

Doyle A. Hanan, Ph.D.
Hanan&Associates, Inc.
P. O. Box 8914
Rancho Santa Fe, CA 92067
858 832-1159

Mr. P. Michael Payne, Chief
Permits and Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, Maryland 20910-3226

Dear Mr. Payne:

My company has been retained by the City of San Diego to assist with permitting and monitoring activities for replacement the life guard station in La Jolla, CA. Please find the attached application from the City of San Diego for Incidental Harassment Authority by Level B harassment for small numbers of harbor seals, possibly sea lions and elephant seals during construction activities of the Children's Pool life guard station, La Jolla, California. The City is applying under Sections 101(a) (5) (A) and (D) of the MMPA (16 U.S.C. 1361 et seq.).

During their iterative planning process and project review, the City has responded to internal and public comments to incorporate mitigation measures for the safety of pinnipeds, birds, and other wildlife in the vicinity of the project. Daily reports of monitoring will be completed and a final report of activities and observations will be submitted to the City and to NMFS.

The City approval process for construction resulted in self-imposed construction moratorium during harbor seal pupping and weaning (January 1 - June 1) as well as, visual barriers to screen activities from beach view, optimal hours for work, and monitoring. The project is scheduled for completion before the end of 2013 and entails demolition, site grading, erecting the structure, and finish work inside the building.

Thank you for your consideration.

Sincerely,

Doyle Hanan

APPLICATION FOR
INCIDENTAL HARASSMENT AUTHORIZATION
UNDER THE
MARINE MAMMAL PROTECTION ACT

Submitted to:
Michael Payne
Division Chief- Permits, Conservation and Education Division
National Marine Fisheries Service
Office of Protected Resources
1315 East-West Hwy
Silver Spring, MD 20910

For
City of San Diego
Public Works Department
Engineering and Capital Projects Branch
Architectural Engineering and Parks Division

Prepared By:
Doyle Hanan, PhD.
Hanan&Associates, Inc.
PO Box 8914
Rancho Santa Fe, CA 92067
858-832-1159

December 3, 2012
Revised (March 28, 2012)

Summary of the Request

Pursuant to the Marine Mammal Protection Act of 1972 (MMPA), as amended, the City of San Diego requests that NOAA Fisheries, Office of Protected Resources, issue an Incidental Harassment Authorization (IHA) for incidental take of three pinniped species: harbor seal, sea lion, and elephant seal during the construction of the La Jolla Children's Pool Lifeguard Station at 827 ½ Coast Boulevard, La Jolla CA 92037.

The existing lifeguard station is located on a bluff above Children's Pool (32° 50' 50.02" N 117° 16' 42.8" W) to oversee nearby reef and beach areas (please see Figure 1, and see detailed maps and photographs pages 30-31 in the attached Mitigated Negative Declaration, updated 11/30/2011, Appendix II). Because the building has deteriorated significantly, is currently unusable, and closed to entry; a temporary life guard tower was moved onto the bluff near the existing station. To accommodate basic year round working conditions for life guards and demand for life guard services (see Table 1) a new station is required. Please see Mayor Sander's memorandum regarding condemnation (Appendix 1).

Most of the above ground structure of the old station will be removed. The contractor will utilize a backhoe, concrete saws, and a jackhammer for demolishing the structure, and then load materials into dump trucks. These materials will be hauled off site to a local landfill where it will be separated into recycled content and waste. Weights of each will be tracked to determine total amount of recycled material. No material will wash into the marine environment as covered by the US Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES) and the California Stormwater Pollution Prevention Plan (SWPPP) developed as required for this construction.

In the same foot print as the old life guard station, a new station is scheduled to be constructed within and adjacent to the existing facility. The new three-story, partially subterranean-1,877 square-foot building will contain beach access level public restrooms and showers, lifeguard lockers, and sewage pump room; second level containing two work stations, ready/observation room, kitchenette, restroom, and first aid station; and third 'observation' level with a 270 degree view of the beach and reef areas will include a single occupancy observation space, radio storage closet, and exterior catwalk. Interior stairs will link the floors. The existing below grade retaining walls will remain in place for the station and new retaining walls will be constructed for a ramp from street level to the lower level for emergency vehicle beach access and pedestrian access to the lower level restrooms and showers.

There is a plethora of activities along the shoreline, beaches, and reefs of La Jolla. Within this lively environment, Children's Pool and nearby shore areas are actively used by swimmers; sunbathers; SCUBA divers; snorkelers; shore/surf fishermen; school classroom visits; tide pool explorers; kayakers; surfers; bogie boarders; seal, bird, and nature watchers (especially seal and sea lion enthusiasts) plus members of the public enjoying the environment as a whole. The proposed life guard facility is an optimal location to provide life guard service to the community.

It will provide a 270 degree view of beaches, bluffs, and reefs for continued service to the public on shore, as well as, in the water as highlighted in summary of life guard activities (Table 1).

Children's Pool was created in 1932 by building a breakwater wall which created a protected pool for swimming. With time this pool has partially filled with sand but still has open water for swimming, as well as, a beach for sunbathing and walking. Harbor seals have taken up residence in Children's Pool and nearby reefs and rocks. They haulout, birth pups, and molt their pelage (hair) on the beach and forage for food in nearby ocean areas. This is one of three known harbor seal hauling sites in San Diego County (also observed at north end of Torrey Pines beach and in a cave on the exposed ocean side of Point Loma). The City has established Children's Pool as a shared beach for seals and people. During pupping season a rope is strung along the upper part of the beach to designate how close people can come to the haulout area. Swimming and other water activities are still allowed as long as there is no direct harassment of the seals.

Pacific harbor seals, *Phoca vitulina richardsi*, haul out on nearby beaches and rocks below the tower. Seal numbers have increased since 1979 and seals are documented to give birth on these beaches during January through May (Hanan 2004, 2011). Several studies have identified seal behavior and estimated seal numbers including patterns of daily and seasonal area use (Yochem and Stewart 1998; Hanan & Associates 2004, 2011; Linder 2011.)

California sea lions, *Zalophus californianus*, and Elephant seals, *Mirounga angustirostris*, are occasionally observed on this beach and nearby areas (Yochem and Stewart, 1998; Hanan&Associates 2004, 2011) in small numbers (less than 5). Although rare in the Children's Pool (CP), the City is requesting that these two species be included in the IHA because of unlikely but potential incidental harassment. Estimates of sea lion and elephant seal incidental take are based on the 100 dB level recommended by NMFS.

The City has pursued an extensive process of internal and public review of this lifeguard tower project, including a biological review and proposed mitigation (Mitigated Negative Declaration, updated 11/30/2011). The IHA would allow the incidental take of harbor seals, sea lions, and elephant seals under the MMPA. These takes would not be lethal and would not have any population effects or subsistence harvest effects.

There are so many human visitors to this site at all hours of day and night, season, and weather that human scent and visual presence are generally not issues (Hanan 2004, 2011). At this site the harbor seals are most disturbed when people get very close to them on the beach (from Dr. Hanan's personal observations: generally less than 2-3 meters). However, the City wants to be prepared with the IHA in case seals alert to novel presence or sounds of equipment not previously experienced at this site. Assuming all seals potentially hauled out at CP (Figure 2) are exposed to Level B harassment during days where sound is predicted to exceed 90 dB at the construction site (106 days); there could be a maximum of approximately 12,783 incidental harbor seal takes. The City requests Incidental Harassment Authority for 12,783 harbor seals, 100 sea lions, and 25 elephant seals.

Responses to IHA requirements mandated by section 7 of the Endangered Species Act and the National Environmental Policy Act (NEPA):

1. A detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals;

This project includes the demolition of the existing lifeguard station and construction of a new station on the same site. Sound levels during all phases of the project will not exceed 110 dB re 20 μ Pa at the source. The contractor used published or manufacturer's measurements to estimate sound levels. Equipment includes a 980 Case Backhoe, dump truck, air compressor, electric screw guns, jackhammer, concrete saw, and chop saws. It is difficult to predict what activities might cause noticeable behavioral reactions with harbor seals at this site. Children's Pool is a highly disturbed hauling site now; seals at this location do not respond to stimuli as observed with seals in other areas (Hanan&Associates 2004, 2011, and see <http://www.youtube.com/watch?v=4IRUYVTULsg>). At some point during some of the working days, we estimate there will be sound source levels above 90 dB (during 106 days, including 27 days of 100 – 110 dB at the construction site). On average, seals will be about 100 feet or more from the construction site with a potential minimum of about 50 feet. Sound levels reaching seals would not exceed approximately 90 dB at the hauling area closest to construction (50 feet) and a peak of about 83 dB at the mean hauling distance (100 feet). Southall et. al. (2007) recommends 149 dB re 20 μ Pa (peak) (flat) as the potential threshold for injury from in-air noise for all pinnipeds and this project will not approach that sound level (Please see below).

Construction of the new life guard station is estimated to take seven months (148 actual construction days of the 214 total days) and if construction starts during the first week of June, 2013, it will be completed by December 23, 2013. Construction activities are divided into phases: 1) mobilization & temporary facilities, 2) demolition & site clearing, 3) site preparation & utilities, 4) building foundation, 5) building shell, 6) building exterior, 7) building interior, 8) site improvements, 9) final inspection & demobilization.

Detail summary (phases overlap in time). All construction will occur during daylight hours.

1) Mobilization & temporary facilities:

Install: temporary perimeter fencing, temporary utilities and foundation, temporary life guard tower, temporary office trailer, temporary sanitary facilities, and temporary sound wall/visual barrier;

Equipment: truck, backhoe, trailer, small auger, hand/power tools, concrete truck;

Time frame: 6/3-6/18;

Maximum decibel level: 100 dB

2) Demolition & site clearing:

- Dismantle and remove existing station, remove hardscape and landscape, trucks expected to haul off less than 5 loads of debris via Coast Boulevard;
Equipment: excavator, hydraulic ram, jackhammer, trucks, hand/power tools;
Time frame: 6/19-7/5;
Maximum decibel level: 110 dB
- 3) Site preparation & utilities:
Rough grade building site, modify underground utilities;
Equipment: loader, backhoe, truck;
Time frame: 7/8-7/30;
Maximum decibel level: 110 dB
- 4) Building foundation:
Dig/shore foundation, pour concrete, waterproofing, remove shoring;
Equipment: backhoe, concrete pump/truck, hand/power tools, small drill rig, crane;
Time frame: 7/23-8/21;
Maximum decibel level: 110 dB
- 5) Building shell:
Precast concrete panel walls, rough carpentry and roof framing, wall board, cable railing, metal flashing, roofing;
Equipment: crane, truck, fork lift, hand/power tools;
Time frame: 8/22-10/9;
Maximum decibel level: 100 dB
- 6) Building exterior:
Doors and windows, siding, paint, light fixtures, plumbing fixtures;
Equipment: truck, hand/power tools, chop saw;
Time frame: 4 weeks;
Maximum decibel level: 100 dB
- 7) Building interior: walls, sewage lift station, rough and finish MEPs (Mechanical Electrical Plumbing Structural), wall board, door frames, doors, paint;
Equipment: truck, hand/power tools, chop saw;
Time frame: 10/3-11/22;
Maximum decibel level: 100 dB
- 8) Site improvements:
Modify storm drain, concrete seat walls, curbs, and planters, fine grade, irrigation, hardscape, landscape, hand rails, plaques, benches;
Equipment: backhoe, truck, hand/power tools, concrete pump/truck, fork lift;
Time frame: 10/3-11/22;
Maximum decibel level: 110 dB
- 9) Final inspection, demobilization:
System testing, remove construction equipment, inspection, corrections;
Equipment: truck, hand/power tools;

Time frame: 10/18-12/23;
Maximum decibel level: 100 dB

2. The date(s) and duration of such activity and the specific geographical region where it will occur;

Because the City of San Diego is already requiring a moratorium on all construction activities during harbor seal pupping and weaning (January 1 - May 30; see Negative Declaration page 5, November 30, 2011); work on this project can only be performed between June 1 and December 31 of any year. The City is requesting the project at Children's Pool, La Jolla begin June 1, 2013, with site preparation (see Negative Declaration page 30-31) followed by demolition of the existing station and construction of the new station to be completed by December 23, 2013 (see time frames for construction phases above).

If the IHA permit is not issued by June 1, 2013, the City would request that the permit be extended through 2014 because the construction might require finish work after the 2014 New Year.

3. The species and numbers of marine mammals likely to be found within the activity area;

The rocks and beaches at or near Children's Pool, La Jolla, are almost exclusively harbor seal hauling sites. On rare occasions, one or two California sea lions, *Zalophus californianus*, or a single juvenile elephant seal, *Mirounga angustirostris*, have been observed on the sand or rocks at/near Children's Pool. However, these sites are not normal/usual haul-out locations for either of these two species. The City commissioned two studies for harbor seal abundance trends at his site. Both studies reported rare appearances of sea lions and elephant seals (Yochem and Stewart 1998; Hanan & Associates 2004, 2011).

Harbor seals haul out on the sand, rocks, and breakwater base at/near Children's Pool in small numbers of 0-15 seals to a maximum of about 150-200 seals depending on time of day, season, and weather conditions. Because space is limited behind the breakwater at Children's Pool, it is unlikely that numbers could ever exceed 250 seals (Linder 2011). At low tide, additional hauling space is available on the rocky reef areas outside the retaining wall and on beaches immediately southward. Radio tagging and photographic studies have revealed that only a portion of seals utilizing a hauling site are present at any specific moment or day (Hanan 1996, 2005; Gilbert et.al. 2005; Harvey and Goley 2011; Linder 2011). These studies further indicate that seals are constantly moving along the coast including to/from the offshore islands and that there may be as many as 600 harbor seals using Children's Pool during a year, but certainly not all at one time.

We have fitted a polynomial curve to show potential seals hauling out at Children's Pool by month (Figure 2) based on counts at CP by Hanan&Associates (2004, 2011), Yochem and Stewart (1998), and the Children's Pool docents (Hanan&Associates, 2004). A three percent annual growth rate was applied to the Yochem and Stewart counts to normalize them to H&A

and docent counts during 2003-2004. Based on personal observations, Dr. Hanan estimated similar numbers of seals hauling out at CP during 2011 and would expect similar numbers during 2012 and 2013.

4. A description of the status, distribution, and seasonal distribution (when applicable) of the affected species or stocks of marine mammals likely to be affected by such activities;

Pacific harbor seals are not “depleted” under the MMPA or “threatened/endangered” under the Endangered Species Act (Carretta, et. al. 2012). They are found from Baja California, Mexico into Alaska, USA and are one of the most frequently observed marine mammals along this coastal environment. There is a subspecies (*P. v. stejnegeri*) extending harbor seal range to Japan in the Western North Pacific. Harbor seals are also common on both sides of the North Atlantic Ocean with three subspecies and are one of the most common marine mammals in those areas. As mentioned above, harbor seal presence at hauling sites is seasonal with peaks in abundance during their pupping and molting periods. Pupping and molting periods are first observed to the south and progress northward up the coast with time (e.g. January – May near San Diego, Hanan 2004, 2011; April – June in Oregon and Washington; Jeffries 1984; Jeffries 1985; Huber *et al.* 2001).

California sea lions, *Zalophus californianus*, are not “depleted” under the MMPA or “threatened/endangered” under the Endangered Species Act (Carretta, et. al. 2012). They are found from southern Mexico to southwestern Canada. They are considered to be at carrying capacity of the environment. There are no rookeries at or near Children’s Pool.

Elephant seals, *Mirounga angustirostris*, are not “depleted” under the MMPA or “threatened/endangered” under the Endangered Species Act (Carretta, et. al. 2012). They are found from Baja California, Mexico to the Gulf of Alaska, USA. They are considered to be at Optimum Sustainable Population level. There are no rookeries at or near Children’s Pool.

5. The type of incidental taking authorization that is being requested (i.e., takes by harassment only; takes by harassment, injury and/or death) and the method of incidental taking;

All takes of harbor seals, sea lions, and elephant seals during this project will be Level B harassment only. There will be no intrusive, injurious, or lethal takes. There is a high likelihood that many of the harbor seals when present during project activity will not be flushed off the beach, as seals at this site are very conditioned to human presence and loud noises (Hanan 2004, 2011 and see <http://www.youtube.com/watch?v=4IRUYVTULsg>). The City is requiring additional mitigation (subject to NMFS modification) visual barriers to shield construction activities from beach view; daily work hours 08:30-15:30; along with onsite monitoring.

6. By age, sex, and reproductive condition (if possible), the number of marine mammals (by species) that may be taken by each type of taking identified in paragraph (a)(5) of this section, and the number of times such takings by each type of taking are likely to occur;

With demolition/construction beginning June 1, 2013, we would expect a range of 0-190 harbor seals present daily during June and a seasonal decline through November to about 0-50 seals present daily (Figure 2). If all estimated seals present are incidentally harassed each day, there could be a maximum of 12,783 harbor seal incidental takes (approximately 3,579 adult males and 2,684 juvenile males; 3,451 adult females and 2,429 juvenile females based on age and sex ratios presented in Härkönen *et. al.*, 1999). We would expect about 90% of the adult females to be pregnant after June/July (Greig 2002). An unknown proportion of the incidental takes would be from repeated exposures as seals return to CP. A polynomial curve fit to counts by month was used to estimate harbor seals expected to be hauled out by day (Figure 2).

Because so few sea lions or elephant seals are ever observed at Children's Pool, the City requests a maximum incidental take of 100 sea lions and 25 elephant seals.

7. The anticipated impact of the activity upon the species or stock;

This type of Level B taking is not expected to affect nor impact harbor seals, sea lions, or elephant seals at the population or stock level.

Since no construction will be performed during the pupping season (January through May) there will be no impacts on birthing rates nor pup survivorship at Children's Pool. There will be no in water construction activities in or near the water so pinniped activities in the water should not be affected.

Additionally seals utilizing this beach are a small portion of the California seal stock and any impacts here would have little effects on the harbor seal population as a whole (maximum 500 seals off La Jolla out of 30,196 seals off California (CV=0.157)) or less than 2% of the California stock which does not include significant numbers of seals off Mexico, Oregon, Washington, Canada, and Alaska. We have also requested a potential maximum take of 100 sea lions which is an insignificant portion of the estimated 296,750 California sea lions off California, not including sea lions in Mexico. We have requested a maximum take of 25 elephant seals which is also an insignificant portion of the estimated 127,000 elephant seals off the U.S. and Mexico (Carretta, *et. al.* 2012) when considering stock or population level impacts.

At the individual level a newly arrived seal (moved in from another area) may not have habituated to humans and noise as seals that have been on site for a while. These recent arrivals may alert to these stimuli, perhaps flushing to the water. But after a few days using this beach, we would expect them to habituate and not react to humans (unless very close to them) or noises at the construction site as observed at CP (Hanan 2004, 2011).

8. The anticipated impact of the activity on the availability of the species or stocks of marine mammals for subsistence uses;

There will be no impact on subsistence uses as there are no anticipated effects on natality, mortality, or survivorship of pinniped stocks because of this project.

9. The anticipated impact of the activity upon the habitat of the marine mammal populations, and the likelihood of restoration of the affected habitat;

All construction activities are beyond or outside harbor seal habitat areas. Visual barriers will be erected to shield construction most activities from seal view; these barriers will dampen but not exclude sound.

The general public will not be excluded from the beaches and areas outside the construction zone. Because the public occasionally harasses the seals with various activities, the NMFS certified monitor will make observations and attempt to attribute any observed harassment to the public or to the construction activities and give all details in the observation report. We will follow NMFS suggested reporting criteria for seal responses to construction: flushing into the water; moving more than 1 m, but not into the water; becoming alert and moving, but do not move more than 1 m; and changing direction of current movement. Additionally, observers will estimate of what portion of seals present were observed to exhibit the behavior, as well as, the apparent source of the stimulus as we anticipate harassment from the public and potentially the construction.

10. The anticipated impact of the loss or modification of the habitat on the marine mammal populations involved;

We do not project any loss or modification of habitat for these species.

11. The availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, their habitat, and on their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance;

All project activity will occur outside harbor seal pupping and weaning periods. Visual barriers will be constructed to screen seal's views of construction activities. However, because the site is a beach with construction along the cliff and on flat areas above the cliff, we don't think a complete barrier can be constructed to hide all activities. Once the walls of the building are in place, much of the construction activity will take place on the bluff above the beach (thus out of sight) and inside the building: thus a visual and partial sound barrier.

There will be no activities in the ocean or close to water's edge and since harbor seals mate underwater, there will be no takes or impacts during any late mating activities as most, if not all, mating should be completed by time of construction. Sea lions and elephant seals are such infrequent users of this area and their rookeries are so far away (at least 65 miles at offshore islands) that there will be no adverse impact on these species mating activities.

12. Where the proposed activity would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses, the applicant must submit either a "plan of cooperation" or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for subsistence uses.

There will not be any activities in Arctic areas, and there are no subsistence uses of seals in the vicinity of Children's Pool.

13. The suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species, the level of taking or impacts on populations of marine mammals that are expected to be present while conducting activities and suggested means of minimizing burdens by coordinating such reporting requirements with other schemes already applicable to persons conducting such activity. Monitoring plans should include a description of the survey techniques that would be used to determine the movement and activity of marine mammals near the activity site(s) including migration and other habitat uses, such as feeding. Guidelines for developing a site-specific monitoring plan may be obtained by writing to the Director, Office of Protected Resources;

The City has developed a monitoring plan (see attached: Appendix II. Mitigated Negative Declaration, 11/30/2011) based on discussions between the project biologist, Dr. Doyle Hanan, and NOAA Fisheries biologists. The plan has been vetted by City planners and reviewers. The plan has been formally presented to the public for review and comment. The City has responded in writing and in public testimony (City Council Hearing, December 14, 2011) to all public concerns.

The basic plan is to survey prior to construction activities and then monitor construction activities by NMFS approved monitors with binoculars and handheld digital sound level devices. These units will measure in the 30 – 130 dB range.

Observers will make hourly counts of seals present and record sound levels during those counts and during any periods of apparent seal harassment. They will make and record observations of any apparent responses to sound or visual events that result in behavior changes whether during public or construction stimuli. During these events pictures and video will also be taken when possible. The City's Negative Declaration states: "Monitoring shall assess behavior and potential behavioral responses to construction noise and activities. Visual digital recordings and photographs shall be used to document individuals and behavioral responses to construction."

Observations will be entered into and maintained on Hanan&Associates computers. For the city reporting requirements, we will follow the City's Negative Declaration: "In addition, the biologist shall document field activity via the Consultant Site Visit Record (CSVR). The CSVR shall be either

emailed or faxed to the City's Mitigation Monitoring Coordination (MMC) section on the 1st day of monitoring, the 1st week of each month, the last day of monitoring, and immediately in the case of any undocumented discovery." And additionally: "The project biologist shall submit a final construction monitoring report to MMC within 30 days of construction completion." These same reports would be sent to NOAA Fisheries using the same schedule or on whatever schedule NOAA requires. Daily monitoring reports will be maintained at Hanan&Associates for the periodic summary reports to the City and to NMFS.

14. Suggested means of learning of, encouraging, and coordinating research opportunities, plans, and activities relating to reducing such incidental taking and evaluating its effects.

Each demolition/construction phase and potential harassment activity will be evaluated as to observed sound levels and any seal reaction by type of sound source. If there is any flushing due to construction, it will be documented by sex and age class. These data will provide instructional for IHA permitting in future projects. Potential additional mitigation will be discussed and suggested in the final report.

Literature Cited

Carretta, J.V., K.A. Forney, E. Oleson, K. Martien, M.M. Muto, M.S. Lowry, J. Barlow, J. Baker, B. Hanson, D. Lynch, L. Carswell, R.L. Brownell Jr., J. Robbins, D.K. Mattila, K. Ralls, and Marie C. Hill. 2012. U.S. Pacific Marine Mammal Stock Assessments: 2011. U.S. Department of Commerce, NOAA Technical Memorandum, NMFS-SWFSC-488, 356 pages.

Gilbert, J.R., G. T. Waring, K. M. Wynne, and N. Guldager. 2005. Changes in abundance of harbor seals in Maine, 1981-2001. *Marine Mammal Science* 21(3): 519-535.

Greig, D. J. 2002. Pregnancy and parturition rates of harbor seals in Monterey Bay, California. Master of Arts thesis. San Jose State University and Moss Landing Marine Labs. 68 pages.

Hanan, D. A., 1996. Dynamics of abundance and distribution in the Pacific harbor seal, *Phoca vitulina richardsi*, on the coast of California. Doctor of philosophy dissertation. University of California, Los Angeles. 173 pages.

Hanan, D. A. 2005. Correction factors for aerial counts of molting Pacific harbor seals (*Phoca vitulina richardsi*) in California. Final report to Pacific States Marine Fisheries Commission. In fulfillment of PSMFC Contract Number 04-41. March 31, 2005. 18 pages.

Hanan & Associates. 2004. Biological letter report and recommendations for construction. Regarding pinniped surveys at Children's Pool, La Jolla, California. Unpublished report submitted to the City of San Diego. May 2004. 21 pages.