

## STAFF SUMMARY FOR OCTOBER 17, 2018

**13. MARINE NON-REGULATORY REQUESTS****Today's Item****Information** ☐**Action** ☒

This is a standing agenda item for FGC to act on non-regulatory requests from the public that are marine in nature. For this meeting:

- (A) Consider action on non-regulatory requests received at the Aug 2018 meeting
- (B) Consider action on pending non-regulatory requests referred to staff or DFW for review

**Summary of Previous/Future Actions**

(A)

- FGC received requests Aug, 22-23, 2018; Fortuna
- **Today's action on requests** **Oct 17, 2018; Fresno**

(B)

**N/A****Background**

FGC provides direction regarding requests from the public received by mail and email and during public forum at the previous FGC meeting. Public requests for non-regulatory action follow a two-meeting cycle to ensure proper review and consideration.

- (A) ***Non-regulatory requests.*** Non-regulatory requests scheduled for consideration today were received at the Aug 2018 meeting in one of three ways: (1) submitted by the comment deadline and published as tables in the meeting binder, (2) submitted by the late comment deadline and delivered at the meeting, or (3) received during public comment.

Today, four non-regulatory requests received at the Aug 2018 meeting are scheduled for action:

- I. Potential abalone/urchin impacts resulting from proposed expansion of Wheeler North Reef
- II. North coast market squid research proposal
- III. Review regulations and policies for harvesting giant keyhole limpets
- IV. Separate FGC into two bodies (marine and wildlife)

Exhibit A1 summarizes and contains staff recommendations for each request; individual written requests are in exhibit A2-4.

- (B) ***Pending non-regulatory requests.*** This item is an opportunity for staff to provide a recommendation on non-regulatory requests that were scheduled for action at a previous meeting and referred by FGC to staff or DFW for further review.

No items are scheduled for action today.

STAFF SUMMARY FOR OCTOBER 17, 2018

**Significant Public Comments (N/A)**

**Recommendation**

(A) Adopt staff recommendations for Aug 2018 non-regulatory requests (Exhibit A1).

**Exhibits**

- A1. [List of marine non-regulatory requests and staff recommendations for requests received through Aug 23, 2018](#)
- A2. [Email and attachments from Jeff Crumley, received Jul 16, 2018](#)
- A3. [Email and proposal from Ken Bates, received Jul 24, 2018](#)
- A4. [Letter from Frank Oakes, Steller Biotechnologies, received Aug 6, 2018](#)

**Motion/Direction**

(A) Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission adopts the staff recommendation for actions on August 2018 non-regulatory requests.

**OR**

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission adopts the staff recommendations for actions on August 2018 non-regulatory requests, except for item(s) \_\_\_\_\_ for which the action is \_\_\_\_\_.

**CALIFORNIA FISH AND GAME COMMISSION**  
**REQUESTS FOR NON-REGULATORY ACTION 2018 - Current and Pending**  
**Revised 10-12-18**

**FGC** - California Fish and Game Commission   **DFW** - California Department of Fish and Wildlife   **WRC** - Wildlife Resources Committee   **MRC** - Marine Resources Committee

Date Received	Name of Petitioner	Request category (Marine or Wildlife)	Subject of Request	Short Description	FGC Decision	Staff / DFW Recommendations
7/16/2018	<a href="#">Jeff Crumley</a>	Marine	Abalone/urchin impact from proposed expansion of Wheeler North Reef	Request that FGC engage in project review of proposed expansion of Wheeler North Reef associated with San Onofre Nuclear Generating Station (SONGS) decommissioning project, due to potential impact to two listed species of abalone (white and green) and damage to the sea urchin fishery. Provides report regarding concerns.	<b>Receipt: 8/22-23/2018</b> <b>Action scheduled: 10/17/2018</b>	<b>10/17/2018</b> <b>FGC:</b> DFW has a project with staff tasked to review and comment on proposed projects with potential impacts to living marine resources; FGC does not have sufficient staff capacity to review environmental documents for external projects.
7/24/2018	<a href="#">Ken Bates</a>	Marine	North coast market squid research	Request for FGC to form a collaborative partnership (under Fish and Game Code Section 7056(k)) among three fishermen, three commercial fishermen's associations in Northern California, and DFW to collect essential fishery information for an enhanced status report (ESR) on market squid.	<b>Receipt: 8/22-23/2018</b> <b>Action scheduled: 10/17/2018</b>	<b>10/17/2018</b> <b>FGC:</b> FGC does not have a role in determining those collaborative research projects in which DFW engages. Encourage requestor to consult with DFW staff on this topic, and he has been in contact. No action required.  <b>DFW:</b> The enhanced status report (ESR) for market squid does not require new information; the ESR will use existing scientific information to help determine what, if any, new management or science is needed.
8/6/2018	<a href="#">Frank Oakes,</a> <a href="#">Steller Biotechnologies</a>	Marine	Giant keyhole limpets	Concern that industry practices may be impacting giant keyhole limpet; request FGC to assist in reviewing/clarifying harvest management regulations, policies and guidelines due to vulnerability of the species.	<b>Receipt: 8/22-23/2018</b> <b>Action scheduled: 10/17/2018</b>	<b>10/17/2018</b> <b>FGC:</b> Refer to DFW for evaluation and recommendation.
8/22/2018	Chris Voss	Marine/Wildlife	Split scope of FGC responsibility	Recommends separating FGC into a marine commission and a terrestrial commission. The current structure is a firehose of information.	<b>Receipt: 8/22-23/2018</b> <b>Action scheduled: 10/17-18/2018</b>	<b>10/17/2018</b> <b>FGC:</b> No action recommended at this time; dividing the commission into two bodies would require an amendment to the California constitution.
8/22/2018	Jocelyn Endevoldsen Heal the Bay	Marine	Lobster Advisory Committee lessons learned	Request to present outcomes of lessons learned report for DFW Lobster Advisory Committee process, derived from a survey of stakeholders involved in the process.	<b>Receipt: 8/22-23/2018</b> <b>8/22/2018: Scheduled for briefing at November 2018 MRC meeting</b>	<b>10/17/2018</b> <b>FGC:</b> No further action is necessary.

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**From:** Jeff Crumley <  
**Sent:** Monday, July 16, 2018 10:09 AM  
**To:** Mastrup, Sonke@Wildlife; Shuman, Craig@Wildlife; FGC; Ashcraft, Susan@FGC; Jeremy Prince; Kashiwada, Jerry@Wildlife; Taniguchi, Ian@Wildlife  
**Subject:** SONGS / White & Green Abalone / Urchin Fishery  
**Attachments:** hy7.jpg; hy3.jpg; hy2.jpg; WNR Analysis Report.pdf; WNR Questions.pdf

Greetings Folks,

I am Jeff Crumley, urchin diver at Capistrano Beach. I am writing you today to bring attention to the SONGS decommissioning project and Wheeler North Reef.

I wrote an analysis report on the proposed expansion of Wheeler North Reef (WNR). I presented this report to the involved parties and at the WNR meeting on April 9, 2018. The damage caused by the operations of SONGS pales to the damage caused by WNR. The corruption and actions exposed in my report violates the Coastal Act and has caused irreparable damage to the urchin fishery. I have attached my report and the questions that need answers.

Secondly, The proposed extraction of the pipelines servicing SONGS must not be allowed. The DEIR has been published for public comment. I am writing my comment to this that presents two main reasons to squash any idea of touching the marine environment.

1. - The DEIR fails to recognize, in its ESA considerations, two species of abalone...Whites and Greens. I have also attached a photo of two threaded and one white that I found at San Onofre recently. There is also an emergent population of green abalone that was shown to Nancy Caruso.

2. - The proposal would destroy the existing urchin fishing on the pipeline.

The reason for WNR was mitigation. The urchin fishery was descibed in the EIR but, excluded from this and the application of WNR to prevent urchins goes against the claimed mitigation. The amount of acreage taken from the urchin fishery keeps increasing. You folks must help me help our resources. This is out of control.

Please arrange for further investigation into my claims...I can prove everything I say.

Thank You for you immediate attention,  
Jeff Crumley

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# Wheeler North Reef

Review & Analysis Report

By Jeff Crumley / Commercial Sea Urchin Diver  
Capistrano Beach, CA.



## Table of Contents:

### Introduction

1. Reef design
2. Outlying reefs & Beaches
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*(This report is incomplete due to the time allotted and the insurmountable information to be digested in this short period. The information presented here is intended to instigate a complete review of this project and seek an equitable solution)*

# Introduction

Wheeler North Reef has failed.

The failure is not only of the reef. The failure is also the erosion of public trust, degradation of the environment and produces scepticism of science.

The failure determination is a result of decades of research, planning and execution. Wheeler North Reef (WNR) is one of the largest and most studied artificial reefs (AR).

This project is in violation of permit 6-81-330-A with conditions (permit), Environmental Impact Report (EIR) criteria and the Coastal Act as a result of the failure designation, since the execution of the design. There is discrepancy in the language of the EIR and permit.

How and Why WNR is failing may seem complicated. It is not. All things are better understood in retrospect. This report explores the cause(s) of failure by analysing the history and sciences along with the purpose and directives prescribed in the permit, the EIR and the Coastal Act. It utilizes my personal observations and investigations to apply logic, reality and pose valid questions and hypotheses.

Is Wheeler North Reef actually a failure? I suggest it's just a stones throw from perfect.

*"Time will tell" ... and, it has.*

# 1. Reef Design

Some key examples of AR literature were presented and compared at the Third International Artificial Reef Conference (IARC) in Newport Beach, CA. 1983 (of which Professor John Stephens was on the steering committee).

The criterion for AR's is highlighted on the cover of the program from this event and is threefold...

## **“Engineering Design, Biological Research and Productivity.”**

The reality of WNR does not meet the criteria. There is a plethora of research, a deficit of productivity, caused by a flawed design.

Identifying how things went awry... There is ample evidence that show beyond question the reef design flaw was in application. The focus drifted.

Social interactions between scientists throughout the history of the project are paramount to understanding the arbitrary nature of decisions made in the planning and execution of WNR. These interactions are often a window to the truth. I corresponded with John Stephens and spoke with Jake Patton (March 2018).

Jake Patton, WNR designer and part of John Stephens team, had suggested the best way to grow a sustainable kelp bed was on low relief reef near existing kelp. Kelp does not grow well on top of reefs rather, around the high spots. Being in the vicinity of existing kelp promotes sustainability through recruitment.

Stephens on the low relief concept - *“I have always thought that the low reefs were a bunch of crap even though it was first championed by one of my guys.”* - referring to “Jake the Diver.”

One flaw in the design was not enough consideration for the associated biota. Professor Stephens stated - *I didn't think the idea was great but other's picked it up and ran with it. My work was always in high relief because that's where there was abundance and diversity of fishes.*

Jake Patton said he - *“designed the reef to be placed on hard substrate, sand/silt is the wrong material.”* - Jake’s solution is to move the reef...*“It was built in the wrong place, there’s no fish there. I think it needs to be moved... but, that won’t go over very well.”* Jake said... *“I never saw it after it was built.”*

Design and placement is very difficult due to the affected area at San Onofre being ancient riverbed (cobble). Cobble stones are small, smooth, round stones that fit together in a way that creates a unique habitat. The cobble at San Onofre is vast and consistent as is the complex ecosystem that resides within.

Construction materials, sunlight exposure and current are determining factors to how species can establish themselves. The difference in surface texture will dictate which species of algae can attach themselves. Light exposure and current affects the density and columns of algal turf. The reference reefs at Mateo and Barn display this. It is described in detail about Pendleton AR - (Carter, ET AL).

The literature presented at the IARC clearly and unanimously identifies location and design as critical factors for an AR to be successful and long lived. Eight mitigation alternatives were proposed (as shown in permit excerpt below). The preparations were detailed and there was plenty of published literature to form a basis.

*Permit -2.7 Alternatives That Avoid Or Lessen Impacts Section 15126(d) of the CEQA Guidelines,*

*The Draft PEIR considered eight alternative experimental and mitigation reef proposals, which were suggested through the PEIR scoping process. These included alternative locations for the artificial reef, alternative designs, and decommissioning of SONGS. **Five of these alternatives were not included for evaluation because they did not meet the SONGS Permit project objectives. These included: 1) an alternative reef site north of San Clemente Pier; 2) an alternative reef site farther offshore from the proposed project site at San Clemente; 3) compound reefs at Big Sycamore Canyon; 4) a kelp planting alternative; and 5) decommissioning SONGS.***

Some scientists in this project determined that thin sand over bedrock was the preferable substrate for performance. This design was described as a “Rock-N-Roll” reef whereas seasonal conditions would cause sandblasting and rolling rocks to prevent “undesirables” from overpopulating the reef. This was a controversial approach but, again, others ran with it. The prospective sites were determined by sonar survey which cannot determine subtle differences in sand constitution. The persistence of a low relief design on silt sediment bottom inherently created a flaw.

There are different types of sand. Typically, the further from the beach, the more silty/muddy the bottom becomes. This characteristic is well defined in the geography of south Orange County. The “kelp line” follows the “mud line.” This silt sediment has different characteristics than the clean, gritty, flowing sand flats that migrate with tides and seasonal conditions found up to and upon the beach.

WNR sits just outside this natural line on mud, in around forty-five feet of water. There is no sand to blast and no rocks to roll. There is virtually no water action that could induce this activity even if the elements were there.

The geographical characteristics from Dana Point to Oceanside are consistent. We have the Capistrano bight with San Mateo being the southern boundary ( this area is unique and discussed later in “Outlying Reefs and Beaches.” ).

The design consists of multiple polygons of modules. They are inconsistent in design and interspersed. The rocks are scattered about in random, as one would expect from being dumped from a barge and falling 40-50 feet to the bottom. There is a center pile with rocks landing outward in singularity.

These modules have no connectivity. They are basically islands. Pendleton AR is actually a great example for this as the modules are connected by cobble pathways. Pendleton is a sophisticated design. Recent observations show diversity of species discounted in some previous literature. Some thought it “died” and no longer worked. Diversity, reproduction/recruitment are observed.

The majority of acreage at WNR lacks habitat for fish to reproduce, hide, or grow up...no relief. There are more hiding places in cobble than on WNR. On the same note, this means less food available. The elephant in the room is the high relief module(s) in WNR that are probably carrying the entire reefs ecological assessment. If the whole reef were built like these we wouldn't be talking about this.

The placement of WNR has been described as acceptable because of it's close proximity to existing natural reef (San Mateo kelp bed). Up to a point, there was no mention of Barge rock. Barge is a couple hundred feet south of the southernmost border of WNR. This was unknown to the scientists until Ken Nielsen educated them. Barge, too, has some medium relief and has the same characteristics as Mateo and Barn.



Another indicator of a flaw is the close proximity of WNR to Barge rock. Barge represents the northernmost edge of the ancient remanence of San Mateo Creek (cobblestone). WNR begins on the adjacent soft bottom. Overflow of fish would better occur if habitat would allow. Observation doesn't match the data.

The issue with reef location is ecological geography. There is a distinguishing pattern to the ecosystem that is governed by geography and the expectations/predictions for WNR don't fit the location. A square peg will never fit a round hole.

## 2. Outlying Reefs & beaches

Nature will follow her own rules.

Long term observations raise questions that can only be answered through the scientific method. Do we know about the nearshore resource loss?... possible causes?... Effects of sand flow and current on natural reefs?... Geological transformation?... Changes to the trophic cascade?

There are several natural reefs nearby and inshore from WNR. West Reef just to the north of San Clemente pier, Seal Rock, Rudies Garden and the inside cobble at Nixon's. These reefs *were* outstanding specimens. They were biodiverse and prolific. We have harvested urchins from these reefs for decades

There has been a sand issue in San Clemente since 1983. Has WNR had any effects on current and sand distribution to exacerbate the existing issue?  
I suggest it has, greatly.

These reefs began to change around the time of construction of WNR. The placement of the rocks increased turbidity, transporting muddy sediment. We didn't start diving there again until 2013. Life on these reefs was fading by this time. The kelp canopy on WNR had become magnificent. Sand was beginning to claim the natural grounds. The whole geography and environment had changed.

These observations raise questions that form some testable hypotheses. One of these questions was put to Patrick Tennant at his San Clemente City Council meeting Powerpoint presentation, October 2017. Steve Swartz asked if the reef would increase the shark presence. Tennant said they haven't seen an increase in sharks. We should be reminded of the shark activity over the last couple years. Tennant's response is

misleading at best. There are no studies on this and there is only one correct answer..."We don't know."

This is where a great hypothesis is created...

*"Does WNR affect the ecological geography which causes changes to the trophic cascade whereas juvenile white sharks have become more common because sand flats have increased and attract larger swarms of stingrays?"*

This would be a valuable study for Dr. Chris Lowe to conduct.

Another question posed is... *"What are the effects of WNR kelp canopy on sand deposits/accumulation that have gathered from Mateo to north of the pier?"*

Yet another..."*Did the kelp canopy at WNR prevent zooplankton from propagating to the inshore reefs contributing to their demise?"*

I spoke with Dr. Lowe regarding my observations. Not only did he agree on the merit of my hypothesis and the need to test it, he said he has been trying to work with the project through Kim Anthony. She is no longer with the project/Edison.

I have recorded red sea urchin harvest from WNR. This harvest occurred between Aug. 2015 and Dec. 2016. There were no urchins on WNR before this period. As I harvested, I noted there was no recruitment. All of the urchins I observed were mature. This time period is when the El Nino event laid waste to everything out to 45+ feet in depth. WNR withstood some of this devastation. I suggest these urchins were the refugees of the population from the inshore reefs.

I sent an email to Steve Schroeter in an effort to communicate my observations. He seemed surprised that I had urchin landings from WNR. Steve abruptly ceased communicating when I expressed my concerns and asked for some understanding of the monitoring method. The event of harvesting urchins on WNR wasn't supposed to happen. Were the monitors aware of the urchins or me harvesting them?...I picked over 6,700lbs in this period, right in front of them.

The relevance, function and value of sea urchins and the sea urchin fishery is understated and under-represented in this project. This goes against the spirit of the project and the Coastal Act.

### 3. Mitigation of Resources

*Seems the only resources benefiting from this project are kelp, lobsters and the money from Edison's customers going to science. Science is not a natural resource.*

The design was directed to consist of like biota of the affected area. San Onofre kelp beds are an urchin hot spot. There is contradiction in the permit.

*Permit - 4.0 CONSISTENCY WITH THE COASTAL ACT ..."Moreover, giant kelp provides habitat and food for a diverse assemblage of animals, many of which also have high biological and economic importance. For example the red sea urchin fishery is one of the largest fisheries in California and is critically dependent on abundant kelp, which is the primary food of red sea urchins. "*

. Yet, in the permit/ conditions- *' important functions of the reef shall not be impaired by undesirable or invasive benthic species (e.g., sea urchins...'*

The sea urchin resource and fishery meet the criteria for "Special Significance" as described in the Coastal act chapter 3 section 30230. In section 30234.5 the economic, commercial, and recreational importance of fishing activities shall be recognized and protected.

The EIR listed a group of parties contacted. Fisherman, ENGO's and land based constituents but, no urchin divers. The California Sea Urchin Commission is a State entity under the Dept. of Agriculture. Was there no intention of including the urchin fishery in the design?

Steve Schroeter is an expert on sea urchins and the urchin fishery. He knows the vital role urchins play in the ecosystem as well as their potential devastating effects. This just adds more scepticism to the reasoning behind some decisions that were made.

The urchin fishery information used was the CDFG urchin landing receipts from block numbers. These blocks encompass several square miles each and provide no local data. I have daily log books that identify "dive spots" and pounds harvested. We know the bottom better than most. Our profession requires keen observing... "Fisherman's Ecological Knowledge." This is the inherent instinct from ancient hunter gatherers applied to quality and conservation. Science seems to exclude this expertise too often.

## 4. Monitoring

The decision for multiple individuals to avoid communication speaks volumes. I have simple, logical questions that need answers. In appearance, the monitoring method is a linear accumulation multiplied by acreage. Why?...the modules are circular and three dimensional.

I see the habitat and populations on the mods as a bullseye target. The yellow center of the target being the most habitable and productive. The red, blue and white rings being successively less habitable and populated. Seems a linear survey doesn't fit.

Monitoring is mentioned in the EIR, permit and described at length in *Compliance and Similarity Determination, CCC, Reed, Schroeter, ET AL-2007* is a hybrid methodology consisting of two statistical methods It is sold as a holistic form of assessment with broad allowances for the unknown.

This is a quantitative statistical method. In this mitigation project, the purpose is to enhance the marine environment. I argue that this method is insufficient. The importance of compliance to the Coastal Act reads as the need for a quality environment. There is a need for qualitative assessment. Quantitative and qualitative are symbiotic.

The lack of communication leaves us kind of incomplete here. So, I'll just list some questions and add to it as I proceed.

***Monitor report - (note undesirables in PowerPoint)...***

[http://marinemitigation.msi.ucsb.edu/documents/annual\\_review\\_workshops/artificial\\_reef/2017/2017\\_arw\\_performance-wheeler-north-reef.pdf](http://marinemitigation.msi.ucsb.edu/documents/annual_review_workshops/artificial_reef/2017/2017_arw_performance-wheeler-north-reef.pdf)

### Questions:

1. How does the report justify performance standard success of “undesirables” when I picked 6,700lbs of urchins? Does the fish count need to be changed? Does this add to the failure?
2. Did the monitors even know of these urchins?...Schroeters surprise indicates not.
3. Where are the specs on transect lines?
4. Are transects on every module?

5. What modules are surveyed?
6. Where are the specs on reference reef transects?
7. Habitat for benthic species is dissimilar, were the trophic needs addressed?
8. Are Moon snails undesirable and what is the effect on the trophic cascade?
9. Why no urchins when they are a majority of biomass at SanO and vital to reef biota proliferation?
10. Is the entire water column counted?
11. Why are some species discounted? (black bass)
12. What species are counted?(lobster, moon snail, clam)
13. There seems to be some confusion as to what the public sees as 28 tons of fish biomass and what is actually considered...explain?
14. The monitoring is a hybrid of quantitative measurement, shouldn't qualitative assessment be used also?...aren't they "codependent?"
15. The relative performance standards do not match observations...where is this data?
16. Can transects be arranged in a way to cherry pick the most productive areas to compensate for the majority of the reef that is far below expectations?

## 5. Summary

Wheeler North Reef design and application was perverted by others. Jake Patton's design was placed on unsuitable soft substrate (mud) and is preventing achievement of the designs intended goals. Jake designed this reef to be on hard bottom. Who changed this?

The process for location was now flawed. The ecological geography at WNR was poorly assessed. From the setting in mud, to the possible effects on the surrounding environment. The trophic needs could never be achieved with this design on this bottom at this location.

Now the intention is to expand the reef, as permitted, if needed. It isn't needed. The proposed expansion is to be located on acreage that was deemed unsuitable in the permit. How is this possible? What has changed?

The success of existing high relief mods on WNR are proof of the need for high relief...not expansion.



The observation of collateral damage to the surrounding environment overwhelmingly suggests the need for immediate study. The amount of research done on this project leaves very little wiggle room for random explanation and creates a higher expectation for results.

The effects of the kelp have created a lagoon of sorts. The inside area from Mateo to the pier performs like an eddy accumulating sand. The massive kelp canopy acts like a curtain and prevents species proliferation. The inshore resources are dead.

The lack of consideration and involvement of the sea urchin fishery is not only a violation of the Coastal Act but, goes against the spirit of the project... mitigation. My resource loss from SONGS has doubled with WNR. Adding the recent marine protected area in Laguna, I have lost 40% of my range. This is unacceptable and must be mitigated.

Looking at this as a whole, indications are that there is more focus on having the biggest reef in the world than on the needs of the environment. The pattern of conduct by the scientists on this project paints a picture of arrogance. This is a public trust. The numerous violations and disregard for rules and the environment is unacceptable.

There is way too much AR literature and precedence to accept the mistakes that were made and the solution for this is too easy. The indications of ethical misconduct must be considered with the understanding of the people involved. We're not dealing with dummies so there is no excuse for the events as they have unfolded. How many of the people have been diving on this reef? It doesn't look like what most think.

WNR is virtually unseen by the people, making it of the metaphysical. People only see a huge floating kelp canopy and imagine a BBC documentary of pristine Channel Islands kelp beds narrated by David Attenborough.

***-" fate and metaphysical aid doth seem to have thee crown'd "***  
**—William Shakespeare**

There are serious implications as to the oversight and compliance on this project. There needs to be an inquiry. The permit must be reviewed. This project needs some new blood and needs to include the urchin diver.

At this point, economic concerns are trumped by environmental and legal requirements.

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## 6. Recommendations

### Equitable Solution

The reason we are at this juncture is because this project has failed. The cause is evident. Science must examine results, observations; deficiencies, trophic needs and apply deductions to a solution adapting a species specific engineering plan.

The solution proposed would provide a satisfactory result and a solid plan for the future. Of the four parties affected, The Environment, Community, Edison and Science, only science has benefited. With this proposed solution, Edison will achieve mitigation; biological research will expand; community will receive benefit; the Environment will suffer less negative effects.

My understanding of the local environment allows a unique vision. The ecological geography is key to understanding how things work at this location. With what has already been done, there is a simple solution.

Placing medium size rock strategically throughout the existing modules creating high relief in some areas and smaller rock by areas of existing high relief creating connectivity. Ultimately creating a consistent/connected substrate conducive to the habitat needs and giving consideration to the trophic needs.

The obvious questions are economics and effect on existing reef. This alternative may be more time consuming and require more material. Care of existing reef would surely be a factor.

## Discussion

I am neither a professor or an investigative journalist. So, I'm gonna throw a twist on this report. This chapter is what the circumstances and my thought provoking investigation produced... questions and awareness. The reader, where applicable, should take note of a relevant point of view....public perception.

As usual, with the more I read, the more questions I find. I've come to the suspicion there is something more motivating to this project than is observable to outsiders. It doesn't pass the smell test. Science is s'posed to be the quest for truth, knowledge and understanding. This is a big deal. It defines us.

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*The following text is my search process to this point. This job isn't complete. It's a mix of copied text and my content. This is unabashed. If you don't get it, It doesn't matter... it isn't for you then. If it does ring a bell, maybe it will spark the dialog that needs to happen. There is a social problem, lack of communication and humbleness has society paralyzed.*

### Metaphysical aid

*WNR is virtually unseen by the people, making it of the metaphysical. People only see a huge floating kelp canopy and imagine a BBC documentary of pristine Channel Islands kelp beds narrated by David Attenborough.*

***-" fate and metaphysical aid doth seem to have thee crown'd "  
—William Shakespeare***

### Public Resource

*Coastal Act clearly understands and expresses public resource and public participation. The CCC, SLC, UCSB, WNR and every entity under the state of California including the State itself is "Of, By and For the People."*

***\*\*Who determines public involvement / participation and to what degree?***  
*I am a stakeholder in this project. I am more than just a concerned member of the public. I have reached out to SLC, Schroeter and Tennant. SLC (Chris Beckwith) was very nice on the phone and seemed concerned but, deflected to CEQA process. Schroeter engaged in 1st email then, cut off contact when I took him up on his offer to*

*discuss my issues (by this time he prob saw my CEQA comment). No response from Tennant but, Kim Anthony responded cordially on LinkedIn informing she was no longer with Edison and would pass along my inquiry to them.*

*Contrary to some popular agenda driven opinions, Man is a natural part of the ecosystem. Man is an animal and consumes animals. He is part of the trophic cascade. He is as much of the marine trophic dynamics as many other marine animals. This is documented in the historic record.*

### *Oversight*

*So, SCE wants nuke plant and needs enviro OK.  
CCC determines mitigation due and creates vehicle for facilitating*

*The CCC hires its own scientists to steer project seeming to use best science. UCSB scientists are successful in creating worlds biggest reef. SCE raises rates and consumer foots bill. Science has perpetual research tool and fame. SLC and CCC cover the oversight and run roughshod. Reef failed and...well...just double it!!  
This is playing out like a racketeering charade*

*Edison is being touted as the responsible party, spending millions and making things right. This may appear true but, obfuscates reality. Mitigation becomes a term of art and assumes a different profile. Edison meerley raises rates a couple pennies and overnight has millions and no one knew the difference. (Credibility, Ethics and Common Sense).*

*The profits for science and politics seems to be the only benefit here. SCE scores points for "attempted" compliance, CCC and SLC score points for authoritarian oversight and environmental protection while UCSB scores points for cutting edge research with an added bonus of perpetual resources for studies and grad student thesis material to aid in the exponential accumulation of redundant scientific verbiage.*

*Nullification.*

*EIR and permit "have enacted allowances which either nullify the Coastal Act or render useless any attempt to enforce it,"*

*Over time nature tends to correct itself, so does science.*

*The EIR sets guidelines but seems to exempt, under circumstances, any actions that violate the permit and Coastal Act\*\*Check the EIR for double standards... The EIR*

*seems to be a big bag of "CYA." The SLC has attys. Listed as contacts on the website right next to admins....HMM?*

*The mechanism for oversight is supposed to be the EIR and the permit. In fact these clear a path for violating the permit and Coastal Act. This creates a scenario of perpetual failure.*

*\*\*Independent survey? Just exactly who is independant? Seems to be a relationship with CCC and UCSB / Reed & Schroeter...Nepotism?*

*The perception is... OK, here's the rules but, they only apply on paper and, were gonna do what we want. We'll justify/explain away in retrospect with verbiage vomit.*

### *Expansion...Carrot and a Stick*

*Lessons Learnt...*

*The perception of a carrot and a stick are overwhelming.*

*Research needs to be refocused and reconfigured to correctly match observations.*

*It now appears this project has reached a state of "Paralysis by Analysis." Studies that require studies to do studies upon studies with no end in sight and still a "Frankenstein" sitting on the ocean floor that no one but me seems to be aware.*

*Schroter is an expert on sea urchins and urchin fisheries. Where was his expertise in the design phase? As an expert, he knows the pros & cons of urchin populations and the vital role urchins play in reef productivity.*

*New expansion would occupy acreage of **alternative 1. Five of these alternatives were not included for evaluation because they did not meet the SONGS Permit project objectives.***

*An article published in the San Clemente Patch 2013 ...." - Schroeter said the team will do more analysis this year to try to understand why the reef isn't home to more fish whether its a natural phenomenon or some flaw inherent in the reef design.*

*"We will monitor Wheeler North much as we did last year," he told the crowd of about 50 people at the Ocean Institute. "We will conduct analysis to try to understand why the Wheeler North Reef consistently fails to meet the 28-ton fish biomass standard." -" This is a redundant talking point seen in multiple media articles.*

*If science desires to repeat the same, they must have looked at it, right?. What did you look at? If you're repeating the design, it must be OK, right?*

*To proceed with expansion. What/where are the applied studies that brought you to arrive at this decision?*



*The acreage affected in both SONGS and WNR now total 332+ acres (with the potential of more if the inshore reefs are considered). The new proposal by SCE adds \_\_\_\_ acres. This would consume a total of \_\_\_\_ acres.*

*The conditions, permit, monitoring and standards should have been set by statistical expectations from observed data. If this is the case, the failure of WNR appoints the acreage of the mitigation reef to the affected acreage at SONGS site. Thereby making it necessary to mitigate the mitigation reef. This is not possible with the proposal to expand. We now have the expectation for expansion acreage to mitigate the failure by the same failed standards and meet the standards of a now increased affected area. Simply put, it is expecting less acreage to produce better results by the same failed plan.*

*Falsifying the monitoring method as cherry picking produces a science conundrum. If method is falsified, science is forced to concede high relief as proven successful alternative. I question the monitoring method because of the species distribution and inconsistency of the modules. I want to see the data and compare it to my observations. At this time, I reject the monitoring data. I suggest the data does not represent the total acreage. Were mods counted individually or as a whole?...Individually they can be assessed by relief comparison. As a Whole, indicates higher relief compensating for low relief and skewing reality. Qualitative assessment is lacking. The linear method must be triangulated to form a 3D method by adding qualitative.*

*I would go as far as describing some of these modules seemingly barren excepting for kelp. I'll go even further and suggest the performance standards assessment is overvalued by as much as 30% (observation opinion).*

*#showthefishcount I just don't see it...show the evidence. #openscience*

*Ask someone about my "bullseye" monitoring theory...someone must have thought of it before.*

### **Ethics & Irony**

*- John Grant (CDFG) was also on this IARC steering committee. Grant initiated a confrontation with a guest of John Stephens at this symposium. Grant was perturbed that Stephens brought a member of the public (my teacher) to the event and tried to remove him. Grant was quoted as saying "the public shouldn't be allowed in here."*

*- Dr. Rimmon Fey worked on this project. He refused to sign onto the EIR without a disclaimer...Why?*

*\*\*If a hypothesis fails a test, it cannot be true, and it must be modified or discarded. In science, if there is a conflict between observation and hypothesis, the hypothesis loses. It doesn't matter whose hypothesis it is or how famous they are - if the hypothesis does not conform to reality it must be rejected.*

*Research must then be refocused and reconfigured to correctly match observations. That's how science is supposed to work.*

*What if two or more competing hypotheses both pass some initial tests - how do you choose between them?*

*Certainly, if the hypotheses generate different predictions it will be a simple matter to pick the best one - as long as it is feasible to carry out the experimental tests. What if the competing hypotheses don't give distinguishable, feasible predictions?*

*Enter Occam's Razor.*

*"Entities are not to be multiplied beyond necessity."- Doubling the reef will only meet the needs of quantitative statistics. You will still have an imbalance and incomplete ecosystem.*

*"The essence of dysfunction is to proceed against the basic laws of science. Empirical evidence is also required."-*

*"Scientists must use the simplest means of arriving at their results and exclude everything not perceived by the senses." - Ernst Mach*

*A good scientist will lay his work down to be tested.*

*Duplicity.*

*Nowadays, there is a struggle in the purity of science with financial needs and social desires seemingly taking precedence over truth and reality. This is made easier by the developed technical jargon that obfuscates the simplest of concepts. Science has been an elite group throughout history.*

*The evidence here seems to point toward "Adventures in Ethics and Science"... a very popular science blog that has a way with words and is worthy of dissemination...*

*- " Scientists are engaged in an endeavor where they're trying to figure out **what the data show** about the world, not just **what they want to see** in their experimental results. Ideally, scientists are making sure their data and conclusions can stand up to the toughest objections they can imagine being raised *before they even send their manuscripts off to the journal.* And, to the extent that*

science is a knowledge-building project where scientists need to be able to depend on the results communicated by other scientists, they know they should be striving for scrupulous honesty and utter clarity of language. Irony is not a literary device that ought to be getting a lot of use in scientific communication.

And yet, part of what drives the “humor” in the “translation guide” is that there are scientists who *do* engage in ... what to call it? Putting the most favorable spin on their results? Stretching the meanings of the words as far as they can go without engaging in outright lies? It’s not the kind of thing in which scientists are typically proud to engage, but when an experiment is being particularly cranky in year 7 of a graduate program, one can imagine that it might be a better option than saying, “I’ve got nothing.” And certainly, one suspects that *other* scientists are engaging in scientific puffery.-

**Janet D. Stemwedel** on July 10, 2007.

*To what end?... Enough is Enough.*

## Reef Design

1. A PhD is disagreeing with me that the reef is a failure. It is by definition but, tell me why then, is expansion necessary?
2. Edison protested size down. Now, science failure must double size, back to original. Looks fishey!!
3. How is pier north now acceptable? A: nearby kepl from WNR...
4. Why was reef set in mud? A: keep urchins off
5. Why was Jake's design set in mud? Jake's not pleased
6. Is there a count on how many people have said high relief? (warnings not heeded)
7. Expansion...so, reef must be OK, proven success, Schroeter said look maybe, if all is good why expand?
8. Who told Tennant "edge of ocean where fish are?"
9. Why is weight scienced when it's on bedrock?
10. Kelp seems too thick...sunlight, benthic ecosystem?

## Outlying Reefs

1. What are you going to do about the inside reefs, geological transformation?
2. What about the sand?
3. Are you going to study the shark situation?

## Mitigation

1. Urchin fishery used in sales job...where's the mitigation?
2. Urchin fishery excluded from planning, why?
3. Affected area now doubled...mitigation fail?
4. Urchin fishery has lost...Harbor, SONGS, MLPAL, WNR...Now this threatens Christmas tree/Poche

## Monitoring

1. When I'm picking urchins...cloud of fish indicates biomass while showing food chain and species. Don't I actually see more?
2. Where does qualitative assessment fit in?
3. Lots of species missing and some sand species mingling with reef species...what is the effect on trophic cascade? (uni shrimp & worms, moon snails)
4. Moon snail juveniles eat algae, what effects?
5. '97 showed kelp scallops at SanO...El Nino cycles different

## General

1. Why such resistance to any challenge?...not normal, scientific method. Real fishey!!
2. Jonna: E-mail thread... stated reef not fail (true by definition), believes in failed science (lots of it!) and says they are locals now...(Highjacked our backyard). Predetermined outcome. Not fluent in local idiosyncricies.
3. Perpetual experiment, fleecing, racketeers. No oversight...perfect for human nature factor.
4. When I'm picking urchins...cloud of fish indicates biomass
5. Why double instead of fix?
6. Many Coastal Act violations
7. Many over time media articles documents sales job...Carrot and stick  
General perception



### *Attitude Protection...*

You have no right to have attitude...this is our backyard and you have failed us. If anyone has right to attitude it is us.

Subjugation

Outnumbered

Oversight impunity

### *Stay on Offense*

---

**From:** Ken Bates  
**Sent:** Tuesday, July 24, 2018 6:07 AM  
**To:** Tom Weseloh; deanna.sisk@asm.ca.gov; Shuman, Craig@Wildlife; Noah Oppenheim; Harrison Ibach; Bill Forkner; noyofish@gmail.com; George Bradshaw  
**Cc:** Ashcraft, Susan@FGC  
**Subject:** Fwd: Petition for Collaborative Squid Research in Northern California  
**Attachments:** Petition for Collaborative Squid Research in Northern California.pdf

Sent from my iPad

Begin forwarded message:

**From:** Ken Bates  
**Date:** July 23, 2018 at 9:12:59 PM PDT  
**To:** "[fgc@fgc.ca.gov](mailto:fgc@fgc.ca.gov)" <[fgc@fgc.ca.gov](mailto:fgc@fgc.ca.gov)>  
**Subject:** Petition for Collaborative Squid Research in Northern California

Sent from my iPad

# Petition for Collaborative Squid Research in Northern California

Request to form a **Collaborative Partnership** [§ 7056 (k)] with the Department of Fish and Wildlife for **Fishery Dependent** EFI collection [§ 7081(b)] for the Market Squid **Enhanced Status Report** via three geographic experimental permits for use north of Point Arena and shore side data collection by three commercial fishermen's associations of Northern California.

## Goal

The goal is to provide **Essential Fishery Information** (EFI) via a Commission approved collaborative partnership [§ 7056(k)] between three Northern California petitioners and the Department of Fish and Wildlife for the purpose of addressing the "**Data Limited**" geographic area North of Point Arena and assisting the Department's efforts to provide to the Commission an accurate, current, **Enhanced Status Report** (ESR) [§7065(b)] on squid stocks North of Point Arena.

## Background

The Marine Life Management Act (MLMA), the Market Squid FMP and the 2018 Master Plan for Fisheries all make compelling arguments for stakeholder participation in the management of California's fisheries. These documents also present to the Fish and Game Commission and Department of Fish and Wildlife wide ranging powers and options to protect, manage and provide access our marine resources.

The MLMA and various recent reports on the effects of oceanic climate change (Climate and Fisheries, Chavez et al. 2017) direct the Fish and Game Commission to be "flexible and adaptive" to the challenges of climate change. The 2018 Master Plan further states that climate change "may also, affect the ability of fishing fleets to access resources, impact port infrastructure, and potentially change the ability to catch and land fish". These impacts are occurring right now in the fishing communities of Del Norte, Humboldt and Mendocino counties to the detriment of local fishermen and businesses.

Northern Fishing Communities (NFC's) have been engaged in a five year effort to react to the changing oceanic climate off Northern California through diversification of small scale fisheries by attempting to access squid stocks present in increasing numbers clear to Southeast Alaska.

In order for the Department to consider NFC's requests to diversify, the 2018 Master Plan calls for an **Enhanced Status Report** (ESR) (7065(b)) on California's squid stocks. The petitioners believe that the Department, as it stands today is under the following constraints that will present very significant hurdles to the completion of a comprehensive, timely ESR. These constraints include:

1. The area north of Point Arena qualifies as "**data limited**" as described in section 7060(a-d). Past squid landing data is incomplete or inaccurate concerning location, effort and gear type for squid landed north of Point Arena. Fish ticket data may inaccurately list Humboldt Squid (*Dosidicus gigas*) landed in Noyo as "squid", and then be incorrectly attributed as Market Squid (*Doryteuthis opalescens*). Trawl and lampara landings may also have been mixed in past reporting.

2. The Department currently lacks vessels and crews willing or able to do survey and exploratory night fishing north of Point Arena. "At sea" sampling will need to be extremely flexible in order to take immediate advantage of good weather conditions. This requirement does not fit well with long term scheduling of Department assets.
3. Limited Entry landings and log book information submitted to the Department is statistically insignificant north of Point Arena, and is presently considered an anomaly by Department staff. The Limited Entry fleet's efforts north of Point Arena amount to 21 "landing days" since the implementation of the Squid FMP. This equates to three tenths of 1% of the total available fishing time that the Limited Entry fleet had to exercise their opportunity to work north of Point Arena.
4. While the California Wetfish Producers Association (CWPA) engagements in collaboration with the Department to monitor squid stocks in the central and southern part of the state have been successful, there is no equivalent **Fishery Dependent** source of EFI data north of Point Arena.
5. The 2018 Master Plan advises the Department that EFI data in "**data limited**" areas can be augmented by the collection of anecdotal and fishery historical information. Presently, the Department's potential efforts to collect such data from local North Coast fishermen has been compromised by the perceived negative treatment of NCF's attempts to diversify. The very low attendance (following the first 2016 Petaluma meeting) at some of the "Fishing Communities" meetings bears this out.
6. The Department today and in the foreseeable future is severely constrained by available funding including funding for data collection and "at sea" research north of Point Arena.

Because of the above facts, the petitioners, on behalf of the North Coast Fishing Communities, propose the following, based directly on the mandate, contained within the 2018 Master Plan for Fisheries for Collaborative Fishery Research (CFR) [7059(a) (3)], to provide **Essential Fishery Information** (EFI) as a way forward for a successful, timely ESR and ultimately the reconsideration of Petition 2018-004.

## **Proposal Details**

### **Part A**

Shore side collection of anecdotal, historical and current observations of squid stocks, spawning areas and other pertinent data via petitioner's activities within the following Fishermen's Associations:

- Fort Bragg - Salmon Trollers Marketing Association
- Eureka - Humboldt Fishermen's Marketing Association
- Crescent City - Crescent City Fishermen's Association

Petitioners will collect pertinent data through direct face to face communications, marine radio reports and stakeholder networks. Squid data will be logged on forms designed by Department staff and submitted to the Department for processing.

## Part B

Collection of “at sea” EFI data within the framework of a **collaborative fishery partnership** between the applicants and the Department, facilitated by the issuance of three Geographical Experimental Fishing permits as described in section 149.3 of the Market Squid FMP and operating under the following constraints and conditions:

### 1. Conditions

These permits are granted under the express condition that they are for **Fishery Dependent Data Collection** similar to the collaborative **fisheries dependent** model employed by the CWPA fleet and the Department.

*It is important to note that during early design of the Squid FMP, the CWPA expressed support for the three experimental permits for fishing outside of the traditional geographic area of the squid fishery only if those permits met certain conditions. “We recommend that such permits be approved conditioned on a mandatory research component evaluation of the extent of local squid spawning grounds”. (D. Pleshner-Steele CWPA, December 5, 2003)*

This proposal is based on the historical CWPA request for additional data from non-traditional geographic areas for squid stocks.

### 2. Input Controls

- a. Airborne lighting for squid, limited to a total of 2000 watts with an additional submerged component of 500 watts for a total wattage of 2500 watts (or 12% of the allowed FMP wattage).
- b. Fishing Gear is limited to hand brail, power assisted brail, jig, or lampara net as defined in Fish and Game code section 8780. Additionally, each lampara wing corkline would not exceed 55 stretch fathoms and fishing depth not to exceed 10 fathoms
- c. Transfer of catch from net to vessel by hand or power brail only.
- d. All squid taken north of Point Arena must be landed in the Northern Zone (39 degrees north to the Oregon Border

### 3. Output Controls

- a. Ten ton landing limit per calendar day (24 hours)

### 4. Other Conditions

- a. Reduction of permit fees to offset investment and overhead of collaborative research
- b. Partnership Funding – Permittees to deliver to dedicated Fish and Wildlife escrow account, 15% assessment of ex-vessel value of landed squid as matching funds for the express purpose of processing and evaluation of Essential Fisheries Information on squid stocks north of Point Arena.

- c. Southern squid FMP Limited Entry participants will be allowed access to real time reporting of squid abundance and location via this geographical research effort.
- d. Department will determine information and format for reporting.
- e. Seven days per week fishing/survey activity allowed due to North Coast weather constraints.

## Reference

### MLMA Justifications for petition

- Fishermen participation: Chapter 3, 7060 (c)
- Overall collaboration: 7059 (a)(1), (a)(4)
- Fishery Management plans, Best Scientific Information: 7072(b)
- Involvement in Development of FMPs by Fishermen Participation: 7073(4)
- Contents of FMPs (7080-7088), effects of oceanic climate change; 7080(b)
- Economic and social factors: 7080 (c)
- Identify EFI: 7081 (b), (c)

## Final Comments

1. Experimental Geographic permits — Petitioners applying for the three geographical experimental permits in 2014 were told that the permits had expired. There is neither language in the squid FMP nor in the 2018 Master Plan terminating the geographical experimental fishing permit program in the FMP. Also, the 2018 Master Plan and the MLMA gives the Commission and Department wide ranging powers and options to manage fisheries (7056 m, i, j, k, l).
2. Granting permits or a trial fishery will trigger CEQA process. The MLPA specifically states that an adoption or amendment to an FMP by the Fish and Game Commission will **not** trigger a CEQA review. [See Master Plan, page A-11, Section 7078(e)]

2018 AUG -6 AM 8:50

August 1, 2018

Executive Director Valerie Termini  
California Department of Fish and Wildlife  
1416 Ninth Street, Room 1320  
Sacramento, CA 95814

RE: CDFW Action Regarding the Management of Giant Keyhole Limpet Fishery

Dear Executive Director Termini,

This letter is a follow-up to my letter to CDFW staff dated April 30, 2018 (attached) in which Stellar Biotechnologies, Inc. requested that the department provide clarification on regulations, policies and guidelines for the management of the giant keyhole limpet, a valuable commercial marine invertebrate resource native to California coastal waters.

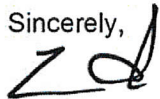
As we noted in our April 2018 communication, the absence of clear regulations regarding the harvest and management of the giant keyhole limpet fishery has led to confusion in the industry, unequal access for stakeholders, and could threaten the sustainability of the resource.

Since 1998, Stellar has worked with CDFW staff to identify how industry practices may be impacting this unique fishery. As a result of these interactions, CDFW took a number of important actions over the past ten years with regards to this species. More recently, CDFW biologists visiting Stellar's facility have come to recognize that the giant keyhole limpet resource may be more vulnerable than they previously recognized.

To support the department's current efforts, at this time, we respectfully request your assistance in bringing greater attention to this matter via the Commission's authority. Companies such as Stellar are experiencing economic consequences from the lack of clarity on this issue and we are willing to participate in any way possible to help CDFW and the Commission bring clarity to this issue.

Thank you in advance for your consideration in this matter and the department's past actions to conserve a truly unique California resource.

Sincerely,



Frank R. Oakes  
President Chief Executive Officer  
Stellar Biotechnologies, Inc.

EC: CDFW Environmental Program Manager Sonke Mastrup,  
CDFW Aquaculture Coordinator Randy Lovell  
CDFW Environmental Scientist Anthony Shiao  
CDFW Environmental Scientist Rob Winn  
California Aquaculture Association Executive Director Michael Lee,  
The Honorable Jacqui Irwin, California Assemblymember, 44th District

April 30, 2018

Mr. Randy Lovell  
State Aquaculture Coordinator  
State of California Department of Fish and Wildlife – Marine Region  
1933 Cliff Dr. Suite 9  
Santa Barbara, CA 93109

Re: California Giant Keyhole Limpet

Dear Randy,

I would like to thank you and the department again for your interest in a truly unique California resource and its global importance.

The Giant Keyhole Limpet (*Megathura crenulata* or GKL) fishery, which is unique to California, has emerged as the sole source for a critical immune stimulating protein, keyhole limpet hemocyanin (KLH). KLH is used in a variety of biomedical research and clinical applications, including therapeutic vaccines for the treatment of cancers, autoimmune diseases, opioid abuse and even Alzheimer's disease. The advancement of these promising drugs through clinical development has created the potential for a rapid escalation in demand for the GKL, and poses a significant challenge for the management of the fishery.

Stellar Biotechnologies, Inc. was formed in 1999, with support from the National Institutes of Health National Cancer Institute, National Science Foundation and the State of California, to develop sustainable, environmentally sound technologies and practices to harvest, cultivate and extract KLH from GKL. Since then, we have developed aquaculture technologies and infrastructure in Ventura County, California that provides an integrated solution and model for the sustainable supply of KLH. We now rely substantially on GKL produced from our hatchery program and our non-harmful extraction method to produce KLH, although we still utilize the fishery. In developing our business, Stellar has worked in cooperation with CDFW to follow best practices based on CDFW's policy objectives for management of the fragile California marine invertebrate fisheries. As you know, given limited historical interest or uses of GKL, there are no regulations specific to the harvest and management of GKL.

For producers that continue to rely exclusively on GKL obtained from the fishery, the absence of clear regulations regarding the harvest and management of the GKL resource has led to confusion in the industry. For example, in response to pharmaceutical industry concerns for an environmentally sound plan for sourcing KLH from the California fishery, a foreign producer (one of the world's largest KLH suppliers) suggests on its website that the [CDFW has sanctioned](#) the unregulated restocking of GKL in California waters following commercial harvest and extraction of KLH. Other companies represent they produce "[Mariculture KLH](#)" yet are not on record as having the permits required for aquaculture production.

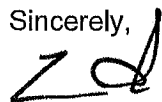


To alleviate this confusion, and to begin planning for a potential dramatic increase in GKL landings, we respectfully ask the department to consider the following actions:

1. **Formally clarify the regulations for commercial harvesting and out-planting of GKL** in a form that can be shared with all stakeholders so that everyone with a commercial or scientific interest fully understands current regulations and can participate on equal footing.
2. **Begin developing a GKL management plan** to assure the long-term sustainability of the fishery under an appropriate BMP that takes into consideration the potential for rapid escalation in landings arising from global demand for the unique KLH protein found in GKL.

Given the limited information that is publicly available on the biology, physiology and natural history of the GKL, I would like to offer Stellar's support to collaborate with CDFW staff to collect the data needed to formulate GKL management plans. In support of this effort I have included the attached brief summary of key observations that we feel are relevant to this discussion and our recommendations.

Sincerely,

A handwritten signature in black ink, appearing to be 'F. Oakes', written over a horizontal line.

Frank Oakes  
President and Chief Executive Officer

Copies to:

Robert Winn  
Anthony Shiao,  
Carlos Mireles

## Giant Keyhole Limpet Management Observations

### Overview

Stellar Biotechnologies was founded to develop sustainable, environmentally sound technologies and practices to harvest, cultivate and extract a key blood protein called KLH from the California Giant Keyhole Limpet (*Megathura crenulata* or GKL). KLH is widely used in medical research, including new therapeutic vaccines under development by multiple pharmaceutical companies and institutes. Despite the global use of KLH, there is very little information of the GKL available in the scientific literature to form the basis of a sound management policy. Although mostly unpublished, Stellar's grant funded research and 20 years of experience working with GKL could contribute greatly to the body of knowledge needed to establish sound management policies. The following summary highlights certain observations that believe may be relevant to policymakers:

- **Out-plantings result in poor survival rates.** Under Stellar's federal grants, the company restocks limpets within the Port of Hueneme's federal waters for research purposes. Our research has found that mortality from out-planting is high (~80%) unless the animals are closely monitored and placed individually to assure attachment to the substrate. As a result, management practices for other marine species used for medical applications, such as horseshoe crabs, are not likely to be relevant for the *M.crenulata*.
- **Intensely harvested areas are slow to repopulate, if ever.** Limpets are solitary animals that do not congregate or occur in high density in the wild; they tend to be cannibalistic when in close proximity. The animal's territorial nature makes it problematic to introduce new limpets to existing populations, even when returning the animal to its previous habitat. Juvenile animals rarely coexist with larger adults; established populations can exist for decades without the recruitment of juveniles. Once GKL are eliminated from an area by harvest, we have not seen the area repopulated. GKL appear to be primary settlers in disturbed habitat such as underwater landslides, new breakwaters, etc. Growth rates are slow, requiring 5-6 years to reach commercial size.
- **Following extraction, animals need to be monitored in controlled conditions for multiple weeks to ensure good health.** In developing our non-harmful extraction method, we observed that many methods that appeared safe at first proved to be fatal ultimately. For example, all of our attempts to penetrate a blood sinus through the foot resulted in 100% mortality by 6-8 weeks following extraction.

### Other Background

Since 1998, Stellar has worked with CDFW staff to identify how industry practices may be impacting the resource. As a result of these interactions, CDFW took the following actions:

- **Commercial landing tickets.** CDFW added *M. crenulata* to commercial landing tickets in order to monitor how extensively the wild resource was being used. Since these limpets are not used for food or other commercial purposes, the department previously had no data on landings.
- **Commercial restocking.** CDFW staff determined that harvesting, extracting hemolymph (blood), rehydrating and subsequent restocking of GKL was not permitted.
- **Scientific Collection Permits.** CDFW clarified that harvesting and restocking for commercial purposes under a Scientific Collection Permit was not permitted.

### Sample of Industry KLH Production Representations

- Ocean Harvest and Restocking: <https://biosynpharma.com/production/>
- Aquaculture: <https://www.stellarbiotechnologies.com/stellar-klh/world-leading-aquaculture>
- "Mariculture": <https://www.thermofisher.com/order/catalog/product/77600>