

## This Year's Check Refund Totals \$300,000

Club to give back \$300,000 total to holders of Club Life Insurance. Do you have Club Life Insurance?

**THE CLUB** — Before the end of the year, the Club will be returning approximately \$300,000 in refunds to more than 8,500 holders of the Club's Life Insurance product.

What will you be doing with your refund dollars? It's up to you ... but only if you have Club Life Insurance.

Members pay premiums each month for the insurance, and that money is paid for life insurance claims. At the end of the year, money that is not paid in the administration of the claims is returned. This year, that totals approximately \$300,000.

**Read the story on page 15 for details on the check disbursement, and how you can be eligible for next year's Club Life Insurance refund.**

## Tony DeClue's City Career Concludes In Flurry of Parties

Asst. Gen. Manager Tony DeClue, Club Member, retires.

*Story and photos by Robert Larios, Director of Operations; Contributions by Yvonne Liu, Office of Finance*



Tony DeClue.

**GENERAL SERVICES** — For General Services Assistant General Manager Tony DeClue, who completed 36 years of City service, October was a flurry of retirement celebrations.

The last retirement reception held in his honor concluded at the Quiet Cannon in Montebello Oct. 16.

Tony DeClue was recognized at a City Council meeting for his illustrious career Oct. 10.

Leonard Walker, Director of General Services/Fleet Services, worked with Tony the last four years. "I will miss Tony for the 36 years of expertise he had in the internal workings of the City," Leonard said. "He was also a people person, and he supported the people at the ground level, like the City mechanics, who got the job done."

**For lots more on Tony's career with the City, and his retirement parties, turn to page 56.**



City Employee Curtis Cash aboard Public Works' ocean assessment boat, the *Marine Surveyor*, during a regular specimen collection voyage.

## Testing the Waters



Curtis Cash and Public Works' Environmental Monitoring Division monitor the waters off the L.A. coast, making sure they're safe.

**SEE PAGE 6.**



City Employees Club of Los Angeles  
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# Holidays!

See page 67

PUBLIC WORKS

Club CEO John Hawkins (left)  
with Curtis Cash, Water Biologist III,  
aboard the *Marine Surveyor*.

MARINE SURVEYOR

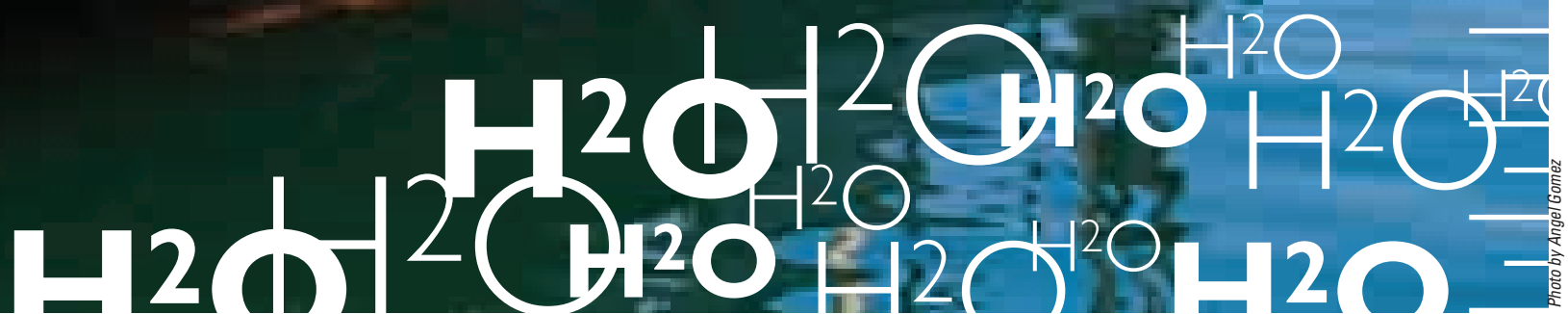
ALIVE! FEATURE

# Testing the Waters



**H**yperion's Ocean Assessment Unit plies the waters of the Pacific Ocean every working day, taking specimens to make sure that the Hyperion Treatment Plant is doing its job.

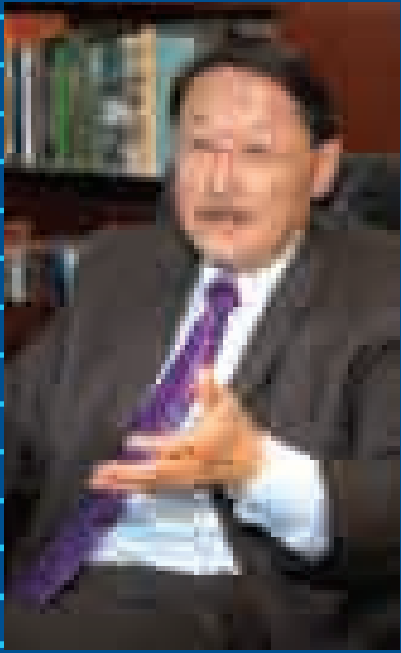
Learn about the Environmental Monitoring Division on the following pages.





# Testing the Waters

## PUBLIC WORKS



## Profile

### Dr. Mas Dojiri

**Wastewater  
Treatment Lab  
Manager III**

**Division Manager**

**Environmental  
Monitoring Division**

**Public Works/  
Sanitation**

- Began working for the City Jan. 29, 1989.
- Bachelor's degree, biology, UC Santa Barbara.
- Master's degree, marine biology, Cal State Long Beach.
- Training at Boston University's Wood's Hole Marine Biology Program.
- Teacher, Georgetown University, Cal State University, Long Beach.
- Born in Japan; grew up in Los Angeles.

### The *Alive!* Interview

# Under the Sea

On Sept. 9, John Hawkins, Club CEO, and Angel Gomez, Director of Member Services, accompanied Sanitation's Ocean Assessment Unit of the Environmental Monitoring Division (EMD), on their assignment that day: monitoring the water and aquatic life in Long Beach Harbor, as part of the Bight Project. The unit also monitors near the Hyperion Outfall, the pipe that places the City's fully treated wastewater into the ocean. Returning the water to the ocean is the last piece of the water delivery and treatment cycle that *Alive!* has been documenting over the last year or so, from the very beginning of the Los Angeles Aqueduct in Lee Vining, in the Eastern Sierras, all the way through the Hyperion Treatment Plant.

Monitoring the treated water as it returns to the ocean via Hyperion Treatment Plant into Santa Monica Bay and Terminal Island Water Reclamation Plant into Los Angeles Harbor, and the plant and animal life affected by the water, is the final and critical step in the process.

The Environmental Monitoring Division also monitors the stormwater and urban runoff at the beaches of Santa Monica Bay, Los Angeles Harbor, and adjacent coastal waters.

After the ride-along with the Ocean Assessment Unit, John and Angel interviewed Dr. Mas Dojiri in his office. He's in charge of the Environmental Monitoring Division, which includes the Ocean Assessment Unit. —Ed.

In an interview with Dr. Mas Dojiri, Wastewater Treatment Lab Manager III of the Environmental Monitoring Division, Bureau of Sanitation, *Alive!* learns all about monitoring the ocean for contaminants.



*Alive!* editor John Burnes (left) and Club CEO John Hawkins (center) interview Dr. Mas Dojiri of Public Works's Environmental Monitoring Division.

### The *Alive!* Interview:

**Alive!** Thanks for letting us go along on the boat for the monitoring today. It was really interesting!

**Dr. Mas Dojiri:** Our pleasure.

How often does the Ocean Assessment Unit go out?

**Dr. Mas Dojiri:** Pretty much every day, four times a week. The boat crew is on a four/ten work schedule, so they have every Friday off. They work ten hours a day, four days a week.

Explain for a person who's not a scientist, not a marine biologist, what the unit does.

**Dr. Mas Dojiri:** Sure. There are really three environmental questions that we address. One, and the public is most interested in this: "Is it safe to swim in Santa Monica Bay?" And the second is, "Is it safe to eat the fish in Santa Monica Bay?" And the third is, "Is the environment protected in Santa Monica Bay?" The third question deals with the marine organisms in the water, the small little worms and clams that live in the mud, and the animals that live on it or swim near the sea bottom like the fish and the starfish and sea urchins (the big invertebrates that live on the mud). So those are the three main questions that we address in our ocean monitoring program.

Is the outfall just one of the areas that you monitor? Is that where you go most of the time?

**Dr. Mas Dojiri:** The outfall area is one of the stops. We monitor right at that area, and then we have stations in concentric rings farther and farther away from it. It's a lot more complicated than that, though, because storm drains and other inputs into Santa Monica Bay complicate the issue and necessitate having additional sampling sites along the coast.

Right. I see.

**Dr. Mas Dojiri:** In certain parts of the country, the stormwater and the wastewater are combined. But here in California, they are separate systems. The sewer system is a system of enclosed sewer pipes that convey all the sewage to one of the four treatment facilities that the City owns. But, the storm drain system essentially just collects all the stormwater and urban runoff, then empties it into a larger storm drain, and it goes straight out into Santa Monica Bay and the Los Angeles Harbor [untreated].

The exception is that some of the stormwater, during dry weather, is diverted to the Hyperion Treatment Plant, where it is treated, and then sent five miles out into the ocean.

Public Works' Environmental Monitoring Division is tasked with making sure it's safe to swim in Santa Monica Bay (below).



Tony Phillips, Water Biologist II, removes the top five centimeters of sediment from a Van Veen grab sampler and places it into various sample containers for laboratory analysis.

But just during the dry season. The rainy season would be too much water?

**Dr. Mas Dojiri:** Yes. We're talking about billions and billions of gallons when it rains.

Hyperion is built for sewage, but if you can treat some stormwater, you do that, too.

**Dr. Mas Dojiri:** Exactly.

Okay.

### Treatment History

When did the whole monitoring project begin?

**Dr. Mas Dojiri:** That's a good question. The City started monitoring the beaches about 50

years ago. Now, that sort of monitoring is pretty archaic. Some of the analysis they did in the lab and the biological analyses that I've taken a look at are pretty simple and pretty outdated, but, for the time, I guess it was not bad.

It was something.

**Dr. Mas Dojiri:** That's right. And science always builds on itself. It improves by increments, just like technology. We've gotten very, very good at what we do here. We have a first-class laboratory here at EMD. We've worked really hard in the last probably twenty years to get to that level. In the last six years, we have become an excellent laboratory!

Do you do the field work for any other municipalities?

**Dr. Mas Dojiri:** For our shoreline monitoring program, yes. The various cities in the Santa Monica Bay watershed don't have monitoring programs of their own, so we monitor, essentially, the entire coastline from Matador Beach, which is north of Zuma Beach, south to Malaga Cove in Palos Verdes Estates. Once it gets toward Lunada Bay, then the rest of it is monitored by the L.A. County Sanitation Districts. And then we pick it up again at Cabrillo Beach.

### Monitoring the Beach

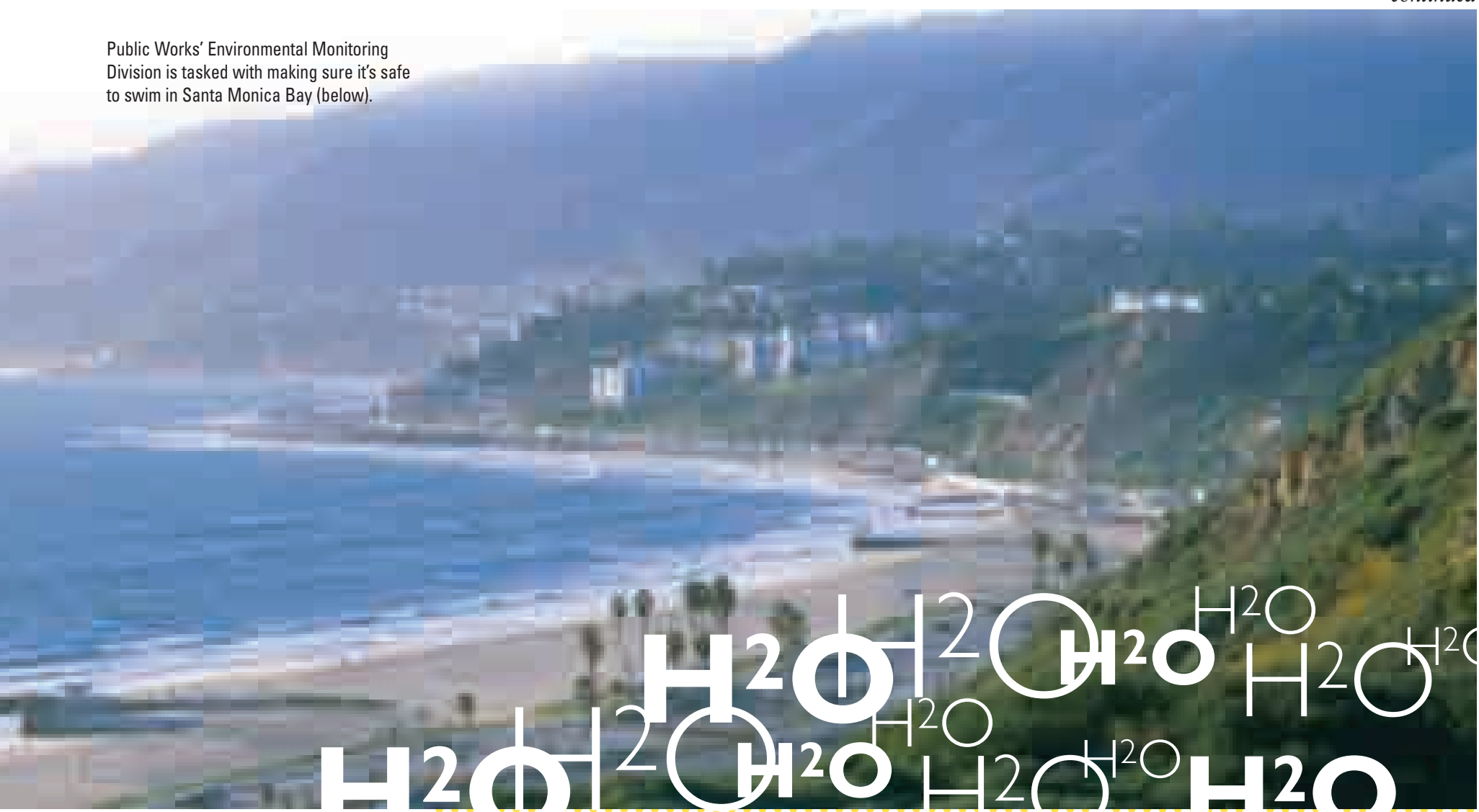
Let's talk about your normal routine. What are you typically looking for in the water?

**Dr. Mas Dojiri:** We're looking for bacterial pollutants and chemical pollutants, that is metals and organics. We're looking to see where the effluent [wastewater] actually drifts to, in Santa Monica Bay. We're looking to see if the effluent is toxic. We're looking to see if some of the pollutants are accumulating in the tissues of marine organisms. We're looking to see if the biological community, whether it's fish or the smaller invertebrates, are affected by the discharge of the Hyperion Treatment Plant out into Santa Monica Bay. We're looking at all of it. Let me just go through each one of these.

— continued

— “There are really three environmental questions that we address. One, and the public is most interested in this: ‘Is it safe to swim in Santa Monica Bay?’ ”

— Dr. Mas Dojiri





# Testing the Waters

The *Alive!* Interview

**PHOTOS, CLOCKWISE FROM TOP LEFT:**

1. Curtis Cash, Water Biologist III, is recording descriptive data for a sediment sample into the computer field data system.
2. Water Biologists are washing down a sediment sample that was collected for marine organisms (benthic macrofauna sample). The biological inventory that was revealed and will be ultimately identified to species will help determine the site's environmental quality.
3. Dr. Greg Deets sorts organisms in a benthic macrofauna sample.
4. A tube, or sheath, of a marine worm collected in a benthic macrofauna sample.
5. An echiuran, commonly called a spoon worm, collected in a benthic macrofauna sample.
6. A benthic macrofauna sample that has been washed down over a screen. The sediment has been removed, revealing the marine organisms.
7. Worm tubes, a snail, and a brittle star from a benthic macrofauna sample.



– continued

Please do.

**Dr. Mas Dojiri:** Back about 20 or 30 years ago, it was thought that the discharge from the Hyperion Treatment Plant was adversely impacting the beach along Santa Monica Bay. So we set up a fence-line strategy. We set up all these stations that were between the discharge point and the beaches to see if the effluent really crossed that imaginary fence, so to speak. After years of monitoring, we concluded that there were really no breadcrumbs that led from the Hyperion outfall to the shoreline. So, it was obvious that the Hyperion Treatment Plant discharge was not the cause of bacterial contamination of the Santa Monica Bay beaches.

So it wasn't coming back in?

**Dr. Mas Dojiri:** Right. The EPA, the Regional Board, and Heal the Bay, also looked at the data and said, yeah, we agree with you. From our data, [we saw] that the bacterial contamination of the shoreline, the beaches in Santa Monica Bay, was a direct result of stormwater discharge. Every time it rained, we would get a huge spike at the beaches. So, in 2004, we started monitoring right in front of the storm drains. They call it point zero. It's where the stormwater from the storm drain hits the surf. We used to monitor it 50 yards away from the storm drain, but now we monitor right in the middle of it. At each of the storm drains.

All of them?

**Dr. Mas Dojiri:** Every single one larger than 36 inches in diameter; the discharge from smaller pipes is relatively minor. We have a really extensive monitoring program in the wider Santa Monica Bay (defined as the area between the Ventura/Los Angeles County line south to outer Cabrillo Beach). Our goal is to get zero exceedance days in summer dry weather, and greatly reduced exceedance days during wet weather. That's going to be a real challenge.

How do you go about doing that? Are you charged with that, too?

**Dr. Mas Dojiri:** Not so much. We just monitor the conditions. There's another division in the Bureau of Sanitation known as the Watershed Protection Division that is in charge of actually reducing the pollutant levels, including bacteria, trash, nutrients, and chemical pollutants.

## In Deeper Waters

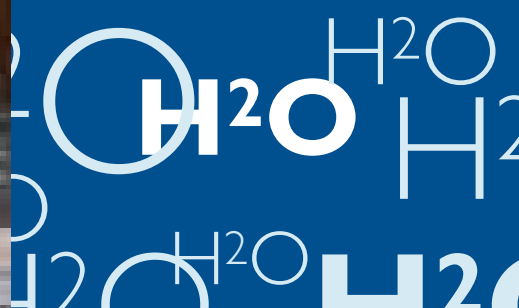
Okay, that's the beach.

**Dr. Mas Dojiri:** Let me get into some other programs we have.

Please do.

**Dr. Mas Dojiri:** About 85 percent or so of our employees are chemists, because so much of what we do is chemistry. But we can't analyze for 100,000 chemicals. It's just impossible. It would be too costly and too time consuming. About 100,000 synthetic chemicals have already been produced by chemical companies, and they're producing 2,000 new ones a year, like pharmaceuticals. To try to keep up with the monitoring on that would be incredibly expensive, and it would be impossible to do on a routine basis. So we monitor for 122 priority pollutants that have been identified by the EPA. They consist of 13 heavy metals, and the rest are organic pollutants. Heavy metals are things like mercury, copper, lead, silver, selenium and molybdenum and others. Organics would be pesticides like DDT, PCBs and others.

We can't test for everything. But, we have a monitoring program called the toxicity testing program. We take different concentrations of the treated sewage, called the effluent, and we test organisms in each of those dilutions. We might test fish in various dilutions of effluent to see if they live or die or if



## ABOUT THE Environmental Monitoring Division

Monitoring and testing of the land, sea and air are performed by the Environmental Monitoring Division (EMD) – a staff of skilled and trained scientists who help protect public health and the environment with a wide variety of physical, chemical and biological tests and analyses. The EMD's primary responsibilities are to:

- Provide all lab testing for the Bureau of Sanitation
- Assess the health of the ocean and inland water bodies
- Assess the quality of air around the City's wastewater treatment plants
- Allow treatment plant operations staff to better direct their activities based on monitoring results
- Stay current with the regulations that affect the City's facilities and reuse and discharge practices
- Advise the Bureau of Sanitation on environmental protection issues
- Serve as a trusted source of information for the environmental community and neighbors of treatment plants.

### EMD Labs

The Harry Pregerson Technical Support Facility at the Hyperion Treatment Plant houses a consolidated EMD lab facility. Here, EMD's staff performs extensive testing and assessments of marine chemistry, biosolids, industrial waste, air quality, storm water discharges, and ground water.

### Skilled Scientists

EMD staff, working in state-certified labs, can test for the presence of more than 150 different pollutants.

### Monitoring Ocean Waters

More than 5,000 samples of ocean water, sediments, fish and other marine organisms are collected and tested by EMD every year. Managing this data is another important function of the Division.

### Monitoring Treatment Plants

Daily testing of wastewater takes place at all stages of processing at each treatment plant. EMD also tests the quality and safety of reclaimed water and biosolids, and reports on water discharged into water bodies.

### Monitoring Air Quality

EMD monitors the health and quality of the air around the City's wastewater treatment plants. Findings are used by engineers to reduce air quality impacts to a minimum.

### Two Vessels

The City has two monitoring vessels: the Marine Surveyor, 65 feet long and used in the L.A. Harbor; and the La Mer, 83 feet long, used in Santa Monica Bay.

# Under the Sea

## For More Information

For more information about the Environmental Monitoring Division's services, please contact:

**Dr. Mas Dojiri,**  
Division Manager  
Environmental Monitoring  
Division  
(310) 648-5610

they grow any differently in the higher concentrations of effluent versus the control, which is just seawater. And then we might test an invertebrate like fertilized abalone eggs to see if the shells of the embryos develop properly. We might test the sporophyte, the tiny little seedling of the giant brown kelp that occurs off Palos Verdes Peninsula, to see if their rate of germination is different, and whether the length of the germination tube is different from the length of tubes in the control.

The program indicates whether there is some unknown toxin in the effluent, something we haven't measured chemically, but something from those 100,000 or 150,000 different synthetic chemicals that might be causing a problem. We might not know what it is, but it'll alert us that something is wrong.

Right. So you're testing specifically for 122 chemicals in this facility?

**Dr. Mas Dojiri:** Yes.

Which is the most common chemical that comes up?

**Dr. Mas Dojiri:** We detect a number of them. Whether we detect them in levels of concern or not is a different issue, but we do detect DDT, for example, and PCB in our southern Redondo Beach stations because the current is traveling northward from the L.A. County Sanitation District's outfall. There was a chemical company that was one of the largest DDT manufacturers up until 1976, I believe, before they ceased existence. They ended up discharging some of their DDT into the Los Angeles County Sanitation Districts sewage treatment plant in Carson, and then the Los Angeles County Sanitation Districts discharged it out their outfall off White's Point located offshore the Palos Verdes Peninsula. There are hundreds of tons of DDT on the Palos Verdes shelf along with PCBs. We've been collecting it now in our surface sediments in the southern Redondo stations, so the DDT is migrating northward.

So, those 122, that pretty much covers everything you monitor for?

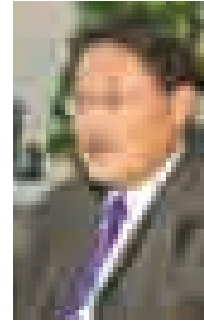
**Dr. Mas Dojiri:** At least in Santa Monica Bay. There are a number of things we look for in samples that we take from the process here at Hyperion, to make sure the treatment plant is operating correctly.

I see.

**Dr. Mas Dojiri:** That process is a little bit different, and we analyze for nutrients, ammonia, settleable solids, total organic carbon, biological oxygen demand, etc. That information is really important to the treatment plant operators and allows them to adjust treatment plant operations to the optimum level.

“Not only are the individual regulatory limits for each pollutant getting lower and more difficult to meet, but also the types and number of tests are increasing.”

– Dr. Mas Dojiri



### Tracking the Effluent, Checking the Mud

**Dr. Mas Dojiri:** One of the other things that we do is track where the effluent goes [after it leaves the outfall pipe]. We send down a CTD, a Conductivity Temperature Depth profiler all the way to near the bottom of the ocean at each of the sampling sites.

We also measure 54 ammonia levels, salinity, pH, dissolved oxygen, and something called transmissivity. Transmissivity is the amount of light that can penetrate a certain distance. The transmissivity is the inverse of turbidity, so we want to know how turbid the water is.

The reason that we study those parameters as well as the acidity (pH) of the water is to try to track the effluent. We want to know where the treated water is going, once it leaves the outfall. The effluent, once it exits the five-mile outfall, gets diffused. It looks like a smoke plume coming out of a chimney. We want to track that.

Once the effluent goes out, many of the pollutants actually adhere to the particles and the particles are denser, so they end up settling down to the bottom. So you end up having this area around the outfall that has a layer of flocculent organic matter.

We're undergoing full secondary treatment now at Hyperion, so we don't have a lot of [organic] particles going out now in the wastewater. But, prior to 1986, when the treatment was

really bad, for example in 1985, when it was historically horrible, we had a lot of organic particles going out and settling down. You'd expect that the area around the outfall would have a different biological community in the mud and swimming around it than areas away from it. So we designed a sampling program to collect the little crustaceans, clams, and worms that live in the mud to see if they're different at areas away from the outfall, and we found out that they are very different.

Based on the types of species and their abundance, we can tell that there's a difference and that area [near the outfall] is impacted. The other way you can tell how the treatment plant is doing is you can take that one site and follow it through time. Are we doing better now in present day than we did prior to 1998, when full secondary [thorough] treatment kicked in? Or in 1985, when the emissions and the treatment at Hyperion was really pretty bad?

### Report Card

What conclusions can you reach?

**Dr. Mas Dojiri:** We took all the biological information that we had and we ran it through a computer program.

The period before 1986 was the historically bad treatment [period] at Hyperion. In 1986 and later, the treatment got a lot better. We did a lot of things here at Hyperion to make it better, and we were actually approaching full secondary standards for the EPA, even though we weren't at 100 percent full secondary — the species diversity and abundance since we went full secondary at Hyperion has been tremendous. In fact, it's one of the most diverse communities out there now.

Curtis Cash [supervisor of the Ocean Assessment Unit] was saying there's, like, 180 species at the outfall, whereas you might have only 20 or 30 in other places.

**Dr. Mas Dojiri:** Yes. I think it's around there. That's a good sign. We're all pretty excited about the results.

And then we also have a trawling program where we send a net overboard. Once we bring it up, we separate all the fish and the larger invertebrates and then we identify them, weigh them, measure them.

And that has given you the same results?

**Dr. Mas Dojiri:** Yeah. Exactly.

So put it into layman's terms. How are we doing? How is Hyperion doing?

**Dr. Mas Dojiri:** It's doing really well. The treatment is very good. They're doing extremely well, and the 100 percent full secondary has obviously improved the outfall area biologically.

That was a huge change, a huge improvement.

**Dr. Mas Dojiri:** Right.

– continued

Curtis Cash, Water Biologist III (right), explains the day's work to John Hawkins, Club CEO





# Testing the Waters

The *Alive!* Interview

— continued

## Tissue Chemistry

**Dr. Mas Dojiri:** Another thing that we do is tissue chemistry. We go out there and catch sport fish, essentially. We mimic the sports-fishermen with hook and line, using the same type of bait, going to the same fishing spots that they do, and collect the same species of fish. We fillet them and put them in various containers, bring them back to the lab, and the chemists do the 122 priority pollutant analysis.

So you get to go fishing.

**Dr. Mas Dojiri:** Well, I used to get to go.

With a purpose.

**Dr. Mas Dojiri:** I used to get to do that. I don't do that any more. I thought once I became the division manager, I would be able to schedule myself on the boat anytime. But if you're going to be a conscientious division manager, you're going to stay back here and read all the reports, hold meetings, direct staff, and do all the personnel and budgetary things that need to be done for the division. So, now I sit behind a desk instead of going out on the boat or doing lab work.

Right, of course.

## A Bigger Picture: The Bight Project

Curtis Cash was telling us about the Bight Regional Monitoring Program. Can you explain it?

**Dr. Mas Dojiri:** OK. The Program is coordinated by SCCWRP, the Southern California Coastal Water Research Project. SCCWRP is a joint powers agency, a quasi-government agency funded by several government agencies that all have a similar mission

or goal. Instead of achieving their research goals separately, they collectively get together as a team to form this joint powers agency so that they can pool their money instead of having duplicative efforts. In 1969, we formed SCCWRP to do a lot of research, primarily regarding wastewater issues that are above and beyond our routine monitoring. For example, once every five years, the SCCWRP member agencies conduct a regional monitoring program that covers several topics within the area known as the Southern California Bight, which is the coastline that extends from Pt. Conception to Cabo Colnett (Mexico). Essentially, the program results in an environmental snapshot of the entire Southern California Bight. It is a massive effort that involves over 60 agencies.

And not just near the Hyperion outfall.

**Dr. Mas Dojiri:** Correct. For 30-some-odd years, we've been studying just the area around our outfall and, as any good scientist will tell you, you can't have blinders on like that. It's great that we've been studying that to find out what's going on near the outfall, but how are we doing in respect to the entire Southern California coastline? [We wanted] to put our results into a bigger perspective. And let people know how we're doing along the entire coast.

So the Bight Project is essentially kind of taking a pause from your normal monitoring routines and doing quite a bit extra for the greater good rather than the local good?

**Dr. Mas Dojiri:** Absolutely. That's a very good way of putting it. We end up posing some bigger questions than we would normally do. For example, this time, we're going to look at nutrient concentrations out in the Southern California Bight, something that

we're not required to do in our permit. And then we're trying to correlate it with harmful algal blooms. We've been having some problems with domoic acid and a few other biotoxins produced by these harmful algal blooms. These algae produce biotoxins — we're not really sure how — but then the sardines and the anchovies end up accumulating the toxins when they eat the algae (they're plankton feeders) and then the marine mammals, seals, sea lions, end up eating the fish and, as it goes up the food chain, and the marine mammals either get sick or die. We've had a lot of marine mammal deaths this past season because of these harmful algal blooms. So it's a real concern.

You see a certain situation developing and you want to go out and investigate it, even though it's more than you need to do.

**Dr. Mas Dojiri:** Right. The agencies get together and collectively decide on the research for the Bight Regional Monitoring Program. The planning takes at least a year, if not longer. It's really an exhaustive, comprehensive planning effort. It's not easy to coordinate over 60 different agencies, as you can imagine.

## Tighter Controls Yet Confused Fish

How much more detailed is the evaluation process getting? Does it get more complex? Are you testing for more every year?

**Dr. Mas Dojiri:** Not only are the individual regulatory limits for each pollutant getting lower and more difficult to meet, but also the types and number of tests are increasing. For example, whenever we find something that's toxic to the organism during our toxicity tests, we have to go through accelerated testing. We never had to do that before. All we had to do was just report that there was an exceedance. Instead of doing the test once a month, we end up doing it six times in 12 weeks. We have to do it more frequently and then we have to try to identify the toxicant, which we didn't have to do before.

And now, in the recent permit, we're required to do what we call special studies. Every year, we have to propose some sort of special studies that we're going to conduct above and beyond our routine studies. One of the things that we've been doing is studying endocrine disrupting compounds. These are compounds that disrupt the endocrine system. What we have found working in conjunction with SCCWRP, Cal State University Long Beach, among others [see below] is that some of the male flatfish near the Hyperion outfall were being feminized. We're finding ovarian tissue in the testes. We're finding egg-producing proteins in the blood of male fish, and they should have zero levels. So they look like they're becoming more and more female.

What's causing that?

**Dr. Mas Dojiri:** The endocrine-disrupting compounds that are flushed down the toilet. There are certain natural estrogenic compounds that women will excrete just naturally. In addition, our bodies do not utilize the entire doses of the drugs that we take to improve or maintain our health; therefore, a certain amount of these drugs enter the sewage system by way of our excretions (urine). Also, unused drugs have typically been flushed down the toilet (programs are developing to encourage proper disposal of these drugs), thereby adding to the problem. And there are a bunch of endocrine-disrupting compounds like DDT, other pesticides, and some other organic compounds that mimic the natural estrogenic type compounds.

We end up having this kind of soup of what we call EDCs (endocrine disrupting compounds) and PPCPs (pharmaceuticals and personal care products like fragrances, cosmetics, deodorants, hair sprays, etc.). There's a whole host of natural and synthetic chemicals out there that end up in our sewage treatment system and go out the outfall. We don't know what's going out there because we don't have the methodology yet to detect them. Certain research laboratories at U.C. Riverside, at Cal State Long Beach, at the U.S. Geological Survey and others, have developed the methods and can detect them. Although these chemicals are being discovered in minute quantities in the environment, we do not yet know if they are having any biological effects, for example, reduced reproduction, on the marine animals.

What other things are sending out warning flags for you? What are the trends?

**Dr. Mas Dojiri:** Generally speaking, the trends are all good. When we collected the fish, we used to see tumors or lesions or fin rot on the fish. We don't see that anymore. I don't think we've reported a tumor or fin rot in probably 15 years or so.

Wow.

**Dr. Mas Dojiri:** Yeah. It wasn't that unusual to find these when you brought up a trawl before. So that's certainly great. And we're finding a great abundance plus a high species diversity.

Both of them?

**Dr. Mas Dojiri:** Yes, both of them are increasing, which is a good sign. And certainly the treatment process has been great at Hyperion and other City treatment plants, as well as L.A. County Sanitation Districts, Orange County Sanitation Districts and the City of San Diego. The four major dischargers are all doing really, really well.

Thank you, Dr. Dojiri.

**Dr. Mas Dojiri:** You're welcome.



Aboard one of the City's boats, the *Marine Surveyor*, Curtis Cash and Tony Phillips process a benthic macrofauna sample.

Boat Captain Pete Christie (right) is at the helm of the *Marine Surveyor* en route to another site. Curtis Cash, Water Biologist III (left) and *Alive!*'s Angel Gomez are along for the ride.





