



# COMMUNITY

## News in Brief

### Special points of interest:

- The next CSUC Board meeting is September 8, 2017 in Ventura and the Annual Meeting and BBQ will be held at the Toro Canyon campsite on September, in Santa Barbara. All divers are welcome to attend.
- This newsletter provides an extensive overview of the CSUC activities.

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## Chairman's Report

After the ocean changes of the past two -years that included relentless large ocean swells out of the west northwest that went on for months, and the radical fluctuations in water temperature from below the southern border of California, up the whole Pacific Seaboard into the Gulf of Alaska we find ourselves looking into the possibility of a bleak future. The southernmost port, San Diego has a bare minimum of divers working as do the Northern California ports and the industry

has requested that the Sea Urchin Fishery be designated a disaster. Our fishery disaster request is sitting on the Governor's desk awaiting his signature with the agreement from the California Department of Fish & Wildlife.

The lack of production has caused a demand in the market that has some processors looking to other sources for product out of a need to fill their orders. Some are importing sea urchins from Mexico. Some I've heard, unconfirmed, are import-

ing wet packed uni from coun-tries further south. The law is clear on the sale of all seafood sold in the United States, whether imported or domestically product, it must be labeled as to its origin. Seafood products and as such, states that any, in our case, sea urchin acquired outside of the U.S. in accordance with the Country of Origin Labeling (COOL). Sea urchins acquired in the United

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Chuck Kavanagh

## Disaster Declaration Request

As all sea urchin divers know it's been rough making a living these days with reduced abundance of harvestable urchins. The Magnuson-Stevens

Fishery Conservation Management Act and the Interjurisdictional Fisheries Act both provide for disaster determinations if made by a Governor or some

other fishery leader. The United States Secretary of Commerce reviews the disaster request under his or her powers by requesting the National Fisheries

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# Executive Director's Report



## Executive Directors Report

The adage “The only thing that’s constant, is change,” is certainly true in the sea urchin industry. We’ve seen a dramatic change in the resource with kelp and harvest levels down. In particular, the north and extreme south have experienced severe kelp loss and consequently harvestable urchins are at their lowest levels. The California Sea Urchin Commission has petitioned Governor Jerry Brown to declare the fishery a failure and request federal assistance. See the article in this newsletter for additional information.

In cooperation with the California Department of Fish & Wildlife, we finished the Capacity

Reduction and Day Back proposal Initial Statement of Reasons (ISOR) which will be heard before the California Fish & Game Commission (CFGC) on August 16 in Sacramento. If all goes well, we expect the CFGC to adopt the regulatory changes in December. This is also explained in detail in this newsletter.

Your California Sea Urchin Commission (CSUC) has been busy with many other issues that impact your bottom line. We worked in a coalition of fishing and seafood processor groups to curtail large increases in landing taxes. The sea otter lawsuit continues to move through the court system. Your CSUC continues to monitor regulatory challenges

at the state and national level. Your CSUC Board members are very much engaged.

The Annual Meeting and Barbecue is scheduled September 8 and 9<sup>th</sup>. We delayed the event so that we would have more information to report regarding the Capacity Reduction and Day Back proposal.

Please let me know if you have any questions regarding the CSUC or any of our program activities.

Cordially,

David Goldenberg  
Executive Director

## Ocean Acidification Paper Worth Reading

[http://broncoscholar.library.cpp.edu/bitstream/handle/10211.3/194019/BriggsLauren\\_Thesis2017.pdf?sequence=4](http://broncoscholar.library.cpp.edu/bitstream/handle/10211.3/194019/BriggsLauren_Thesis2017.pdf?sequence=4) By Bruce Steele, Diver

Divers should take a look at this thesis paper. It shows that purple urchins increase feeding rates by about 500% when exposed to acidified conditions that are currently occurring in Northern Calif. during spring upwelling season. ( see figure 8 ) No wonder the kelp is all gone. Of

course 150 purples per square meter can do plenty of damage without an increased rate of feeding. The Calif. Fish and Wildlife shows purples in those concentrations across their abalone survey transects. The paper doesn't show how the gonad index responds with the increased feeding rates because the experiments didn't run that long but if the gonads can increase along with feeding rates then purples will just take over under acidified conditions. Of course the

gonads won't increase when they run out of kelp to eat. We need to set up some experiments to research whether we can get purple to eat lots of kelp and produce decent gonads by pumping extra CO<sub>2</sub> into seawater tanks under controlled conditions. At any rate it appears purple urchins may actually like acidified conditions. We already knew they were resistant to acidified conditions but it appears they actually thrive in them.

## Capacity Reduction/Day Back

Efforts to reduce the capacity of the California Sea Urchin fishery are on track. The California Fish & Game Commission (CFGF) is scheduled to consider the first in a three step process on August 16, 2017 in Sacramento where the California Sea Urchin Commission (CSUC) and the California Department of Fish & Wildlife (CDFW) will make a joint presentation. The two main changes to the fishery regulation is to reduce the number of licenses from 300 to 150. Over 150 licenses are latent and have not been used over the last ten years. The lottery was modified last year to prevent the addition of licenses over 300. The second phase is to add new divers

on a 10 to 1 ration. One diver will be added for every ten that drop out and do not renew their license. The new lottery system allows for greater preference for those who have tried the longest, while still allowing opportunity for new entrants.

The second request is to add one Friday fishing day in Southern California from June through October. Northern California will remain the same. The additional day back is requested to allow direct marketers to dive on Friday for their fresh market. It also allows divers an extended week if weather conditions were poor earlier in the week.

If the first Notice is adopted on August 17, 2017 the CFGF will open a public hearing on October 12, 2017 in Atascadero, with a final Adoption Hearing on December 7, in San Diego.

A copy of the Initial Statement of Reasons (ISOR) for the Regulatory Action can be found on the CSCU website at:

### ISOR Document

<http://calurchin.org/assets/pdf/ISOR120-7-061917-date-change.pdf>

### Summary of Changes

<http://calurchin.org/assets/pdf/Proposed-Regulation-Summary4-26-17.pdf>

## USFWS Import/Export Inspection-Fee

The California Sea Urchin Commission (CSUC) in cooperation with the Maine sea urchin and cucumber industry collaborated on HR4245, a Bill to exempt importation and exportation of sea urchins and sea cucumbers from licensing requirements under the Endangered Species Act (ESA) of 1973. In 2008 the United States Congress exempted fin fish and shell fish used for food from the ESA import and export regulations carried out by the US Fish & Wildlife Service (USFWS).

Many years went by until sea urchin and squid processors started receiving visits by USFWS inspectors demanding \$93 import/export permits along with visual and paperwork inspections. In light of the Congressional exemption for shellfish, the USFWS used a less often used definition of shellfish found under the Convention on International Trade in Endangered Species (CITES) which defines urchins, squid, cuttlefish and similar species as econoderms and not shellfish. The

USFWS used this determination to begin demanding permits and inspections. The upshot is that inspections can impede exports causing loss of quality waiting on the inspector to show up, and the \$93 permit fee is nothing more than a way for the agency to increase its budget.

The CSUC in cooperation with other groups, including the California Wetfish Producers Association and the Maine seafood industry tried no avail to work with the  
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## Bullet Dodged – A Fish Tax Tale

It didn't come easy. A week after New Years, the California Governor's Budget Proposal was announced. To the commercial fishing community's surprise, there was a twelve million dollar increase on landing taxes from the Department of Fish and Wildlife (DFW.)

On an average, the DFW has been collecting about a million dollars per year and this twelve-fold increase was to support their 95 million-dollar budget for their non-dedicated preservation fund account. The proposed increase in landing tax for sea urchins was to increase the tax from the current .0013 per pound to .035, a 2600 % increase.

DFW was required to meet with stakeholders prior to the announcement. Director Chuck Bonham said that he'd met with the Sport and Hunting industries last year and "forgot to include the commercial fishing industry." When the California Fisheries Seafood Institute (CFSI) and fishing industry stakeholders met with Bonham on January 30<sup>th</sup>, Bonham said he was "very sorry." His explanations for the staggering increase began with, "We have a budget problem." Bonham continued to explain that the Agency will run out of money in the next year and they are currently spending twenty million more than budgeted.

The fishing industry responded that, "We can't afford that increase for many reasons." Landings are down due to water quality and rising ocean temperatures including: Sea Urchin die-offs due to El Nino and the Warm Water Blob. Crab landings were shut down and delayed due to Domoic Acid. The Sardine fishery was closed due to changing ocean water temperatures. The salmon industry was impacted by six years of drought and squid landings fell due to El Nino conditions. The industry proposed working with the DFW on the issue but had many questions. Sport fishing, hunting, and commercial fishing licenses have been increasing yearly according to Director Bonham.

Industry asked, "How is the DFW using its money and what is the cost to manage each fishery?" Bonham responded, "I will get you the numbers and be transparent." The industry waited one month with no answers or information. On March 29th, the Annual Fisheries Forum (Joint Committee on Fisheries and Aquaculture) convened at a hearing at the State Capitol. The landing tax issue dominated the meeting as well as the state of the fisheries.

*The proposed increase in landing tax for sea urchins was to increase the tax from the current .0013 per pound to .035, a 2600 % increase.*

In a meeting immediately following the Fisheries Forum, Bonham held a second opportunity to hear from the commercial fishery representatives. Much of the same information on the Department's costs was reviewed. However, there were no answers to the questions previously requested. Industry stakeholders suggested an alternative landing tax increase matched to inflation since 1993. Director Bonham said he did not have the authority to negotiate any change in the landing tax proposal. He eventually said any negotiations would be between the Executive Branch (the Governor's Office) the Legislature and the stakeholders.

Industry stakeholders, including the California Sea Urchin Commission spoke out against the Landing Tax increase and signed on to joint letters sent to Legislative leaders. By the time the budget passed, the twelve-million-dollar increase was reduced to \$900,000. The legislative work paid off. At the end of the day the legislators approved shuffling some budget monies around, and only increased sea urchin landing tax to .0047 a 260% increase.

By David Rudie  
Catalina Offshore Products

## Chairman's Report continued from page 1

States are not required to declare that they originated in a particular state other than where they were produced in the U.S. Soon the Canadian markets will be opening up and we can expect that there will Canadian product coming into California to be handled and passed on by the same processors that we regularly sell to. What the wholesalers do with the product is a step beyond what we can track, but the same laws apply to them. Both processors that I have knowledge of have said that when they import sea urchin, they follow the law and label

Country of Origin, and I don't doubt them. There are records of their importing the product into the U.S., so the paper trail exists.

In the past few years we have seen the demand for our sea urchin increase dramatically to the point where we see, in Santa Barbara Harbor people going into fish markets buying whole live sea urchins and sitting sometimes on the curb stones in the parking lot eating the sea urchins and loving it! This is a booming market! With a diminishing supply, and where I come from and in the various businesses I've been in, in the past,

that means higher prices to the suppliers. It's time for some like minded people to start getting together and devising an alternative avenue to the end consumers. We need the import/export U.S. Fish and Wildlife interference into our business to end giving us more flexibility to develop our own offshore markets and more people working toward self marketing.

Sincerely,

Chuck Kavanagh  
Chairman  
CSUC

## USFWS Import/Export Inspection-Fee

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USFWS to stop the practice by explaining Congress' intent. We then worked with Doc Hastings, Chairman of the House Natural Resources Committee to put legislative pressure upon the agency. The USFWS scoffed at the effort and increased their inspection activities.

HR4245 was introduced to clarify Congress' intent to exempt sea urchins and sea cucumbers from the agency's regulatory authority. The Bill tracked well in the House and



got hung up in the Senate. The issues in the Senate were nearly cleared when at the last hours of the 2016 Congress, Senator Barbara Boxer amended the Senate Bill under pressure from a number of environmental groups.

When she did that, the House of Representatives had already recessed for the December Holidays and the Bill failed to pass

because there was no time to work out the differences in a conference committee.

The CSUC has begun efforts to restart the legislative process and remove this regulatory burden. The process is long and slow moving. However, we got beat by a retiring Senator who made concessions to her environmental friends and who threw us under the bus without providing time for a rebuttal. We now know the arguments of the other side, so we'll be in a better position to address any future roadblocks.

# Disaster Declaration Request Continued from page 1

Management Service to conduct a review according statute requirements. There are several provisions for disaster determinations including manmade, natural or undetermined. Under the following thresholds a commercial fishery can be declared a failure based on the loss of 12-month revenue compared to average annual revenue in the most recent 5-year period, if:

Revenue losses greater than 80%;

Revenue losses between 35% and 80% will be evaluated further (e.g., to determine if economic impacts are severe);

Revenue losses less than 35% will not be eligible for determination of a commercial fishery failure, except where the Secretary determines there are special and unique circumstances that may justify considering and using a lower threshold in making the

determination.

On May 17, The California Sea Urchin Commission (CSUC) petitioned the Director of the California Department of Fish & Wildlife to work with Governor Jerry Brown and declare a gubernatorial disaster request from Wilbur Ross, the U.S. Secretary of Commerce. On June 27, a joint Congressional Letter was sent to Governor Brown encouraging his assistance in the disaster declaration. A similar letter was sent by California State Senator Mike McGuire and Assemblymember Jim Wood on July 11.

The requests were made in response to dramatic losses in the North and in the South. Fort Bragg production has decreased over 80 percent and in San Diego production is down over 90 percent. If a determination is made, it will be for the entire state. A Federal disaster declaration opens the door for Federal assistance. The CSUC will work

with Congressional representatives to sponsor an appropriation request for federal disaster aid. The process can take time, but Federal aid will not materialize if the CSUC did not initiate the first steps seeking a Governor declaration.

To view copies of the aforementioned letters you can use the following links on the California Sea Urchin Commission's website:

<http://calurchin.org/assets/pdf/2017-Sea-Urchin-Disaster-Request-20170516210100.pdf>

<http://calurchin.org/assets/pdf/2017-Sea-Urchin-Disaster-Support-Data.pdf>

<http://calurchin.org/assets/pdf/Congressional-Disaster-Ltr20170627-Final-Sea-Urchin.pdf>

<http://calurchin.org/assets/pdf/2017-7-11-Disaster-Declaration-Sardines-Sea%20Urchin-SenMcG-AsmWood.pdf>

## Sea Otter Legal Challenge Enters Its Final Chapter

By Jonathan Wood, Pacific Legal Foundation

For four years, CSUC has been engaged in a long legal battle against the U.S. Fish & Wildlife Service. This saga has included two federal lawsuits and multiple appeals, but at the core of everything is a simple legal

question: can a government agency disregard mandatory instructions in a law passed by Congress?

The answer is a resounding NO. When Congress expresses its intent in the plain language of a

statute, federal agencies must give that language full effect. In 1986, Congress devised a statutory compromise, in which it granted the Service authority to establish an experimental population of southern sea otters at

## Sea Otter Legal Challenge Enters Its Final Chapter

San Nicolas Island. But there were important limits placed on that authority. To protect the fisheries and those who work in them, Congress required a management zone surrounding San Nicolas, from which wandering otters would be returned to the island. It also exempted lawful fishing activities from the punishing sanctions for incidental take (i.e., harming or disturbing a protected animal) under the Endangered Species and Marine Mammal Protection Acts.

Those protections were not optional—the law repeatedly says the Service “shall” and “must” implement them. And the Service accepted the statutory compromise, moving a number of otters to San Nicolas. But about 25 years later, the Service de-



Jonathan Wood  
PLF Attorney

ceded it no longer wanted to uphold its end of the bargain, and issued a regulation declaring the experiment a “failure” and eliminating the management zone and incidental take exemptions. Meanwhile, a population of otters continues to thrive and grow at San Nicolas Island. Additionally, otters have been migrating into the

management zone, depleting shellfish populations, and putting fishers and divers at risk of legal liability. This result is not only patently unfair, it is illegal.

To add insult to injury, another federal agency, the U.S. Geological Survey, recently touted the success of the San Nicolas sea otter population as a prime example of the species’ overall recovery. That hardly jives with the Service’s contention that the experimental population was a

failure. USGS expressed hope that the San Nicolas otters will emigrate and colonize other Channel Islands. Good news for the otters, but without the management zone protections, this could spell disaster for Southern California divers and fishermen.

The battle has finally entered its final chapter. On June 16, the Pacific Legal Foundation, on behalf of CSUC and other organizations, filed an opening brief to the Ninth Circuit Court of Appeals, presenting arguments on whether the Service could lawfully rescind the management zone protections. After briefing is completed on July 31, the next step will be for the parties to argue the case before a panel of judges. Hopefully, the court will reaffirm the fundamental principle that government agencies are bound by the law, just like the rest of us.

## Annual Meeting & BBQ

The California Sea Urchin Commission’s Annual Meeting and BBQ will once again be held at Toro Canyon II site in Santa Barbara.

The date is Saturday, September 9. The Annual Meeting is scheduled at 11:00 a.m. with lunch served at 12:00 Noon.

Raffle prizes are being pursued by generous businesses in the area. The menu and refreshments will be similar as in years past.

The meeting has been pushed back due to the capacity reduction efforts. We hope to provide a report at the meeting.



# Warty Sea Cucumber

by Nathan Rosser, Ventura Diver

You may have heard that the Warty Sea Cucumber (WSC) Dive Fishery is in the process of undergoing regulatory change, and you may also be wondering why this news is in the CSUC newsletter! Well, for those of you who didn't know already, the majority of cucumber divers are also urchin divers, and whether you are a cucumber diver or not, it's worth noting that both the WSC and RSU fisheries are closely tied, and that a change in market demand or harvesting effort in one fishery typically impacts the other.

Worldwide, market demand continues to climb for sea cucumbers, and some fisheries, especially those in developing countries, are grappling with the repercussions of over-fishing. In recent years, landings of WSC in Southern California have been in a mostly downward trend, likely due to a combination of reasons, such as the warm water event of the past few years, an increased demand for sea urchins—which has shifted some effort away from the cucumber fishery, and the gradual effects of effort compaction due to Marine Protected Areas. Although some divers in the fishery surmise that the drop in landings has little to do with fishing effort, there are others that feel that an increase in fishing pressure over the last decade is partly to blame. Regardless of who or what you believe, the DFW is currently attempting to usher in new regulations to the WSC fishery.

Unfortunately, very little is known about the biology of the Warty

Sea Cucumber, and because the DFW classifies the fishery as 'data-poor', fisheries managers generally take a more cautionary (i.e. restrictive) approach to managing this type of fishery. Despite the fact that many concerned fishermen have identified shortcomings with the limited data that is available, nevertheless, the DFW has maintained that the downward trend in landings is significant enough that they plan on enacting regulatory changes as soon as possible, with new regulations likely in place by the spring of 2018.

A team of DFW personnel are crafting these regulations, including, among others, Tom Mason, Derek Stein, and Sonke Mastrup; along with Carlos Mireles—a DFW scientist who has been spear-heading WSC data collection and is largely responsible for reaching out to divers, myself included, to gather WSC harvest data and to get a grasp on fishermen's harvesting strategies and behavior. It appears that the DFW's management approach to the WSC dive fishery is largely patterned after the regulations in place for the Washington State Commercial Sea Cucumber Dive Fishery (for a related species, the California Sea Cucumber). Meetings between the DFW and sea cucumber permit-holders were held this past year in Los Alamitos and Ventura, and a follow-up mail-in survey issued to all cucumber dive permit-holders has influenced the direction the new regulations will likely take.

More recently, on June 22<sup>nd</sup>, the DFW issued 'notice of intent' to

enact regulatory change to the WSC fishery at a meeting of the Fish & Game Commission in Northern California. This is the first of several more steps the DFW will take before any new regulations become law. Traditionally, there are about 8 months a year when Warty Sea Cucumbers are landed in volume. As it stands, the Fish & Game Commission is considering several seasonal closure options, encompassing from 3 to 5.5 months of traditional fishing activity. The advent of these lengthy, continually—closed periods will no doubt have a large effect on the WSC fishery in the short term, and one can expect that displaced dual permit-holders will likely significantly increase their efforts in the RSU fishery if and when these sea cucumber closures take effect. There is however, hope that if we as fishermen stay active and involved throughout this process that ultimately our interests will prevail and the WSC fishery will prove increasingly sustainable and lucrative in the years ahead. There has been significant efforts made by many participants in the fishery to collaborate with the DFW to actively manage this fishery, and the industry is optimistic that the upcoming regulations are only a first step in fine-tuning the fishery overall. If you would like to learn more about the issue and how you can get involved, please feel free to contact me.

Nathan Rosser  
Ventura Co. Sea Urchin Commissioner  
[paradisecoveseafood@gmail.com](mailto:paradisecoveseafood@gmail.com)



## Deep Diving Preparedness by Charles Kavanagh, Chairman, California Sea Urchin Commission

For the past year a small group of individual sea urchin divers have been involved with Walter Chin, Program Director for Hyperbaric Medicine, UCLA, BSN, ADMT, CHT, in an attempt to analyze how our individual dive profiles would compare to the divers in similar dive fisheries in Mexico that he works with, attempting to better educate all of us for our mutual benefit. Walter's research has compiled 2867 real time working dive profile worldwide with 400 of those dives originating from Sea Urchin Divers in California. Some of the things that Walter found out from us is that for the most part all the US divers in the program use the tables with a wide margin of safety, in some cases however, the profiles revealed that some of the dives crossed over into decompression dives and in those instances, the dives were planned to be that way with the individuals prepared for an in water decompression using O<sup>2</sup> while hanging off at designated depths for designated times, and in some cases dive profiles went over limits resulting in Decompression Sickness (DCS).

This form of diving is becoming more common with a small number of divers who have received training for this. Oxygen under pressure is the most valuable tool for divers who want to be

safe. I advise all sea urchin divers to acquaint themselves with decompression techniques, the equipment necessary to perform safely in water O<sup>2</sup> decompression, and the US Navy's treatment tables for DCS [https://docs.lib.noaa.gov/noaa\\_documents/NOAA\\_related\\_docs/SEALAB/us\\_navy\\_diving\\_manual\\_rev5%20Part%201.pdf](https://docs.lib.noaa.gov/noaa_documents/NOAA_related_docs/SEALAB/us_navy_diving_manual_rev5%20Part%201.pdf). Walter gathered this data from individual sea urchin divers in Los Angeles, Channel Islands Harbor and the Santa Barbara area by providing a dive recording computer, one which only stores recorded data of dives. This can only be accessed by a program designed to accept the code that it tabulates, to be worn along with the dive computers that we all have purchased that are based a variant of the ZH-L16 (Buhlmann) decompression algorithm. This is used by the recreational diving community and the human testing of the ZH-L16 is well documented. Although this is not the only decompression algorithm, it has become the standard for the recreational dive community and is generally considered the more conservative choice. The information compiled in Walters program, is shedding light on our particular form of diving, and in the future might contribute to an adjustment to the ZH-L16 algorithm.

Walter Chin's research is compiling valuable, real-time data about the dive profiles of working divers that is important enough that the US Navy has recently awarded him and the research he does a second grant to increase his research with California Sea Urchin Commission and other ocean harvesting divers. In a recent conversation with Walter he told me he would like to recruit another 30 sea urchin divers to allow their dive profiles to be monitored for his research. Walter and his staff would also like hold a seminar on decompression, use of oxygen and DCS treatment at UCLA at his facility for all sea urchin divers who would be interested in attending.

Since 2000, the U.S. Navy has conducted a number of experiments in which an individual dives the identical profile numerous times, sometimes resulting in DCS and sometimes not. That is clear evidence that an individual's susceptibility to DCS changes on a day to day basis. There are two important messages in that research for divers: 1) Divers are not completely "safe" or "unsafe"- rather they have a higher or lower risk of DCS; and 2) having done similar dives in the past without incident is not a reason to discount DCS using that same dive

## Deep Diving Preparedness Continued

profile on future occasions, shows us that a given dive profile is not a binary event, many factors are in play that could increase the risk factor, for instance, dehydration could increase risk, increased percentage of body fat could be a factor, lack of sleep, water temperature, the list goes on.

Modern decompression science is concerned with measuring and predicting DCS risk. Dive computers and decompression tables handle the person-to-person, day-to-day variability in susceptibility to DCS by providing a choice of relatively conservative decompression guidance, so that most people on most days will be safe if they dive properly.

Recently I spoke with Dr. Jeffery Davis, Director of Hyperbaric Medicine at the John Muir Medical Center in Walnut Creek. Dr. Davis was concerned about the two recent cases of DCS11 that he treated at their facility, both individuals were from the Ft Bragg area and both developed DCS harvesting sea urchins, one individual recovering partial use of his legs and the other went into a coma and lost his ability to breath, was put on life support ultimately resulting in his death. Dr. Davis, formally being involved in public health was concerned that an interven-

tion would be necessary to better understand why these people were coming into his facility for treatment. In the course of our conversation Dr. Davis came to understand what it is we do and the history of our industry sufficiently enough to hold back from involving California Occupational Safety and Health Administration (Cal OSHA) in our industry. He explained that both divers treated suffered from spinal stenosis, a shrinking of the spinal column that, in both these cases ultimately put pressure on trunk nerves branching out of the spinal cord that caused nerve paralysis in different areas on each person body. On one individual total loss of motor control resulting in paralysis and loss of control of the nerves that control breathing, the other was affected with paralysis in the lower extremities and lost bladder function. Stenosis is common in people as we age. The average age in our industry is hovering around the high fifties to early sixties. If we continue diving we must embrace techniques that will provide for us some degree of added protection in the event of, for one, DCS. Acquainting ourselves with oxygen is the best thing that we can do for ourselves as an industry and individually. The continuing thread here running through everything

we are discussing is safety and the use of oxygen to provides that margin of safety. There are around 1300 decompression chamber in the United States. Very few of these chambers, somewhere around 100 facilities accept emergency patients on a 24 hour basis. The only one in Northern California is at the John Muir Medical Center at Walnut Creek, and that's a long way from the Ft Bragg area. It might be wise to have a bank of O<sup>2</sup> bottles with a regulator and a 40 foot length of hose either on a dock in Ft Bragg with at least 30 Feet of Seawater (FSW) under it, if that exists, or on a boat that could transport a diver to that depth of water so a diver could descend to for treatment at 30 feet breathing O<sup>2</sup> for a length of time, but the best method would be that all boats involved in diving operations have a supply of O<sup>2</sup> on board their boats and be trained in O<sup>2</sup> decompression protocol. Some Individual divers who might be extremely experienced divers with years of diving harvesting sea urchins may never have experienced symptoms of DCS might think they are immune to DCS and won't recognize the onset symptoms without a prior experience. This thinking is dangerous, if you even suspect a symptom, most likely it will only get worse, you

## Deep Diving Preparedness *Continued*

need to start breathing pure O<sup>2</sup> immediately and either get to a chamber or descend into the chamber your floating on which is the Pacific Ocean. In water treatment of DCS may not be the best option, but if it's the only option you need to do it without waiting for things to get worse. This practice was common in the past in Australia with its thousands of miles of coastline and relatively few decompression chambers in the country, so this technique of decompression is not without precedent. It's been done and it works, I can personally attest to it. "The life you save may be your own".

There are dive schools all over the west coast that have workshops, seminars and reference material that can be accessed, all a click away. Diver Alert Network, <http://www.diversalertnetwork.org/> conducts seminars and has a



wealth of good and accurate, up to date information available online. Most Coast Guard vessels carry breathable O<sup>2</sup> on board in the event that they are called to treat a diver before being transported to an appropriate facility for treatment. Look at your individual diving technique and see how you can better things for yourself. Maybe diving shallower and less is a good answer for you. On the other hand, understanding the added risks that the changing conditions and demands of our industry has put on us as a group and the fact that our day to day susceptibility to DCS is a variable requires that a pro-active stance should be initiated to have a real time response to DCS and learning how to best put to use proper techniques. Having O<sup>2</sup> on board your boat is your best option along with the proper equipment and training in its administration.

Many divers now have NITROX systems on their boats utilizing the advantages that can be obtained by increasing oxygen percentages to between 28% and 36%. Along with increased bottom times at depth a diver has to be aware of staying below 1.4 Atmospheres Absolute (AA) of O<sub>2</sub> while working and 1.6 AA at rest. If those boundaries are breached there is a possibility of developing O<sup>2</sup> toxicity which

causes lack of consciousness, convulsions and can lead to death. Hopefully anyone using this gas has gone through a training program and understands what they are doing. NITROX has its own set of tables like air diving has and a diver can find that pushing the limits of those tables can result with consequences.

However you choose to dive to harvest sea urchin, your safety should be your main concern whether you dive air, NITROX, dive deep or shallow. Preplan a decompression dive, or stay within no decompression limits. Because of the variable circumstances that could arise at any given moment, an equipment failure, for instance, requiring a free ascent that would make your rate of ascent too fast putting you at risk of DCS, or anything else unforeseen that could happen putting you at risk could be easily handled with a bottle of O<sup>2</sup> and dedicated regulator and hose safely attached to your boat that you will hopefully never have to use.

One last thing I would like to briefly touch on is Dysbaric Osteonecrosis (DON), something many of us suffer from. DON affects three bones in the body, these are called yellow bones, or fatty bones. They're not blood

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**MISSION STATEMENT:**  
*"To ensure a reliable, sustainable supply of quality sea urchin products to consumers and enhance the performance of California's sea urchin industry."*

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## Deep Diving Preparedness

Continued

forming organs, they are weight bearing bones, they are the femur, humerus and tibia, the thigh, lower leg and upper arm bones. The place most affected is the areas around the joints, the hips, shoulders and knees. By the time a diver notices this by feeling pain it's manifested in the body and your options are limited. You can hang up your fins or you can basically deal with it until you're forced to replace the effected joint, in which case you'll never be bent there again since the joint is now steel and unaffected by nitrogen. The onset of this problem can be

slowed down and even prevented by watching your rate of ascent and adhering to the safety stops that are built into your dive computer. Rate of ascent should be 25 feet per minute, with a 3 minute stop at 20 feet, a little time for a lot of prevention. For a detailed look at this problem look at Underwater, the official publication of the Association of Diving Contractors International, May-June 2017 <http://www.nxtbook.com/naylor/ADCS/ADCS0317/index.php#/22> at DECA or view it on line at their website.

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