

Virtual Tour

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Read on for an in-depth tour of the MWVCRC.

(Updated and complete as of 4/19/2007)

As you approach the front door to our facility, the Marine Wildlife Veterinary Care and Research Center (MWVCRC) and peer inside the windows, you'll wonder, like everybody else, what exactly is this place? An office of the Department of Fish and Game? A place to take oiled wildlife? The place where dead sea otters go? A sea otter training institute? A marine research laboratory?

It is all of those and a bit more. The easiest way to explain the multitude of programs, collaborations and responsibilities of the MWVCRC is to start with the basic areas of research and response we are involved in. There are four main programs that are run out of this facility—you can find out about them in more depth by using the menus to your left:

The Response Program, which is CDFG-OSPR funded and staffed, ensures our facility and its staff and mobile equipment are ready and capable of responding to an oil spill of any size, or other marine emergency that involve wildlife along the coast of California. Several boats, mobile veterinary labs and response trailers, capture equipment and floating pens, and specialized and all terrain vehicles (ATVs) are based at the MWVCRC. This program most frequently works very closely with or under the Oiled Wildlife Care Network which is a CDFG-OSPR funded and U.C. Davis-Wildlife Health centered and operated.

The Laboratory Program is funded by CDFG-OSPR, UC Davis, and various State, Federal (USGS/BRD, NOAA-NMFS, USFWS) and private grants, and staff include employees of CDFG-OSPR, UC Davis, UC Santa Cruz, and Moss Landing Marine Labs as well as graduate students and volunteers. This program utilizes opportunities to sample dead or dying animals in order to better understand factors that have negative impacts on human, wild animal and environmental health and is divided into the following research areas:

- **Southern Sea Otter Pathology and Research:** We do full post-mortem examinations of every fresh-dead sea otter found off the coast of California (from 60-90 otters per year) and examine most of the others (an additional 150-200 otters). In addition to gross examination, we process blood, urine, and other fluids that give us clues as to how and why the sea otter died. We also fix tissues for later microscopic examination, possibly for special stains or electron microscopy. These fluids or tissues may be examined for chemical or biological toxins or cultured to isolate infectious agents. An initial diagnosis is often fairly quickly determined, but depending on the complexity of the post-mortem workup, it can take up to a year to determine a final diagnosis.

- **Pinniped Health Study:** With funding from the National Marine Fisheries Service-Marine Mammal Health and Stranding Program and in cooperation with UCSC, Moss Landing Marine Labs and the Marine Mammal Center, the MWVCRC performs examinations on dead stranded seals, dolphins and whales (pinnipeds and cetaceans) to determine cause of death and to gather important biological data and samples.

- **Seabird Health Study:** Under funding from OSPR's SSEP program the MWVCRC, in cooperation with Moss Landing Marine Laboratories, conducts post-mortem examinations of seabirds collected during and between major die-off events and collects the results in a database. Periodic reports on the causes of marine bird wrecks are issued. This program also does live marine bird capture, sampling and banding and health studies.

- **Terrestrial Animal Disease Vector Research:** As part of an NSF-NIF funded grant to UC Davis the MWVCRC conducts postmortem examination of small terrestrial animals collected by Federal, State and county agencies to determine the patterns and flow of land-based pathogen into the ocean (pathogen pollution). Several other State and Federal grant funded projects examining various other types of pathogen pollution are hosted or based in part out of the MWVCRC.

The Field Research Program is jointly staffed by CDFG-OSPR, USGS/BRD, and the Monterey Bay Aquarium (MBA), and is funded by those institutions with support from USFWS. This program is primarily concerned with the health, biology, welfare and conservation of living sea otters and is divided into three areas:

- **Sea Otter Counts:** Conducted by sea, air, and land, our survey team determines the overall trends in the Southern sea otter population twice a year. Development and improvement of counting methods, GIS mapping and response focused aerial surveys are part of this work.

- **Sea Otter Capture and Sampling:** A team of certified and specially trained divers help capture, flipper-tag, instrument and sample free-living sea otters involved in ecological studies. VHF radios that transmit core body temperature information, time/depth recorders and other methods may be employed in follow-up. Otters that are captured and released are also given health checks and have blood samples taken.

- Sea Otter Health Studies: Using samples taken during captures and from other sources sea otters disease exposure, genetics, immune function, exposure to contaminants and other health related research is conducted.

The Captive Sea Otter Research Program is staffed by CDFG-OSPR, the UCSC-Marine Mammal Training Program with help from Monterey Bay Aquarium and other agencies and funded primarily by UCSC and CDFG. Currently four adult male sea otters that have been declared "unreleasable" by USFWS live at the MWVCRC. They are trained to allow examination, various non-invasive medical procedures, and to do certain behaviors that allow physiologic measures to be taken. Two are also used to study how to wash sea otters more efficiently, safely and effectively should they become oiled.

How Did the MWVCRC Come Exist?

The existence of the MWVCRC was specified under the landmark Lempert-Keene-Seastrand oil spill act of 1990 which was California's response to the Exxon Valdez oil spill in Prince William Sound, Alaska. The resulting devastation from 11 million gallons of spilled oil, both environmental and economic provided the political, financial and social will to galvanize the California Legislature:

- Most of the oil coming from Alaska is transported to refineries in the San Francisco Bay or Los Angeles harbor areas. This means that an average of one Exxon Valdez size tanker a day arrives in California, making the likelihood of a major oil spill a very real possibility.

- An oil spill the size and volume of the Exxon Valdez could cover the entire range of the southern sea otter and effectively destroy this "threatened species" potential for recovery.

- Given the sensitivity of wildlife and habitat along the California coastline, the extreme value to California and the USA of its beaches and marine businesses all pertinent measures to prevent and respond to oil spills seem prudent.

- Given Exxon's \$2 billion cleanup response and resulting fines, oil companies were also looking closely at a solution for response and cleanup that could already be in place should a disaster strike and reduce response time, increase effectiveness and reduce environmental damage.

Among the many things the Lempert, Keene, and Seastrand Oil Spill Prevention and Response Act from the 1990 EPA specified:

"Among its provisions, the new law establishes a new office within the Department of Fish and Game that would work to prevent spills and coordinate clean-up efforts, funded through fees imposed on oil transported across California's coastal waters." This office was named the Office of Spill Prevention and Response (OSPR).

- Source: <http://www.arb.ca.gov/newsrel/nr101690.htm>

In further detail, SB2040 provided specific provisions for response and readiness including:

- OSPR would build and maintain facilities for the care of marine mammals and marine birds, the first to be built in the center of the sea otters range, and under subsequent legislation additional centers were built in partnership with the Oiled Wildlife Care Network covering the rest of the State and its wildlife species.

- Oil companies and transporters would be relieved of the logistical and financial responsibilities of maintaining their own response facilities, personnel, and equipment. In contrast to Valdez, Exxon had to maintain a fleet of 100 boats and aircraft at the height of its own response to their spill and four centers for oiled wildlife care.

- By maintaining response facilities, personnel can respond to a spill within 24 hours (in practice, it is generally less than two hours between the initial report and the first responders on scene).

- Wildlife can be treated within 24 hours of the spill, with primary care responsibilities being given to the response center closest to the spill, and overflow delegated to other participating centers. In practice, this has resulted in an average survival rate of 30-50% of all animals triaged, and these figures are constantly improving with ongoing research. In contrast, Exxon had to ferry supplies to build response facilities by helicopter, and train or fly in response personnel. The delay between spill and treatment and cleanup was critical, and resulted in very high animal mortality rates after intake and triage.

The MWVCRC is the only facility built and operated by CDFG-OSPR. All subsequent primary care facilities have been built by the OWCN and are operated in partnership (and between oil spills at the expense of) various universities, non-profit groups and for-profit corporations.

The Role of OSPR and the OWCN

OSPR maintains the Oil Spill Response Trust Fund, which is funded by a per-barrel fee on oil transported across California's coastal waters or pumped through California pipelines. The law mandates that this fund have \$50 million dollars in it to respond to major spill events should a responsible party for a spill be unknown or unable to pay for cleanup. The OWCN is funded by a portion of the interest in the Trust Fund during non-spill periods to maintain wildlife

readiness, response and research. The law also established the Oil Spill Prevention and Administration Fund (OSPAF) that funds OSPR's various activities. OSPR and the OWCN work together to maintain trained staff, equipment, facilities, and ongoing spill cleanup and wildlife handling training. The primary difference is that OSPR coordinates the federal, state, and local response to the spill itself, including damage assessment, cleanup contractors, and communication with the responsible party. The OWCN is primarily involved with the care, treatment and rehabilitation of affected wildlife resulting from the spill. OWCN supports a competitive research grant program to improve the care of oiled wildlife and better understand the effects of oil on wildlife. OSPR supports an internal research program to improve response and technology development.

Other Oiled Wildlife Care Facilities

Though the MWVCRC is unique in its position as the only spill response facility built and operated by OSPR and the one facility specializing in sea otter care, it is only 1 of 25 participating organizations and primary care facilities that are part of the OWCN in California. Seven of these facilities were purpose built for oiled wildlife response at strategic locations (San Diego, Huntington Beach, San Pedro, Santa Barbara, Morro Bay, Santa Cruz, Fairfield and Arcata).

The OWCN has a map on their website to better illustrate this:

<http://www.vetmed.ucdavis.edu/owcn/participants.cfm>

The type of commitment OSPR has made to comprehensive oil spill prevention and response and, through the OWCN, the example it has set for oiled wildlife research, care, rehabilitation and release, has set a new global standard. Similar programs are being developed in Japan, Western Europe, Scandinavia and elsewhere in the USA.

A major non-profit rehabilitation organization that partners with OWCN and OSPR is International Bird Rescue Research Center (IBRRC) (<http://www.ibrrc.org/>). They have an informative website maintained by Russ Curtis, at another primary care facility in Anchorage that coordinates spill response activities in Alaska similar to those in California. The IBRRC operates two of the largest California centers and provides care for hundreds of injured, orphaned, sick and starved birds in partnership with the OWCN at the San Pedro and Fairfield care facilities. The University of California-Davis, School of Veterinary Medicine-Wildlife Health Center supervises routine veterinary care during and between oil spills.

Oil Spills and Southern Sea Otters

The entire population of the Southern sea otter, a federally threatened species, is between Half Moon Bay to the north, and Santa Barbara to the south. A large enough oil spill, particularly without in-place response organizations, has the potential to wipe out the entire population or kill so many the recovery would be virtually impossible. One of the first tasks for OSPR was to find a suitable location near the middle of the sea otter range to build a response facility. There were three suitable locations that had access to sea water. One such place was Santa Cruz, on the northern edge of Monterey Bay, where UCSC owned property on the very western edge of Santa Cruz city limits, and the only other buildings on the property at this time was the Long Marine Laboratory. This laboratory had an existing sea water system that could be extended to CDFG. (As of 2006, other buildings have been built – see this page for more detail: <http://mwvcrc.org/content/view/21/80/>)

The Leaseback Agreement between OSPR and UCSC

Deciding to build a sea otter oil spill response and research facility on UCSC property has turned out to be ideal for both agencies. The first step in this process was a leaseback agreement signed by OSPR and UCSC, that has set the terms of the partnership between the two agencies. In summary:

- The leaseback is in effect for 40 years, renewable for another 40 years after 30 years have elapsed.

- OSPR pays UCSC a \$30,000/year for the use of the property, and is responsible for all operating costs (sea water pumping and maintenance, facility utilities, sewer, repair and maintenance).

- OSPR is paying \$100,000 to improve the sea water transport system on the property, which is shared with Long Marine Lab, the Seymour Marine Discovery Center and NOAA/NMFS.

- OSPR reserves up to 25% of their facility for cooperative and collaborative research projects with the university. As of 2006, this equates to an office in the administrative wing of the building, use of the necropsy facility and major portions of its specimen freezer, and use of the mammal clinic and adjacent recovery pools in the hospital wing for the sea otter research of the Marine Mammal Physiology Program, <http://mwvcrc.org/content/blogcategory/34/73/> and use of other portions of the facility as requested.

- Because some MWVCRC staff have research appointments at UC Santa Cruz and UC Davis they can route research grants and contracts through those institutions and provide opportunities for graduate and undergraduate students.

- This arrangement has allowed UCSC students to get practical experience in marine animal research and health care, has facilitated support of MS and PhD projects, has provided many research and joint funding opportunities for UCSC faculty and has helped to build a cooperative Federal, State, University marine science campus.

A Hybrid Facility

The leaseback agreement is important because it guarantees that programs run by OSPR will always intermingle with programs run by UCSC—in short, we are a hybrid facility. The Sea Otter Washing Study: <http://mwvcrc.org/content/view/52/70/> is a good example of direct collaboration between the UCSC Marine Mammal Physiology Program and OSPR to research the effects of water temperature and composition (warm softened fresh water versus ambient temperature salt water) on sea otter fur and ability to maintain thermal equilibrium. This study is aimed at improving the way sea otters are washed, should a major oil spill occur and is only possible because of our continuous collaboration between UCSC and OSPR.

Construction Costs

In 1995, when the bid was awarded to Maudlin-Dorfmeier Construction, of Fresno, CA, the cost was about \$5 million. In contrast, in 2006 construction of the MWVCRC would cost \$14-\$16 million. There were three locations within the middle of the Southern Sea Otter range with access to sea water, this being one of them, which also happens to be on property owned by UCSC. Rather than having to purchase the land, Fish and Game signed a 40-year leaseback agreement with the University.

Initial Facility Design

As you go farther into the virtual tour, the benefits of the two-wing design of this facility become apparent. The number and types of rooms were largely taken from several versions of response facilities that had been built in Alaska. The configuration and layout of the MWVCRC was the product of three years of work with architects, builders, veterinarians and administrators.

Facility Layout and Design

Our facility is made up of several components:

- A main building with two wings, connected by a breezeway
- Two outbuildings: necropsy and the supply barn
- The pool compound and UV disinfectant system.

Additionally, we have offices in double-wide trailers adjacent to the necropsy facility that we share with the Predatory Bird Group, and water and power hookups for mobile veterinary labs and overflow recovery pools adjacent to the trailers.

Main Building: Administrative Wing: Front Office

The administrative wing of the building is open and occupied the entire year. This virtual tour starts with a view into the front office:

Under normal conditions (non-spill):

The front office has four offices, four cubicles, and approximately 9 personnel, made up of field, laboratory, response, and UCSC staff. The conference room, at the rear of the front office, hosts small meetings and conferences for Fish and Game and other affiliated agencies several times a week.

Under spill and spill-drill conditions:

We set up the front area of the office as a volunteer and staff check-in area. This allows us to keep track of who is onsite, offsite, or in the field and what skills, training, and certifications they have, which in turn determines where they are allowed to work in the facility or in the field. OSHA's HAZWOPER training is mandated for oil spill response staff who will be working within a certain radius of the spill source. Many volunteers have already taken basic or advanced rehabilitation training offered by the OWCN. They need to be quickly identified and put to work in appropriate capacity.

The conference room becomes our communications and media relations center. We set up phone banks, computers, and radios, and are able to project information onto a large display screen for conferences.

We recently set up Internet-based video cameras, one of which resides in the conference room for video conferencing. See more information about them here:

<http://mwvrc.org/content/blogcategory/32/71/>

Administrative Wing: Human Kitchen

Under normal conditions (non-spill):

The human kitchen functions as a break room for the staff.

Under spill and spill-drill conditions:

The human kitchen is capable of preparing meals for several hundred volunteers working 24 hours a day, on a continuous (human) feeding schedule.

Administrative Wing: Fish Kitchen (Animal Food Prep)

Under normal conditions (non-spill):

The fish kitchen is used to prepare the meals for our four sea otters, approximately \$4,000, per year, per otter, of mostly restaurant-grade seafood (squid, surf clams, shrimp). The Monterey Bay Aquarium pays for the cost of their food.

Under spill and spill-drill conditions:

Depending on the animals affected by the spill, the fish kitchen can be divided into both an avian and marine mammal food prep facility, capable of holding 11 tons of food in cold storage, and producing 500 meals per day.

Administrative Wing: Laboratory

Under normal conditions (non-spill):

The laboratory is used for post-necropsy serum and tissue processing. Read more about this in [Anatomy of a Necropsy](#). The laboratory is also used to support Sea Otter capture operations, where we do further processing on samples taken from live sea otters in the field. Read more about this in our [Field Research: Sea Otter Captures](#) section. We also have a bacteriology/microbiology laboratory inside the general lab.

Under spill and spill-drill conditions:

During spill-drill conditions, our laboratory operations remain uninterrupted to support our pathology efforts. We also do packed cell volume, plasma protein, and glucose measurements on all oiled birds to determine progress of care and when they might be released and we can do basic bacteriology in support of clinical cases.

Administrative Wing: Freezer Complex

This room houses our minus 80 freezers for blood and tissue archiving.

At negative 80 degrees C, most blood and tissue samples are stable and most life processes are inactivated. We also have separate negative 40 degrees C freezers for less sensitive samples. Other large bulk freezers are located in the necropsy outbuilding discussed below.

Administrative Wing: Fabrication Shop

Under normal conditions (non-spill):

The fabrication shop is used to support the day-to-day maintenance and upkeep of the facility. Unlike an office building that may have a measured and predictable amount of upkeep, our facility is used 7 days a week for the The Marine Mammal Physiology Project, and for continuous storage of blood and tissue samples in support of our laboratory programs. Because we operate a spill response facility, we are also required to be ready to respond to an oil spill of any size within 24 hours to provide “best achievable care” to oiled wildlife. This puts our maintenance, inspection and upkeep on the level of a small hospital.

Under spill and spill-drill conditions:

The Fabrication shop has been a central hub of activity during oil spills in building and maintaining pens and holding areas for oiled wildlife, and for modifying existing pool structures to accommodate the type of wildlife we are treating. This may include birds as small as a sandpiper and as big as a pelican. During a spill, our director of maintenance activates the heating and cooling systems in Hospital Wing (see below), and prepares our pens and totes, or individual holding pens, for the immediate intake of oiled wildlife.

Main Building: Breezeway

Under normal conditions (non-spill):

The breezeway is located between the administrative and hospital wings of the facility, at the very center of the complex. In general terms, people enter through the administrative wing, animals through the hospital wing, and supplies through the breezeway.

The breezeway has large, rolling, barn-like doors for receiving large pallets of goods directly from the access road outside, making it a convenient place to receive and disburse most large items that enter our facility.

Under spill and spill-drill conditions:

The breezeway is the demarcation between the "cold" administrative and "hot" treatment areas of the facility. In the cold area, the only Personal Protective Equipment mandated are closed-toe shoes, and gloves, eye-protection, and lab coats when applicable. In an oil spill, the "hot" treatment area requires that all volunteers and staff don white Tyvek "bunny suits," shoulder-length gloves, eye protection, and boots. This is done in the breezeway before entering the hospital wing. The hospital wing has separate restrooms and showers.

Hospital Wing: Laundry

Under normal conditions (non-spill):

Just because we're not treating oiled birds doesn't mean you want to do our laundry. After all, every item of clothing used during our daily necropsies gets washed, on hot, with bleach.

Under spill and spill-drill conditions:

500 birds x 5 times a day feeding = lots of dirty towels. This was the equation developed three days after we opened when responding to our first major oil spill. Laundry needed to be done fast in order to achieve best treatment for oiled wildlife at all stages of rehabilitation. Sometimes there are bad bugs in the bird poop, so doing this all on site is important.

Hospital Wing: Dive Locker

Under normal conditions (non-spill):

The dive locker stores all equipment used in capturing sea otters for survey work, including drysuits, rebreathers, CO2

scrubbers, underwater propulsion devices and Wilson traps, which are specially designed nets for catching sea otters designed by Ken Wilson, a biologist who used to work for OSPR. See the Field Research section for more information about the sea otter capture program

Under spill and spill-drill conditions:

The dive locker is still a dive locker.

Hospital Wing: Telecomm/Mechanical Room

Under normal conditions (non-spill):

Perhaps the room you're least interested in, but you might want to check out the Technology section of the website for a blow-by-blow account of what happens there. All voice and data connections are aggregated into this room, along with relays for our seawater pumping system. It has no windows and is cool (always 73 degrees F!) and depressing inside.

Under spill and spill-drill conditions:

The current system administrator would enter this room and most likely route all the spare telephone lines he or she could find to the front desk or conference room to facilitate volunteer/media/unified command post communication.

Hospital Wing: Mammal Clinic

Under normal conditions (non-spill):

Currently, the staff responsible for the sea otter portion of the Marine Mammal Physiology Project are housed in here, as the clinic is located directly adjacent to the pool compound (see below).

Under spill and spill-drill conditions:

The type of spill and the animals affected would determine the use of this room. As shown in a photograph from the 1997 oil spills, the sheer number of birds being treated necessitated that this room be used as an overflow recovery room, as space was at a premium. If the oil spill involved treatment of oiled marine mammals or sea otters, this area would probably remain open for the treatment of mammals, or would be used interchangeably with the avian clinic (below). This room has a single examination table. The avian clinic has two.

Hospital Wing: Avian Clinic

Under normal conditions (non-spill):

The avian clinic has occasionally been used as office space, but we normally don't heat the hospital wing in the winter—this makes the area not well-suited for habitation. The avian clinic also contains the X-ray processing room, which we use after x-raying animals in the intake room (see below).

Under spill and spill-drill conditions:

This room has two examination tables, and like the mammal clinic (above), would be used differently depending on the needs of the oil spill response. In the past, this has been where oiled birds were taken after the intake room (below) to triage/assess condition and determine the course of subsequent treatment.

Hospital Wing: Surgery and Surgery Prep

Under normal conditions (non-spill):

Surgery and surgery prep are used occasionally for surgical procedures on animals housed at our facility or the Long Marine Lab. Dental examinations, for example, are done under full anesthesia and generally performed here. Also, implantation of core body temperature recorders in our captive sea otters for the Washing Study were done here. You can see procedural pictures in the Photo Gallery under "Research Related".

Surgery Prep is an adjoining suite that the veterinarians and technicians enter and exit through to don sterile apparel. There is also a row of sliding trays that can be accessed from both surgery and surgery prep to facilitate the passing of instruments back and forth between the rooms in order to maintain a completely sterile working environment in surgery.

Under spill and spill-drill conditions:

Surgery and surgery prep would be used to handle the most serious and critically ill animals after their initial assessment.

Hospital Wing: Animal Intake

Under normal conditions (non-spill):

The animal intake room has an X-ray machine used for radiographing incoming dead sea otters and other wildlife, so this is generally where intake of dead animals for the laboratory programs start. This room is also equipped with a high capacity hanging scale and a more conventional floor scale for determining accurate weights upon intake.

From here, dead animals are generally taken directly to the necropsy outbuilding (below). Bringing dead animals farther into the facility increases the likely hood of cross-contamination between live and dead animals.

Under spill and spill-drill conditions:

Under spill conditions incoming animals are sorted at the covered porch outside animal intake. The dead go to necropsy. Those needing care go to the clinic. All incoming animals are tagged or marked, photographed, and a sample of oiled feathers or fur are taken. Some sedation or adjustment of caging may occur here.

Hospital Wing: Washing

Under normal conditions (non-spill):

During non-spill conditions, we take advantage of the wash tables in this room to conduct trials for our sea otter washing study.

Under spill and spill-drill conditions:

If, after initial intake, the animal is deemed healthy enough to be treated immediately, the animal is then brought into this room for a cycle of washing (view these 1997 spill washing photos). Typically, both sea otters and sea birds are washed with a solution of 4% Dawn dishwashing detergent. The dilution is mixed and heated to a specific temperature, and the animal is then immersed in the solution. After a through washing period, the animal is washed again with warm fresh water on one of four washing tables. Each table consists of a rectangular basin with a grated platform over the top to rest the animal on. The wastewater generated from the washing of oiling wildlife goes into a separate catchment system from the rest of the general septic plumbing in the facility. Depending on the amount of oil, water, and scat present, it may be allowed to pass to the sewer, or it may be hauled off for more appropriate disposal.

Hospital Wing: Drying

Under normal conditions (non-spill):

This room is not used.

Under spill and spill-drill conditions:

The drying room is adjacent to the washing room, marked by heavy, sealed doors and double-paned glass. Why? The dryers we use for drying wildlife are low heat, high volume industrial blowers that make a lot of noise and require a significant amount of power. This is also why all ceiling mounted AC outlets in the room are on a separate 30 amp circuit. The drying tables are similar to the washing tables, except that they are rubber coated with steel construction, and each of the four is equipped with a steel boom to support the weight of the drier itself.

Hospital Wing: Recovery

Under normal conditions (non-spill):

This room is not used.

Under spill and spill-drill conditions:

Successful rehabilitation of oiled wildlife is determined by time between recovery and treatment, effectiveness of treatment, level of stress arising from treatment, and the right amount of captive recovery time before being re-released. Depending on the nature of the spill, animals affected, treatment course, and sheer volume of animals, our recovery areas may shrink or grow as needed. As a general rule of thumb, however, critically injured birds need warmth, clean bedding, and round-the-clock tube feeding. Most animals that come into the facility during an oil spill are not only heavily oiled but are affected by malnutrition and may also be reacting to the toxic effects of oil in their systems. In the past this has resulted in poor recovery rates but the treatment and recovery rate is now about 50%, and as techniques are refined, this rate is slowly increasing.

Pool Compound

Under normal conditions (non-spill):

The 5 round and 1 oval recovery pools are used for the sea otters trained by the Marine Mammal Physiology Project. The totes (below) are not used.

Under spill and spill-drill conditions:

If we needed to respond to an oil spill involving sea otters and needed the use of all pools in the compound, the Monterey Bay Aquarium or the Marine Mammal Center would temporarily house our research otters.

The totes are designed for compatible otter pairs (mom/pup), or for isolation of individual otters, supporting the larger pools in case of an overflow situation. They were designed based on direct input from personnel involved in the Valdez oil spill. Water in each tote can be separately managed, and sick animals and their wastes separated from well animals.

Overflow Pool Compound

Under normal conditions (non-spill):

The area adjacent to our pool compound has 12 water and electricity hookups—this area is used as storage during non-spill times. The Marine Mammal Center is in the middle of a rebuild and has limited capacity for large mammal response, so a temporary cetacean stranding pool currently occupies the northeast corner of this area.

Under spill and spill-drill conditions:

We can set up as many as 12 K-D pools to act as overflow rehabilitation areas, should we run out of space within the regular pool complex, or need to separate species.

Mobile Vet Labs

Under normal conditions (non-spill):

Two of our mobile vet labs and two of our response trailers are kept on-site at all times. As the Swiss army knife of spill response and laboratory work, these units can back up our regular lab facilities. We use these labs to support field work at remote locations—sea otter captures at Big Sur, for example, or oil spills and other animal disease emergencies anywhere in this state. These units are designed to be completely self-sufficient for several days, and can even put out enough power for our ultralow freezers, should we have an extended power outage or a diesel generator malfunction. Each year during State Scientist Day you can tour one of our vet labs in Capitol Park in Sacramento.

Under spill and spill-drill conditions:

We can respond to an incident at most any remote location in California and begin triage and transport within 24 hours..

Outbuilding: Seawater supply, Pumping, Filtration, and Disinfection

Under normal conditions (non-spill) and spill conditions:

As explained in How We Fill Our Pools, our normal seawater intake requirements are adequately met by seawater piped from The Long Marine Lab intake, at an approximate flow of 150 gallons/minute. However, should we need to activate all of the "totes" and isolate the water in each of our 6 recovery pools, we would need to activate recirculating pumps, filters, and the UV system to ensure that bacteria was not spread between the pools as the water was rapidly recirculated, at about 1,000 gallons a minute. The UV system could also be brought online if the main seawater pumping system failed for a great length of time and forced us to recirculate our existing seawater.

Outbuilding: Necropsy

Under normal conditions (non-spill):

The necropsy outbuilding has been a hub of activity since the day we opened our doors in 1997. This is partly because there are not many coastally located necropsy facilities capable of handling large-scale examinations of wildlife, along with two pathologists and several highly trained prosectors, and partly because of the sheer volume of ongoing pathology research directed and carried out by the staff of this facility. The necropsy facility has a very large walk-in freezer and refrigerator, plus two examination tables, so that we can and often perform several necropsies simultaneously. We have a continuous commitment to performing full postmortem examinations on every fresh sea otter recovered off the coast of California. During peak mortality periods, which have typically been in the months of November and April, we will do upwards of 5 full sea otter necropsies a week, each one taking up to 5 hours for a through gross examination. Read about this in more detail here: [The Anatomy of a Necropsy](#). However, the necropsy facility is also utilized by other teams working within our facility, including Adam Schneider's terrestrial carnivore research program, Dan Rejmanek's NIH health study, and the Seabird Health Study, and Elizabeth Wheeler's cetacean health study, all detailed under Laboratory Programs. On a regular basis, we are not only examining sea otters, but also dolphins, seals, sea turtles, sharks, and on the terrestrial side of things, hawks, opossums, and occasionally mountain lions.

Under spill and spill-drill conditions:

During a spill response, particularly one involving sea otters, we would most likely suspend our regular laboratory programs to conduct necropsies on oiled wildlife. Even if the cause of death seemed obvious based on the circumstances, we would archive blood, serum, tissue, and feathers or fur for later examination, both to determine the type(s) of oil involved in the spill (done by OSPR's WPCL Laboratory), and any contributing causes of death that occurred in the animal. The large freezers store the carcasses of all dead oiled animals until the litigation is settled. This can sometimes take 4-7 years.

Outbuilding: Supply Barn

All oil spill response equipment, including two Zodiac response boats, is stored and maintained here. We also keep spare Tyvek suits, gloves, goggles, boots, tarps, pools (for the overflow pool compound above), and everything else we might need within the first several hours of a spill. Even during more recent inland spills affecting birds that we were not directly responding to, we ended up shifting a significant stockpile of equipment to Cordelia to support their response efforts.

Sources:

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