwrecks that are found within Massachusetts Bay represent the region's role in the coal trade. Similarly, other shipwrecks represent historic vessel activity related to passenger travel or fishing, for example.

Beginning in the seventeenth century, emigration from Europe brought both people and goods into the New World, and coastal New England ports played an important role as entry points and hubs for distribution, which allowed for sustenance of the local economies. Prior to the establishment of the Cape Cod Canal in 1914, vessel traffic rounded Cape Cod in order to reach coastal ports, ultimately traversing most of the sixty-five mile wide expanse of the North Atlantic comprising Massachusetts Bay while moving from points south such as New York to points north such as Boston, and Bangor, Maine among others.

Within the region, passenger travel via coastal ferry was a prevalent mode of transportation, even through the twentieth century. Not only were these methods of transportation relatively efficient once steam engines began to replace sailing schooners, but they could be quite luxurious and afforded a means of travel and style not generally otherwise available on land routes. From a standpoint of commercial transportation of goods and people, coastal ferries served as an efficient and sensible vehicle to conduct business within New England from an infrastructure standpoint, and generally expanded the region's prosperity through distribution of goods and people outside the most populated portions of the area not easily accessible by land or otherwise unknown to tourism.

Traveling within coastal waters did not mean that vessels were not exposed to the harsh realities of New England weather. Massachusetts Bay presents a complex setting where local pockets of weather can produce vastly different conditions as one moves within or through an area. Historically, the dynamic and unpredictable nature of Massachusetts Bay, coupled with limited ability to forecast weather conditions, left even coastal vessels vulnerable to storms, or collisions that were precipitated by poor weather hindering navigation.

Historic and modern fishing activity in New England spans a four-hundred year period that has evolved and adapted to the changing landscape of the region. Its demographic has included Native Americans, early European colonists and continues through present day. Massachusetts Bay, inclusive of the "Middle Bank" also known as Stellwagen Bank, and offshore areas such George's Bank accessed by crossing Massachusetts Bay, make up rich fishing grounds within the Gulf of Maine that continue to represent a vital commodity, and source of food.

The historic dominance of fishing combined with the often unforgiving ocean environment has resulted in hundreds – if not thousands – of fishing vessel losses and consequently shipwrecks that represent every era of fishing from fishing schooners, to steam trawlers and modern day diesel powered vessels. While less widespread, historically passenger ferries have been presented with similar risks and fates that fishing vessels most dominantly faced. This article highlights two examples of a passenger ferry and a fishing vessel that represent shipwrecks as a depiction of historic coastal vessel activity in Massachusetts Bay.


The Boston Daily Globe

Dolan Loses Bond Suit, Must Repay City

LINER SINKS SS. ROMANCE

212 Saved as Provincetown Excursion Steamer and New York Crash in Fog, Boat Nearly Cut in Half, Noses Over in Flames After Collision Off Graves Light

COURT BIDS DOLAN PAY BOSTON $131,161

Ex-City Treasurer Made Profit By Handling of Municipal Funds, Judge Finds

QUABBIN BATTLE TO GO TO COURT

17 Are Slightly Injured — Craft Goes Down In Cloud of Steam

Captain Swims to Safety — Passengers Climb Over Ladder Onto Liner

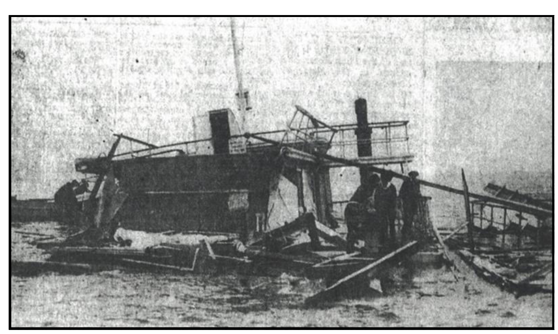
Headline from a September 1936 Boston Daily Globe.

The wreck of the excursion steamer Romance rests in 85 feet of water at the bottom of Massachusetts Bay, approximately one mile north of Grave's Light in Broad Sound. The Romance sank following a collision in heavy fog with the steamer New York on September 9, 1936.

The 245-foot long Romance was originally constructed as the coastal passenger ferry Tennessee in 1898 by Harlan and Hollingsworth Co. of Wilmington, DE. As the Tennessee, the steamer operated primarily in Chesapeake Bay, and later ran routes between Hartford, CT and New York. The Tennessee's most notable event was her involvement in the August 12, 1907 sinking of the three-masted wooden schooner Myronus following a collision in Long Island Sound.

At the age of 35 years old, the Tennessee was sold to the Bay State Steamship Company for use in the lucrative and competitive summer passenger ferry service between Boston and Provincetown. Even today, Boston to Provincetown "fast ferries" continue to operate and represent an important part of the summer tourist economy in Massachusetts. The Tennessee was renamed Romance and put into service carrying thousands of excursionists across Massachusetts Bay each summer.

On September 9, 1936 the Romance was inbound to Boston from Provincetown with an estimated 208 passengers aboard. The conditions were fair except for the dense fog that was present just outside of Boston. The Romance proceeded towards Boston at 15 knots until the whistle of the outbound New York was detected off the Romance's portside. At this time, the Romance slowed to 3 knots, but it was too late – the New York emerged from the fog, and sliced twelve feet into the Romance as they collided.


A photograph of portions of the Romance deckhouse structure awash after sinking.

The New York kept her engines engaged ahead so that the vessels remained locked together – effectively plugging the hole in the Romance for long enough to mobilize the transfer of passengers into lifeboats and to the New York. While first hand accounts of the Romance's abandonment vary widely, the effort was generally conducted without controversy and all passengers were removed from the stricken vessel within 20 minutes of the incident occurring.

As the Romance sank, she caught fire. Nearly the entire wooden superstructure came free of the steel hulled vessel where it washed up on Winthrop Beach before it could be recovered at sea. The Romance sank in relatively shallow water and therefore was considered a hazard to navigation. As a result, the wreck was "clam-shelled" – demolished by explosives to lower the profile and eliminate risk to deep-draft vessels traveling into and out of Boston that could strike the wreckage.

A view of the bow section as it sits today.

An investigation into the sinking called out the actions of each master in order to determine ultimate responsibility for the collision and sinking of the Romance. The issues that predominated were the judgment of Captain Wickens aboard the Romance with regard to his vessel's speed and maneuvering once the collision was imminent. It was also determined that the Romance was not monitoring her radio at the time of the sinking and therefore had no means other than through sound signaling to communicate with other vessels navigating in the area. Ultimately, Captain Wickens' license was suspended for six-months by the Bureau of Marine Inspection.

Today, the wreck of the Romance exists largely as a debris field – appearing more like a footprint of a shipwreck with only a few areas that afford any significant amount of vertical relief. The areas that are most recognizable and semi-intact are the bow, separated from contiguous wreckage and laying on its side; the boilers, which have the greatest amount of relief, rising to within approximately 55 feet of the surface, and portions of the stern. The engines themselves are only partially recognizable with the starboard engine mostly destroyed and the port engine relatively intact.

Moving aft, each shaft is present, though not continuous; however, even in low visibility they can be used for navigation to the stern section. At the very end of the wreck, the rudder can be found on the bottom lying off towards the portside. A small section of the hull is partially intact, but otherwise the entire aft area is mainly debris framed by hull plates along the periphery of the wreck.

A starboard side view of remaining engine and machinery structure.

The physical location of the Romance does not afford good visibility in part due to the bottom composition, which is a soft mud bottom, and also due the proximity to Boston as it relates to the movement/flow of water. While there are some portions of the Romance that can be navigated by following the features of the wreck, in most cases it is advisable to use a guideline reel. The wreck site is adjacent to the busy Boston shipping lanes and surfacing away from the boat is unwise. Moreover, the low visibility at the site – visibility that can be as poor as 1-3 feet, can make it impossible to explore the wreck with any sense of direction. The conditions are tide-dependent and visibility is often at its best during a flood tide or right around the time of high tide. Average visibility at the site is 5-12 feet. In the winter, with a prevailing west wind and flood tide, cold water can produce 60 feet or more of visibility, but this is the exception, not the rule.

The Gloucester fishing vessel Miss Sonya.

Despite advances in navigation equipment and technology – advances that in present day would have potentially prevented an incident such as the sinking of the Romance – shipwrecks do still occur though the frequency has without a doubt declined. Fishing vessels tend to be most vulnerable because these vessels must travel to where the fishing is best and often times must work in poor weather or in difficult conditions due to the realities of modern day fisheries management that dictates open/closed seasons, quotas and use of permits with a fixed number of days that fishing is allowed. An example of the consequence of these realities is the March 25, 2008 sinking of the F/V Miss Sonya.

Constructed in 1972 and previously named Lizzy Bear, the 43 foot Miss Sonya was a Gloucester-based fishing vessel that fished primarily for cod and yellow tail flounder. The vessel sank after it began taking on water a few miles from Gloucester while returning from a week-long voyage where it had been fishing on Stellwagen Bank. According to various news reports, the Miss Sonya was forced to stay at sea longer than necessary because their catch had amounted to the equivalent of two days of fishing, when in actuality they had caught it in one day.

A Coast Guard utility boat patrols near the sinking Miss Sonya (U.S. Coast Guard photo).

Fisheries regulations dictate that a vessel fishing in Stellwagen is debited two days against the boat's permit, even if the boat only fishes for one day. The Miss Sonya had caught the equivalent of a two day quota of fish in one day, and therefore had to stay at sea an extra day - a day that brought them much closer to bad weather. On the day of the sinking, the winds were approximately 20-25 knots out of the North, and the seas were about 4-6 feet. Within four miles of a safe harbor, the Miss Sonya was struck by waves, rolled to starboard and quickly capsized. The captain of the Miss Sonya sent a distress call to the U.S. Coast Guard at 7:28 am, and the Coast Guard was able to reach the boat, rescuing the captain and one crewmember within 22 minutes, averting a tragedy and any loss of life.

The Miss Sonya rests in 160 feet of water approximately three and a half miles off Gloucester. As of April 2009, it is unknown whether any salvage will be conducted, though it is unlikely the vessel will be recovered. In April 2008, NADE conducted a survey of the Miss Sonya for the insurance company handling the loss of the vessel for the purpose of observing and documenting the condition of the hull, as well as looking for potential environmental impact (fuel/oil leaks). No obvious damage was observed and it appeared as if the Miss Sonya simply foundered given the sea conditions and the amount of cargo aboard.

Underwater views of the Miss Sonya.

The wreck sits on a very soft, clay-like mud bottom. On our initial dives, visibility was very poor - pitch black and ranging from about 1-5 feet on average, which was somewhat due to the tide and overall poor ocean conditions at the time. This wreck is likely to have lower visibility given the bottom composition and size of the vessel, which makes stirring things up easy with a group of divers concentrated in a small area. Despite having turtled while sinking, the Miss Sonya sits upright, intact and is listing sharply (approximately 35 degrees) to starboard on the bottom. Like most "new" shipwrecks, there was quite a lot of debris floating around the wreck, suspended in the water column - fishing nets and rope being the most prevalent. Part of the A-frame has collapsed and the starboard spreader arm was found laying out into the mud. While this wreck is unlikely to become a popular dive site for technical divers, a small group looking to explore a newer shipwreck will find this site to be an interesting dive.

Both the Romance and the Miss Sonya are unique shipwrecks, each representing a facet of historic and modern vessel activity within Massachusetts Bay that speaks to the diverse use of the region – diversity that persists through present day, but with historical relevance that makes each dive an interesting tour through history.

Zoning Coastal Waters: The Massachusetts Ocean Plan

Energy and environmental challenges are dominant, relevant issues today and as a result, traditional uses of the ocean – mainly being fishing, recreation, tourism, scientific research, shipping and trade – have been expanded to include activities that can be generally viewed as those that represent an "industrialization" of the ocean. Activities such as aquaculture, operation of liquefied natural gas (LNG) facilities, wind farms and high speed ferries, etc., have added new considerations to how our coastal waters are used. As a result, Massachusetts has endeavored to become the first state in the nation to develop a comprehensive plan for the management of ocean resources – and this affects all of us.

Last year, Massachusetts passed the Oceans Act of 2008, which directs the Secretary of Energy and Environmental Affairs (EEA), with the assistance of an Ocean Advisory Commission and a Science Advisory Council, to develop a comprehensive ocean management plan. The Oceans Act requires that the ocean plan identify areas for sustainable uses, activities, conservation, protection, and regulatory management needed to implement the plan. In doing so, the plan aims to organize uses of ocean space and the interactions between uses, balance the demands for development with the need to protect the environment and at the same time achieve social and economic objectives.

Ultimately, the Oceans Act of 2008 has enabled the EEA to zone our coastal waters for uses that are based on prioritization of needs, environmental impact and overall balance within the region. While in principle, a plan like this is needed in order to prevent the highest bidders from moving into state waters and establishing themselves in a "land grab" with little opportunity for regulators to consider the overall picture, there is no doubt that all uses will be affected as the landscape is defined. For some, access may be restricted or denied. What this means to a small stakeholder group like scuba divers is that our access could be eliminated if certain areas are zoned for other activities incompatible with simultaneous use by others.

How this potentially affects divers is fairly straightforward. State waters extend to three-miles from land, but in actuality, state jurisdiction extends to include all of Massachusetts Bay, all of Cape Cod Bay and Nantucket Sound, and this comprises waters more than three miles from land. Our dive sites are chosen by where the best diving is – where the shipwrecks are located, where the lobsters are found, etc., and therefore all areas of our coastal waters are important for us to access. We rely on the maintenance of biodiversity and overall health of the ecosystem since scuba divers want to see marine life. For example, if a particular area is organized such that dredging and mining is occurring, this can affect the water quality in nearby areas since the mining operations will disrupt the bottom. This can create turbid water, low visibility, and affect marine life in the immediate area, which can also make surrounding or adjacent areas that were once pristine undesirable because of these effects, given how water flows and moves within Massachusetts Bay.

With regard to shipwrecks, these are archaeological resources that not only represent maritime history, but also hold significant appeal for divers who wish to visit and explore these wrecks. Already we have felt the encroachment of restricted access by way of the offshore LNG terminals in federal waters that have security zones placed around them that make areas once accessible no longer open. The Ocean Plan must recognize the existence and importance of these maritime heritage resources (shipwrecks), and be consistent with existing laws (e.g., the Federal Abandoned Shipwreck Act of 1987) and regulations as applicable through the Board of Underwater Archeological Resources, to protect and facilitate public access to them. Only the diving public can and will advocate for this, so it is critical that the dive community plays a role in this process.

The diving community has good reason to be concerned that as a constituency, our group is not a visible, active participant in this process and that as a result, assumptions and consequently decisions might be made that negatively affect us as a stakeholder in the Ocean Plan. The diving community should also be concerned that a plan like this could be used to advance the interests of other groups. For example, those that wish to regulate access to shipwrecks through creating marine protected areas could conceivably use a plan like this to unfairly manage and control access to the diving public.

Ultimately, it is unclear at this time what the Ocean Plan really aims to do – is it a conservation plan or industrialization plan? Will it try to do both, and where does the public's interest fall in the overall spectrum given the region's energy needs? In April 2009, a draft plan is scheduled to be released with public review and comment through July. In December 2009, it is expected the plan will be finalized and implemented. This is an aggressive timeline that will only allow for so many opportunities to provide input. Dive community representatives have met with state representatives, as well as conceptually partnered with conservation organizations; however, the diving public's participation – individuals expressing opinions – is needed. Plan to participate in this important landmark process to ensure that the diving community is viewed as a stakeholder and considered as our coastal waters are zoned and developed. Other states will follow on and the Massachusetts Ocean Plan will, may represent a precedent and potential model for other states to mirror.

For more information:

Massachusetts Oceans Act of 2008:

http://www.mass.gov/czm/oceanmanagement/oceans_act/index.htm

The Massachusetts Ocean Partnership:

http://www.massoceanpartnership.org/

Approaches to Mixed Team Open-Circuit and Closed-Circuit Rebreather Diving (Part 2 of 2)

Part 1 of this article, included in Issue #1, reviews our approach to dealing with differences in equipment and decompression profiles. In this final part we discuss procedures and gas management relating to diving mixed teams.

Procedures:

An effective mixed-team can remain together during ascent and decompression. Joel Bertuzzi and Roman Ptashka begin their ascent from the deck of the Chester Poling.

There are several issues that must be reconciled for open-circuit (OC) and closed-circuit rebreather (CCR) divers to operate successfully as a mixed buddy team. The most fundamental of which is the way in which each is taught to solve problems.

In OC technical diver training, divers learn how to solve problems (e.g., isolate a free-flowing regulator). As training progresses the complexity of the problems increases and the time available to solve the problems decreases. Technical diver training with a team focus teaches the divers to solve problems as a team, allowing and expecting buddies with better access to more quickly and effectively identify, communicate, and resolve the problem. This teaches OC divers within a team to instinctively alert their buddies of a problem and to look to their buddies for assistance, and their buddies to instinctively provide assistance (e.g., donate a regulator).

CCR training, in general and in our experience, is different than many OC training programs in that it focuses on self-reliance and more than team problem solving; other than carrying team bailout, which is discussed in the gas management section below. It seems apparent that this fundamental difference in training stems from the fact that, in many cases, the most probable problems occur within the CCR loop (e.g., low/high PO2, high CO2, etc.), so the CCR diver is often the first to realize something is wrong, and often the only person that can identify the problem. This teaches CCR divers, solo or within a team, to instinctively look to themselves for assistance and not immediately alert their buddies of a problem. As a result, their buddies may not instinctively provide assistance when they realize there is a problem (e.g., donate their bail-out regulator, which they may be able to deploy quicker because they are not stressed or impaired).

Development of problem solving procedures is essential to a successful and effective mixed team. As discussed in Part 1 of this article, our team adopted as many OC conventions as feasible. CCR divers clip all cylinders to the left side with the bottom bailout gas located in the outer-most position (top cylinder; gas turned on, this does not exclude the use of in-line shut-offs used by some to minimize potential free-flows) and the next shallower gas is located in the inner-most position (bottom cylinder; gas turned off). Additional cylinders are attached to a tank leash that is clipped to the diver's left hip d-ring. A similar convention is used by OC divers utilizing a bottom stage. Bailout cylinders should not be used for drysuit inflation, primarily because the diver will lose his/her inflation gas if the cylinder must be donated.

The rationale for this cylinder configuration addresses issues such as regulator accessibility, cylinder interchangeability and to a lesser extent, gas management. Locating the bottom bailout gas cylinder in the outer-most position makes the regulator most accessible to all divers and easiest to donate to another diver. Although the gas in the cylinders in the inner-most position may eventually need to be donated, the donation will occur after the immediate emergency is over and the divers can take the extra time necessary to donate, charge, and deploy the decompression gas. Also, many CCR divers plumb their bailout gas into their rebreathers through "quick-connects." These connectors should be a type that is easy to disconnect during the donation process (e.g., Swagelok QC6 connectors) and all team members should be aware of the need to do so.

While CCR divers on our team practice self-rescue bailout, in a mixed team setting it is important to recognize that the most sensible option may be to initially seek a bailout regulator from a CCR or OC buddy; this is obvious for an OC diver since it is his/her only choice. This also means that the buddies recognize the need to donate a regulator. A dive buddy may recognize a problem and have their primary or bailout regulator deployed and to the distressed diver's mouth quicker than the distressed diver can deploy his/her own bailout regulator, especially if the diver is impaired. This practice ensures that the CCR diver is receiving a cleanly deployed and functioning second stage regulator (when donated by an OC diver). It also involves the buddies in the problem solving, heightening team awareness around whatever issue occurred that lead to the bailout. Additionally, the donating buddy is now in a position to assist in the deployment and switch (if appropriate) from the donating buddies regulator to the CCR diver's bailout cylinder. The use of an integrated bailout valve (BOV) does not remove the need for divers to be prepared to donate a regulator to the distressed diver.

Conversely, if an OC diver needs assistance, the configuration of the CCR diver's bailout cylinders facilitates the quick deployment of the second stage regulator by the CCR diver or OC diver, and if necessary, donation of the cylinder to the OC diver.

Gas Management:

Calculating the volume of gas required by an OC and CCR mixed team is relatively simple, though not necessarily simple to execute in practice as gas demands become greater with increasing depth and/or runtime. Our team believes in the following approach to gas management:

- Each diver must carry a sufficient volume of gas (minimum gas) to deal with a gas-related emergency at the maximum depth, runtime, and distance from the exit point, and reach a designated point of return/ascent without modification to the planned decompression schedule.
- Each CCR diver must carry a sufficient volume of gas to support one diver in the event of a gas-related emergency.
- Each OC diver must carry a sufficient volume of gas to support two divers in the event of a gas-related emergency.

Divers must carry a sufficient volume of gas to deal with a gas-related emergency. This relates to any emergency in which a diver loses his/her gas supply (e.g., lost gas, inaccessible gas, contaminated gas, etc.). This typically refers to bottom gas because the diver often has sufficient bottom gas remaining to accommodate a lost decompression gas as a result of the minimum gas requirement. This approach allows for the loss of one diver's bottom gas supply in a two-person team; a three person team will be inherently more conservative. This requirement acknowledges the fact that it is often not practical to plan for two gas-related emergencies.

The depth, runtime, and distance criteria relate to any type of dive in any environment. The distance criteria generally relates to horizontal distance and can have very different impacts on gas planning depending on the type of dive and environment (e.g., diving small size shipwrecks in open water vs. cave diving). We assume the horizontal distance component is negligible in this article.

The designated point of return/ascent can be the surface, the first gas switch, or a safety diver. It is the point in which additional gas becomes available. This designated point is defined during the gas planning stage and is typically based of the minimum gas limitations (i.e., how many tanks are required). Our team typically uses the surface for shallow dives with no decompression or short decompression, first gas switch for dives in which a decompression cylinder is required (a CCR diver would have to carry a bailout and decompression cylinder), and safety divers for deeper dives where divers cannot practically carry sufficient gas.

Given the above requirements, the minimum gas required by a CCR is half that of an OC diver. There are a few methods of calculating the minimum gas required. The calculations can be as complex or simple as the diver desires. Regardless of the precision in the calculation, ultimately it is an estimate based on assumptions that define its conservatism. We calculate minimum gas based on gas consumption rate assumptions that change with depth; this reduces the conservatism with increased depth in an attempt to balance safety and practicality. This approach is also an acknowledgement that a higher level of performance, comfort, and fitness is required as depth increases.

We calculate minimum gas based on the following assumptions:

- Dives less than 120 fsw – SAC rate of 1.0 cubic feet per minute up to the first decompression stop.
- Dives deeper than 120 fsw – SAC rate of 0.75 cubic feet per minute up to the first decompression stop.
- At the first decompression stop, we assume the diver's SAC rate will decline to 0.6 cubic feet per minute.

Table 3 illustrates a relatively simple dive in which a mixed team is diving to 90 feet. The minimum gas calculation requires the OC diver to carry 80 cu ft of gas to reach the surface. This means the CCR diver must carry at least 40 cu ft of bailout.

Table 3: Dive to 90 fsw for 60 minutes				
Combined OC and CCR using a modified, harmonized schedule				
Depth	CCR Diluent	CCR Set Point	OC Backgas	Time (min)
90	Air	1.2	EAN28	60
50	Air	1.2	EAN28	1
40	Air	1.2	EAN28	1
30	Air	1.2	EAN28	2
20	Air	1.2	EAN28	8
10	Air	1.2	EAN28	17
Total Decompression Time				29
Minimum Gas (OC)				80 cubic feet
Minimum Gas (CCR, EAN28)				40 cubic feet

V-Planner (v3.80) Model VPM-B, Surface Interval = 5 days with modifications to manually insert deep stops beginning at 50 feet with 1 minute stops until first program generated decompression stop.

CCR: Conservatism = +4; OC: Conservatism = +2

Minimum Gas = 2 minutes on bottom; SAC = 1.0 cu ft per min up to first decompression stop; SAC = 0.6 cu ft per min during decompression and ascent to the surface

Deeper, more complicated dives are less straightforward with regard to gas management. Not only are overall volume requirements greater, but gas switches are also required. It is here that there can be the greatest divergence in decompression profiles between the OC and CCR divers during a gas-related emergency depending if the CCR diver carries two or three bailout cylinders. If we assume the CCR diver carries only two cylinders, the diver is limited to one decompression gas because the other cylinder must be bottom bailout, where the OC diver would typically carry two decompression gases (e.g., EAN50 and 100%). This requires the CCR diver to choose the decompression gas that provides the greatest balance of decompression efficiency (time) and overall gas volume (that is, what is feasible to carry).

In the example illustrated in Table 4, the CCR diver carries two gases – 15/55 bottom bailout and EAN50 decompression gas. The OC diver is carrying three gases – 15/55 backgas and EAN50 and 100% decompression gases. In a routine setting, each diver can dive the same schedule since each diver's parameters were matched in the planning phase. However, in the bailout setting, the CCR diver is at a disadvantage with one decompression gas versus the OC diver's two (i.e., more decompression time is required). It is also important to note that since the team must remain together for the decompression, the OC diver needs to carry an equivalent volume to what the CCR diver will need for matched gases (i.e., EAN50). This means the OC diver will be carrying additional gas beyond what is required for his or her routine consumption.

Table 4: Bailout Requirements for a Dive to 230 fsw for 20 minutes					
Combined OC and CCR Harmonized Schedule from Table 2 **OC – 15/55, EAN50, 100% O2;** **CCR – Diluent 15/55; Setpoint 1.2 PO2; Bottom Bailout Gas 15/55 and EAN50**					
Decompression Schedules				**Gas Requirements**	
Combined OC and CCR		**Bailout Schedule CCR**		**Minimum Gas OC**	**Minimum Gas CCR**
Depth	Harmonized Schedule	Gas	Time (min)	Volume (cu ft)	
230	20	15/55	20	24	12
Ascent *				40	20
130	1	15/55	1	6	3
120	1	15/55	1	6	3
110	1	15/55	1	6	3
100	1	15/55	1	5	2.5
90	3	15/55	3	14	7
80	2	15/55	2	9	4.5
70	2	EAN50	2	--	4
60	3	EAN50	2	--	4
50	5	EAN50	4	--	6
40	5	EAN50	5	--	7
30	7	EAN50	7	--	8
20	12	EAN50	12	--	12
10	19	EAN50	26	--	20
Required Bottom Gas				110	55
Required EAN50 (Calculated/1.5x Supply)				--	61

Tables generated using GAP v 2.3, Build 1665. Model: Bühlmann ZH-L16B, GF 80-30

Minimum Gas = 2 minutes on bottom, SAC = 0.75 until first decompression stop, SAC = 0.6 cu ft per min during decompression, to the surface.

* Note – Ascent volumes are calculated based on time and using average depth formula.

To increase decompression efficiency the CCR diver must carry a second decompression gas (i.e., three bailout cylinders). As depth increases both OC and CCR divers will require decompression or bailout gas volumes beyond what an individual can reasonably carry in many environments (e.g., ocean), even with a DPV. It is within this framework that support divers are best utilized.

In summary, as stated in part 1 of this article, a mixed team approach is not reasonable in all circumstances and depending on the nature of the dive it may be more reasonable and effective to standardize the team as OC or CCR. However, a mixed team approach is feasible in many settings provided that each diver is willing to take steps towards harmonizing equipment, procedures, decompression schedules, and gases.

Disclaimer:

The gas planning rules described herein are used by our team members and developed based on our diving style, environment, and skill level, and may not be suitable for all divers. They do not necessarily account for all situations (e.g., hypercapnia) nor do they account for all possible advantages (e.g., semi-closed operation, O2 gas sharing, etc.).

No decompression procedures of any sort can guarantee that DCS will not occur. As noted in the tables above, some of the decompression schedules presented have been modified. We do not suggest the use of these schedules by others and have not sought endorsement of our modifications by any decompression software vendor or expert modeler. All decompression planning software programs generate decompression profiles based on various theoretical calculations. These decompression profiles should be taken to be experimental in nature and should not be used without an understanding of the inherent risk of decompression sickness. In other words, don't sue us if you get bent.

Gauntlet News — Winter Diving Highlights & Dive Show Recap

The 2008-2009 winter season has been one of the harshest in recent memory – this year, we experienced a "real" New England winter! Many trips have "blown out" due to heavy wind and low air temperatures, creating conditions not suitable for boat diving. However, when we have been able to get off the dock, the diving has been spectacular with incredible visibility only rarely seen in these parts. Here are a few highlights of winter dives aboard Gauntlet!

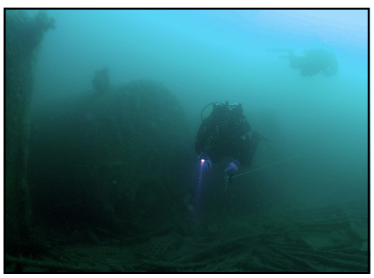
Cold. Really Cold!

Pat Beauregard tries to stay warm while Gauntlet makes her way into the marina through the ice.

Some of our dives have been in rather low air temperatures – single digits, and below zero with the wind chill factored in. This requires special preparation in order to protect equipment from icing, as well as protect oneself from the harsh elements. We encourage all divers who are new to diving in New England in the wintertime to read our article on winter diving considerations: http://northernatlanticdive.com/gauntlet/winter_diving_prep.pdf.

When diving from Gauntlet, we shield equipment from the elements by covering everything with heavy-duty trash bags before we secure the equipment to the rail. Other items ride inside the cabin, such as drysuits, dive computers and even certain components for some makes of rebreathers because of the way that cold air temperatures can affect batteries, for example. Covering skin is also essential as frostbite is a concern, but most importantly, staying as warm and comfortable as possible before the dive is a must, because once in the water one will only get colder, not warmer. Water temperatures declined steadily over December and January, but appear to have stabilized around 36 degrees Fahrenheit.

Exceptional Visibility!



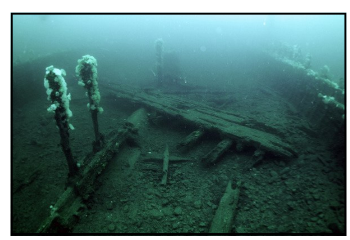
Al Anzuoni and Dave Cangiano swim up the port side of the SS Romance towards the bow.

There's a good reason to put up with the extreme cold – and it's the fantastic underwater visibility we can observe when the conditions are right. Over the winter we were able to visit four wrecks (several times in some cases) that rarely are seen in this kind of exceptional visibility. Winter conditions – with cold, clear water – are sometimes the only conditions that will produce good visibility at these sites. In these cases, it produced incredible visibility! Here is a short summary of some of our highlight dives!

SS Romance —

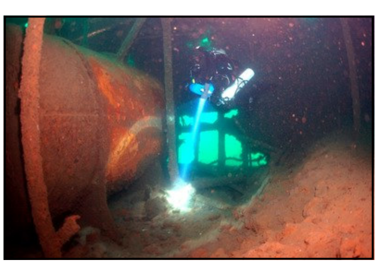
The background and history of the Romance is featured in this issue of The Lookout. Only a few times have we observed the Romance in this kind of visibility. When we jumped in the water, at a depth of about 35-40 feet, we could see the bottom. It was stunning! The Romance is difficult to navigate because of the combination of low visibility and the scattered layout of the wreck. On this particular dive, we did not need to use a guideline reel. We could swim to the bow – and past it – while still seeing enough of the wreck to find our way back. Anyone who has dived this wreck in typical conditions knows what a treat we experienced!

Alma EA Holmes —



A view across the Alma EA Holmes, looking aft.

The coal schooner Alma EA Holmes sank on October 10, 1914 following a collision with the steamer Belfast. This is another wreck that typically has visibility in the 10-15 foot range and at times even less with about 5-10 feet during summer months when the water is warmest. Normally we only dive this wreck in the winter because that is when conditions can be the best, it is a short boat ride close to shore, makes for a good technical dive (depth 155-160 fsw), and during summer we're venturing off to other wrecks that we cannot reach in the winter. On one trip to this wreck, we observed visibility of at least 50 feet. The wreck measures approximately 40 feet across and not only could we see clearly across it, but we could see beyond a good distance. We also had the rare opportunity to swim well off the bow, which in normal visibility, without a line is a good way to get lost! There is some reason to question whether this is in fact the wreck of the Alma Holmes and not one of the L&WBC Co. coal barges given some inconsistencies at the wreck site relative to what we would expect to find here if this truly were a four-masted schooner. This is something we hope to explore in a discussion article in a future issue of the The Lookout!



Diver Bert Foster illuminates a water tank inside the forward section of the wreck.

New York Central No 14 II —

The identity of wreck of the New York Central No. 14 (ii) (NYC 14-2) was a long standing mystery in Massachusetts Bay from the time of its discovery in 2002 until it was finally identified in 2008. The NYC 14-2 was built at the Staten Island Shipbuilding Corporation on Staten Island, New York, in 1916. The NYC 14-2 was constructed for use as a steam lighter for the New York Central Railroad. After its long service as a steam lighter, the NYC 14-2 was sold in February 1962 to Capt. E.S. Wilcox of New London, CT. One month later, the vessel's enrollment was surrendered and the NYC 14-2 was lost to further documentation. First-hand accounts indicate the NYC 14-2 was used as a storage facility and eventually became a floating office for the Ross Towboat Company in the 1960s after their office was destroyed when the Boston T Wharf collapsed. In 1979, Ross Towboat was purchased by Boston Fuel Towing Company. There is no record of the NYC 14-2 being part of Boston Fuel's vessel fleet and thus it is believed that the NYC -2 was scuttled sometime before the sale of the Ross Towboat. This establishes a fairly wide window, placing the sinking sometime between the mid-1960s and 1979. Research efforts to uncover further details pertaining to the sinking are ongoing, but we're quite sure this wreck is in fact the long lost NYC 14-2!

Dive Show Recap

Heather, Scott, and Roman at the NADE booth during the 55th Boston Sea Rovers Clinic.

Northern Atlantic Dive Expeditions (NADE) and the Gauntlet crew participated in the March dive shows, which are always exciting events with opportunities to recap the previous dive season's adventures, as well as catch up with new and old friends.

Boston Sea Rovers (BSR)

The 55th annual Boston Sea Rovers Clinic was a success with a great line-up of speakers, exhibitors and evening film festival presenters. This year, the Boston Sea Rovers Clinic was covered by LiquidAssets.tv – a media and marketing group lead by Aaron Faulls, who created the 2006 documentary "Still On Her Keel: The Legacy of the Chester Poling." Heather and Dave were fortunate enough to be interviewed by Aaron as part of the BSR coverage – you can see that interview here: http://www.diveshow.tv/boston-sea-rovers-2009.

Beneath the Sea (BTS)

At this year's BTS dive show, Heather and Dave presented on the team's 2007 and 2008 trips to Halifax, Nova Scotia. You can read about the Halifax expeditions here: http://northernatlanticdive.com/halifax/halifax.htm.

BTS was otherwise a great weekend to catch up with friends and hatch plans for another exciting dive season!

This Quarter In Shipwreck History…

April

April 2, 1946 – The liberty ship Charles S. Haight runs aground on Flat Ground Shoal.
April 6, 1923 – The freighter John S. Dwight is scuttled by rum-runners.
April 7, 1935 – The excursion steamer King Philip is scuttled off Boston.
April 10, 1963 – The nuclear sub USS Thresher SSN-593 sinks and implodes during exercises.
April 16, 1944 – The Pan Pennsylvania is torpedoed by U-550 off Nantucket.
April 16, 1944 – The U-550 is sunk by destroyer escorts.
April 22, 1938 – The British freighter City of Salisbury wrecks on Graves Ledge.
April 27, 1717 – The pirate ship Whydah grounds and breaks up off Wellfleet, MA.
April 29, 1923 – The collier Seaconnet founders in Vineyard Sound during a storm.
April 28, 1953 – The tugboat Alert III sinks in Buzzards Bay.

May

May 7, 1905 – The steamer Aransas collides with schooner barge Glendower in fog.
May 10, 1944 – The Navy lighter USS YF-415 sinks following an explosion off Boston, MA
May 11, 1907 – The 4-masted schooner Sagamore sinks following a collision off Martha's Vineyard.
May 15, 1931 – The former Eagle Boat PE-42 is scuttled off Boston.
May 15, 1934 – The Nantucket Lightship LV-117 is rammed and sunk by the Olympic off Nantucket.
May 18, 1909 – The 5-masted schooner Jennie French Potter grounds on Halfmoon Shoal.

June

June 1, 1928 – The freighter Kershaw sinks following a collision off Martha's Vineyard.
June 10, 1930 – The tanker Pinthis burns and sinks following a collision off Scituate, MA.
June 15, 1913 – The 5-masted schooner Paul Palmer burns and sinks off Provincetown, MA.
June 17, 1773 – The King's Boat capsizes and sinks off Eagle Island in Marblehead, MA
June 18, 1979 – The bulk carrier Regal Sword sinks off Chatham, MA following a collision.
June 29, 1944 – The minesweeper USS Valor sinks in Buzzards Bay following a collision.

What's Ahead?

The next issue of our newsletter will be published in July. There's a lot diving and writing to do between now and then! Our summer schedule is nearly done and once again we are aiming to do as much diving and new target exploration as possible – with great trips to shipwrecks in Massachusetts Bay and in Stellwagen Bank National Marine Sanctuary. Look for trips to the Pinthis and the Paul Palmer, as well as spectacular deep shipwrecks like the YF-415, Bone wreck and Snetind!

Are you interested in recreational or technical dive training? If so, contact us right away! This is the best time to meet, talk about your goals, and set you on the right path to acquiring any necessary gear and scheduling dives. We offer instruction through both NAUI and TDI.