

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

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August 26, 2010

TO: All Commissioners and Alternates

FROM: Will Travis, Executive Director (415/352-3653 travis@bcdc.ca.gov)
Mamie Lai, Assistant Executive Director (415/352-3639 mlai@bcdc.ca.gov)

SUBJECT: Approved Minutes of August 5, 2010 Commission Meeting

1. **Call to Order.** The meeting was called to order by Acting Chair Goldzband at the Port of San Francisco Board Room, Second Floor, Ferry Building, San Francisco, California at 1:06 p.m.

The Commissioners voted to approve him as Acting Chair. Commissioner Regan moved, seconded by Commissioner Carruthers, the motion carried unanimously, by voice vote.

2. **Roll Call.** Present were Acting Chair Larry Goldzband, Commissioners, Bates, Brown (represented by Alternate Carrillo), Chiu, Gibbs, Gioia, Gordon, Jordan Hallinan, Lai-Bitker, Lundstrom, Maxwell, McGlashan, McGrath, Moy, Nelson, Reagan, Sartipi, Shirakawa (represented by Alternate Carruthers), Wagenknecht, Ziegler and Chappell. Legislative representative Charles Taylor was also present.

Not Present were: Resources Agency (Baird), Department of Finance (Finn), U.S. Army Corps. of Engineers (Hicks), State Lands Commission (Thayer), Association of Bay Area Governments (Wieckowski), Governors Appointee (Randolph).

3. **Public Comment Period.** Ms. Ellen Johnck, Executive Director, Bay Planning Coalition, representing the Bay Planning Coalition and the California Marine Affairs and Navigation Conference, mentioned that the Commission should read the report entitled, San Francisco Bay Subtidal Habitat Goals Project.

The agencies that have produced this report are BCDC, the California Coastal Conservancy, the NOAA Fisheries and the San Francisco Estuary Partnership. She was concerned that there has not been official oversight from BCDC on this report. She requested that the report be read and scheduled for a public hearing and voted upon to endorse the goals.

Some of the recommendations and goals found in the report appear to run counter to the goals and mandate of the McAteer-Petris Act establishing BCDC's authority for ensuring the balanced use of bay resources. Some of the objectives in the report are not supported by the science in the report. BCDC should look at the report to ensure that what's coming out of it is consistent with the McAteer-Petris Act.

Commissioner Carruthers asked if the report had been distributed to the Commission.



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Executive Director Travis responded that he had mentioned it in his Executive Director's Report and it's online. The Commission had been briefed on the project and it's scheduled for another briefing in a few of months.

4. **Approval of Minutes of May 20, 2010 Meeting.** Commissioner Carruthers moved, seconded by Commissioner McGrath to approve the May 20, 2010 Minutes, the motion carried by voice vote with Commissioners Chappell and Reagan Abstaining.

5 **Report of the Chair.** Acting Chair Goldzband reported on the following:

a. **Delta Conservancy.** Chair Randolph has requested that I ask for the Commission's concurrence on his appointment of Joe LaClair, our chief planner, as BCDC's representative on the newly-established Delta Conservancy, and the appointment of Jessica Hamburger as Joe's alternate.

The new Delta Conservancy is modeled on the Coastal Conservancy. It has 11 voting members and 11 non-voting members, including one appointed by BCDC. The voting members are cabinet members, locally-elected officials and representatives of key stakeholders. The non-voting members that have been appointed are staff members from government agencies and organizations such as Joe and Jessica who have been working on Delta issues for some time. Therefore, they can ably represent our interests.

MOTION: Commissioner Chappell moved the item to concur with the appointments, seconded by Commissioner Reagan, The motion carried unanimously by voice vote.

b. **Next BCDC Meeting.** The August 19th meeting has been cancelled, therefore the next meeting will be held on September 2nd at the Ferry Building. The following matters will be considered:

- (1) Vote on the Potrero Hills Landfill expansion application.
- (2) A public hearing and vote on the federal consistency determination for the restoration of wetlands on Cullinan Ranch.
- (3) A briefing on the impact of climate change on the Bay ecosystem.
- (4) Consider a status report on the progress in carrying out the Commission's Strategic Plan.

Commissioner Ziegler introduced his alternate Jason Brush who manages the EPA Wetlands Office.

c. **Ex-Parte Communications.** No ex-parte communications were reported.

6. **Report of the Executive Director.** Executive Director Travis provided his report, as follows:

Last week Governor Schwarzenegger issued an executive order reinstating the three day per month unpaid furlough program beginning August 1st and continuing until an approved state budget for the current fiscal year is in place. The changes for the furlough days this year are the second, third and fourth Fridays of each month. The furlough program has both personal financial effect on our staff whose salaries are cut almost 14 percent, and it's also the equivalent of losing six staff positions. Also, until a state budget act is passed we won't be able

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to pay your per diem for attending Commission meetings. I truly apologize for this situation.

As always, I'll keep you apprised of any new budget information as it arises.

a. **Emergency Permit.** On June 30, 2010, the Army Corps of Engineers requested emergency approval to remove 8,000 cubic yards of sand that had created a shoal in the federal navigation channel in Suisun Bay. I concurred and, under the provisions of our recently issued consistency determination to the Corps, I approved the removal of the sand and its disposal at the Suisun Bay aquatic disposal site. With the shoal removed and the immediate navigational issue resolved, the Corps is now looking into performing advanced maintenance dredging in this area to prevent further hazardous shoaling.

b. **Paradise Cay Marina.** As you may recall, we've been dealing with enforcement problems at the Paradise Cay Marina in Marin County for quite some time.

In an effort to inspire the owner to complete the construction of the marina, you issued a cease and desist order, imposed financial penalties, filed a lawsuit and approved a settlement agreement with terms that are still in the process of being fulfilled.

In the past seven weeks there has been considerable progress. Landscaping has been installed around the newly-constructed harbormaster's building. Most of the construction equipment has been removed and repairs have been made to the boat docks and other facilities.

The tasks that remain to be completed are relatively few. By August 15th, the parking lot, irrigation, landscaping and finish work to the harbormaster's building will be completed. By September 15th, the marina parking lot entrance gate will be installed. By October 15th, the elevator in the harbormaster's building will be installed. And by November 1st, just prior to the rainy season, the final seeding will be done which will fully complete the project.

The marina owner has paid \$80,000 in penalties and an additional \$44,000 remains to be paid. Please direct any questions about the details of this enforcement case to Adrienne Klein.

c. **Reports.** I would like to call to your attention to two reports that we sent you on July 23rd, both of which are provided to fulfill objectives in your Strategic Plan.

The first is a report on Delta issues and the second deals with the climate science research we have underway. If you have any questions about either report, please let me know.

d. **Caitlin Sweeney.** As I informed you at our last meeting, our Chief Deputy Director, Caitlin Sweeney, will be leaving us at the end of this month.

Our staff has drafted a resolution for your adoption to express your official appreciation for Caitlin's many accomplishments and contributions.

You may find that the language is a bit more casual in tone than the draft resolutions we typically provide for you. However, Caitlin is a truly unique individual who we believe deserves something special. I would appreciate a motion, second and affirmative vote to adopt this resolution.

MOTION: A motion to adopt this resolution was made by Commissioner McGlashan and

seconded by Commissioner Gioia. The motion passed unanimously, by voice vote.

7. **Commissioner Consideration of Administrative Matters.** There were no questions on the Administrative Listing.

8. **Public Hearing and Vote on the Enforcement Committee's Recommended Enforcement Decision Involving Proposed Stipulated Cease and Desist and Civil Penalty Order No. CCD 4-09; San Pedro Cove Homeowners Association, Lamperti Incorporated, and the Charles E. Paganini Estate.** This item is a public hearing and vote on a stipulated enforcement order to resolve an enforcement problem at the San Pedro Cove community in San Rafael. Tim Eichenberg presented the staff's recommendation.

Mr. Eichenberg, BCDC Chief Counsel stated that on July 22nd the Enforcement Committee approved a recommended enforcement decision which is Attachment 1 in your materials, which settled an enforcement action regarding public access at San Pedro Cove Subdivision on Point San Pablo Road in the city of San Rafael pursuant to Permit Number 22-77.

The terms and conditions of the settlement are set forth in the Proposed Cease and Desist and Civil Penalty Order CCD-4-09 which is Attachment 2 in your materials.

The Homeowners Association signed a stipulation agreeing to the order in Attachment 3.

The Enforcement Committee found that the proposed order fairly resolves a long-running dispute with the developers and the Homeowners Association regarding public access at the San Pedro Cove Subdivision.

The Homeowners Association has agreed to take responsibility for the alleged violations after reaching an agreement with the original developers.

The permit required the dedication of an 800-foot path from San Pedro Road to a 2.9 acre marsh and upland called the Eastern Wildlife Area, and a 1,060 foot public access way through the subdivision to a deck overlooking the Bay.

A 10.6 acre open-water tideland lot was also part of the agreement.

The permit also required that plans to design, improve and maintain the public access areas be reviewed and approved by staff prior to construction.

Under the proposed order the Homeowners Association has agreed to a specific timetable to take assignment of the permit from the developers, to obtain all necessary property rights and local government easements and approvals, to submit a permanent amendment to improve the public access, to submit final access and landscaping plans consistent with Exhibits A and B of the proposed order, to complete public access improvements and a new signage program, to remove all signs that impede public access, and to record legal instruments to permanently guarantee public access in open-water areas.

The proposed order requires substantial additional improvements to landscaping, maintenance and public facilities in the Eastern Wildlife Area including a vital connection to the Bay Trail at Loch Lomond Marina when it is redeveloped which is located adjacent to the Eastern Wildlife Area.

This agreement also upgrades the path to the entrance of the overlook deck, and expands the signage program.

The proposed order provides specific administrative penalties for failing to meet stipulated timeframes and it reserves the right to seek additional judicial penalties for violating the order.

The Enforcement Committee's recommended enforcement decision recommends that the Commission approve the proposed order to secure the additional public access improvements, resolve the contested violations, avoid additional delays, expense, and uncertainty, and conserve additional Commission time and resources.

The Enforcement Committee also requested that the public be notified about the new public access improvements to the landscaping and the paths to the Eastern Wildlife Area, and the future link to the Bay Trail and the signage and pathway to the overlook.

If the Commission approves the proposed order the staff will work with the Bay Trail and other parties to bring these improvements to the attention of the public.

Mr. Riley Hurd representing the San Pedro Cove HOA gave public comment, and supported approval of this settlement. He listed benefits as follows:

- (1) The permit gets transferred to a responsible and accessible party who is prepared to work on this immediately.
- (2) The Commission is getting a lot more in this settlement than what was originally required.
- (3) Additional landscaping is being provided.
- (4) The San Pedro Cove HOA has budgeted for this for this fiscal year and they're prepared to begin as soon as tomorrow if today goes well.
- (5) And finally, this settlement gets BCDC exactly what its mission is and that's access.

Ms. Laura Thompson, Manager – San Francisco Bay Trail Project, made the following public comments: Without the support of the McAteer-Petris Act the concept of a continuous 500 mile shoreline Bay Trail would be next to impossible. The construction of this trail will give the public an opportunity to access this area of the shoreline and will ultimately connect to Loch Lomond.

We did publish trail maps for the public. They're available on our website. We are planning to update them in 2011.

MOTION: Commissioner Carruthers moved to close the public hearing, seconded by Commissioner Lundstrom. The motion passed unanimously by a voice vote.

Commissioner McGlashan of the Enforcement Committee commented that he chaired the Committee's meeting pertaining to this matter and he wanted to commend staff for coming up with a great resolution.

And in the opinion of the Committee, this is a good win/win and the Commission is

exceeding the goals of the original proposed improvements that should have been done years ago as part of this development.

Commissioner Carruthers stated that Chairman of the Committee, McGlashan spoke for all members on the Committee.

Commissioner McGrath voiced his opinion that this was a great resolution for the circumstances present. He was troubled by the fact that by the time these improvements are completed it would have been about a 20 year hiatus.

And there has to be a lesson in here about how we do business. I looked at a six percent discounting rate and that's a doubling. So if you put the money into an interest-bearing account you could pay for the improvements and buy a house.

In the principle of making sure that people don't derive financial benefits of this, we might want to take a look at how we structure conditions to make sure that we can't get into a circumstance where the real developer is out of the picture.

It's a great resolution for where we are, but it is a little troubling.

Commissioner Carruthers added that: The Enforcement Committee took the same view and expressed the same concern and the staff made assurances that they would undertake what's necessary to address that.

Acting Chair Goldzband commented: When the Enforcement Committee met on this we ended up by talking with Adrienne and Travis and we said this presents an opportunity because we can resolve something by increasing access.

So we requested the Enforcement staff to go back on the older cases at first and pick out those cases which are similar to this, and immediately start working on those cases in the hope that an agreement like this could be reached sooner rather than later.

We're concerned that this can essentially be seen as simply a cost of doing business which is what we don't want the regulated community to think.

We expect to hear back from them in the near future with regard to which ones they plan to actually look at.

Commissioner McGlashan commented: The other piece that the Enforcement Committee was interested in was actually holding an agenda item sometime in committee about how we avoid this syndrome in the future with other old cases too.

MOTION: Commissioner McGlashan moved, seconded by Commissioner Carruthers to approve the Staff recommendation.

VOTE: The motion carried unanimously with a roll call vote of 21-0-0 with Commissioners Bates, Carrillo, Chiu, Gibbs, Gioia, Gordon, Jordan Hallinan, Lai-Bitker, Lundstrom, Maxwell, McGlashan, McGrath, Moy, Nelson, Reagan, Sartipi, Carruthers, Wagenknecht, Ziegler, and Chappell, and Acting Chair Goldzband voting "YES", no "NO" votes and no abstentions.

Commissioner McGlashan thanked the HOA for stepping up in a really responsible

manner. He mentioned that the community of Bay lovers and the community of Marin will benefit.

9. Closed Session on the Recommended Enforcement Decision Involving Proposed Stipulated Cease and Desist and Civil Penalty Order No. CCD 4-09; San Pedro Cove Homeowners Association, Lamperti Incorporated and the Charles E. Paganini Estate.

Acting Chair Goldzband announced that since the Commission had approved the Enforcement Decision, a closed session was not necessary.

10. Commission Consideration of a Contract for Proposed Amendment to the San Francisco Bay Plan, the Suisun Marsh Protection Plan and the Solano County component of the Suisun Marsh Local Protection Program. Joe LaClair, BCDC Chief Planner, asked for the Commission's authorization for the Executive Director to enter into a contract with Solano County to cover staff costs for processing proposed Bay Plan, and Suisun Marsh Plan amendments and local protection program (LPP) certification efforts arising out of the update of the county's General Plan and the need to incorporate that into the county's local protection program. Some changes to the Bay Plan and Suisun Marsh Plan are needed so that the LPP documents can be consistent.

Staff also recommends that the Commission authorize the Executive Director to make any changes to the contract that would not involve substantial changes in the scope or the amount of the contract.

The Solano County Board of Supervisors will take up a resolution directing its staff to forward the application to the Commission later this month.

Commissioner McGlashan asked if the Solano Landfill Case had any bearing on this consulting work.

Mr. LaClair answered that it did not except insofar as there may be land use designations for that land area that would be incorporated into a local protection program but your consideration of the landfill permit relies on the existing LPP as it now stands and the process to certify the new LPP will take some time. Right now we'll be using the existing Local Protection Plan policies to evaluate that permit.

MOTION: A motion to approve the item was made by Commissioner Reagan and seconded by Commissioner McGrath. A hand vote was taken and the item passed unanimously.

11. Briefing on Hayward Shoreline Planning. A panel consisting of City of Hayward, the East Bay Regional Park District and the consulting firm of PWA was present.

Erik Pearson from the City of Hayward stated that Hayward is a member of the Hayward Area Shoreline Planning Agency or HASPA.

HASPA consists of three agencies, Hayward, the Hayward Area Park and Recreation District and the East Bay Regional Park District.

So HASPA hired PWA to author the study, the preliminary effects of the sea level rise on the Hayward Shoreline. The authors of the report are here.

The study was completed in March of this year. Presentations were made to the
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Hayward City Council, the HASPA Board and a few other agencies including the East Bay Dischargers Authority.

Hayward completed a Climate Action Plan last year which focuses on mitigating the effects of climate change.

The study identifies a lot of different infrastructure that exists on the Hayward Shoreline and begins to address how some of that infrastructure can either be protected or adapted to rising sea levels.

Jeremy Lowe made the following presentation:

Our study was a very preliminary one where we're just coming to grips with the understanding of what sea level rise means and the impacts it's going to have on our communities around the Bay.

The first thing we looked at was vulnerability, what is vulnerable to sea level rise on the Hayward Shoreline.

Secondly we were asked to look at what possible adaptation structures would there be. How can we avoid some of the worst effects of sea level rise? And not just looking at the next few decades but over 100 years into the future with the types of sea level rise that are being predicted by the work for the international community and by the California state.

And we also looked at what would be the long-term plan? What's the process we should come up with for looking at the vulnerability and looking at the adaptation of that shoreline.

When looking at the amount of potential inundation we tend to use BCDC's maps that were produced last year.

All of the shoreline is inundated at the 16 inch level by 2050. The only areas that aren't are the landfills that are in the middle of the map.

We looked at the different uses of the shoreline and what they're vulnerable to in terms of sea level rise.

We looked at the habitats found along the shoreline. A number of different marshes are constrained by levees that surround them to protect inland areas. Some marshes are protected by tide gates which are set according to the present Bay levels and not necessarily those of the future.

We tried to understand how these systems would react to changes in sea level rise.

We have storm drainage. We have a number of channels that cut across the shoreline. These not only concentrate storm water through the system which previously would have been dispersed across the marshes but this is now controlled into channels.

This also controls sediment delivery from the watershed.

The maintenance of these channels with rising sea levels will become more difficult.

The landfills are going to need to be protected. We cannot allow erosion of these areas. Understanding how the future shoreline is going to affect these landfills is important.

The potential changes in groundwater level with rising sea levels is important to understand how that interaction occurs with the groundwater plumes from any of these landfills.

We also have two wastewater treatment plants at Ora Loma and at the Hayward Shoreline.

We have the Bay Trail that runs across the levees. But underneath this whole shoreline we have the EBDA pipeline, 17 million gallons a day of treated fresh water taken north to out near Oakland.

We also have PG&E lines and at the back we have railroads, high-pressure gas lines, cables; there's a whole series of different activities that could be interrupted if sea level rise damages any of these facilities.

So what would these facilities and functions be vulnerable to?

Well the obvious one is inundation. What happens if we take down the levees and allow the tide to inundate an area? The rare occurrence of a storm today might become a more regular event as sea level rises.

Erosion is another problem that we have. The natural response of the Bay Shoreline to rising sea levels is for increased erosion of the mudflat.

The increased wave activity will stir up the mud from the outer levees that border the marshes and put that into suspension and then carry it on shore and place it on top of the marshes.

Another impact we have is groundwater elevation. As the sea level rises we expect to see groundwater changes to occur. And the facilities that are currently out there are not necessarily designed for an increase in groundwater elevation.

We were then asked to look at, what are the potential adaptation structures for this shoreline given the number of functions that are here and given the long period of time that we've been asked to look at.

We came up with a number of criteria for adaptation structures. Firstly, we are looking at a moving frame of reference. The natural system is going to change and evolve. The mudflats are going to continue to erode, the marshes are going to accrete. Sediment is going to continue to move around.

And so we have to understand how that natural system is going to interact with how we're fixing parts of the shoreline.

Secondly, when thinking about the natural shoreline, it tends to adapt to different environmental conditions; maybe more readily than our heart structures do at the present. And how can we incorporate that natural shoreline adaptability into any future strategies?

And what we get into here is a conflict between the movable and the immovable. We

have levees in place which don't move around but we have a mudflat offshore which is trying to move landward.

How can we accommodate one and yet provide flood protection which the levees will provide?

We're trying to avoid coastal squeeze. We're trying to avoid the loss of those natural ecosystem functions of the wetlands, of the mudflats which would otherwise be lost as they gradually come up against the levee and are gradually lost against the levee.

And we're also trying to understand how this system works on a regional scale, how sediment moves around between different parts of the Bay, how the functions of the ecological functions also are looked at on a regional scale.

An advantage of working with HASPA is that they actually try to manage a section of the shoreline instead of just having a small piece or having a particular sector interest, they're looking at the whole section of the shoreline and that allows us to come up with more innovative adaptation strategies.

When we looked at adaptation strategies we looked at what we're doing at the moment which is hold the line.

What's going to happen in the future? Well in the future we're going to have a levee but the levee is going to have to be armored increasingly with larger and larger armor rock as the wave sizes increase as the water level increases.

The crest height is going to have to be increased because the size of overtopping is going to increase as the waves get larger. We're going to get more inundation.

And the mudflats are going to continue to erode down. So the toe of the structure that supports the rock is going to be eroded away and we're going to have put more and more rock at the base of the structure.

If we hold the line we can see that our maintenance is going to increase.

We can see that the cost of the construction is going to increase. The structures are going to get larger. They're going to get more fixed.

They're going to keep the water out for a period of time but if they fail then the consequences of that failure because the water levels are so much higher is that much greater.

So what happens if we took advantage of some of the natural systems that we have?

What happens if we did something we call realignment where we take down levees. We allow the waves and the water to transgress across the existing wetlands.

That allows the wetlands to take some of the energy out of the waves. The waves get a little bit smaller. And it means that you can build a smaller levee, a more sustainable levee, a more maintainable levee further inshore.

This is something that we looked at. There are only certain areas where we can do this.

There is not enough space to allow realignment. On some of the built-up spaces in the Bay realignment is difficult.

We looked at alternative strategies. One opportunity we have is sediment. We have huge amounts of sediment trapped in the storm water channels which requires ongoing maintenance.

We have sediment trapped in marinas in San Leandro. We have sediment trapped in various places which it wouldn't normally be held in a natural system and which we then spend money moving around.

Can we put that sediment to use on the shoreline as opposed to putting it out at some deeper water disposal area?

In the natural system those sources of sediment were much more diffuse and they appeared over much wider ranges of the shoreline than they do at the moment.

At the moment we channelize the sediment.

And we do much the same with the freshwater supply as well. Huge amounts of fresh water pass through this system, treated fresh water.

But it passes in a pipe underneath the system. In the past fresh water use would enter the system at the back, into brackish marshes and into salt ponds.

We've basically taken that fresh water out and pass it underneath the marshes then into a deep-sea area. This is no longer available to the marshes.

Can we not make use of both the sediment and the fresh water?

One idea we came up with is to look at dissipating the wave energy, providing protection over a longer distance than what we do at the present but not as long a distance as we would require of a natural marsh.

So what we're trying to do is to increase the height of the marshes in line with the sea level rise and provide a steepening of the existing natural shoreline.

We thought of building a seepage berm, placing material from the storm water channels onto the back of the marshes. This would allow water to penetrate through.

We then take fresh water from the wastewater treatment facilities and we pass that water through the seepage berm promoting a brackish marsh.

The advantage to a brackish marsh is that the vegetation that you have in a brackish marsh grows more quickly and is more substantial in the amount of material, the mass of material that you have then on the existing tidal marshes.

And so you'd expect to see a brackish marsh to accrete more rapidly, to trap more sediment, to grow more rapidly and to grow more in line with the predicted sea level rise rates.

The advantage of this is that we're not continually having to go out and build up a levee

and increase the height of it and put more rock on it.

We're hoping that such a system would allow the marsh to rise adaptively but in response to changes in sea level rise.

So the advantage of passing the fresh water through here also reduces the vulnerability of our system to sea level rise.

One of the major vulnerabilities of the shoreline is the EBDA pipeline. Impacting that movement of water, if that gets cut off, it cuts off five or six different water treatment plants.

So we're reducing the vulnerability of the system. We're increasing the protection provided by the marsh. And we're providing other benefits through an increased shoreline which is more in keeping with the historical character and ecology of that area and which also can provide other benefits such as increased carbon sequestration and treatment of the storm water and waste water.

On this shoreline there are these landings, these hard areas that provide more protection than the mudflats do to the shoreline.

We wondered if this was something we could emulate within the system. Is there something we could do for those areas such as the landfills and such as the waste water treatment plants where we haven't got much space? We don't have the luxury of space to provide a larger marsh that we need to build up close to levees but still provide a shoreline which can adapt and change.

We looked at placing material further seaward of the levees, looking at gravel or shell berms, looking at shell beaches, providing mud berms which could feed the mudflats and increase their height, looking at ways in which we could provide more natural materials which would react dynamically to sea level rise which could also adapt to changes in environmental conditions.

So we had a number of alternatives to this gradual steepening adaptation strategy. We understand how they may work in terms of the natural system but we also understand that these are new ideas for the Bay which will require a lot of discussion about how we could actually implement such a thing as this.

Our next steps are to look at the vulnerabilities of these different functions in much greater detail. And particularly we're looking at the infrastructure.

We want to understand what levels of sea level rise is the infrastructure vulnerable to and when. How much is it going to cost?

So then we can provide a timeline to each of the utilities, each of the different facilities or when they're likely to have to spend money and how much so they can incorporate that into their capital planning and avoid these damages rather than trying to come up with a way to protect.

We're also looking at the different ways of vulnerability of the ecological system. And

then we're coming up with an adaptation strategy.

The adaptation strategy may take several decades. It may take 50 years or so to come into fruition. It may be an ongoing process.

We are also understanding the interim management. Do we need to maintain the functions and facilities of this shoreline now as well as into the future?

We come up with next steps for understanding the environmental assessment and looking for funding, and also for the permitting process.

Mike Anderson will speak about the immediate next steps.

Mike Anderson made the following presentation: We would like to expand the plan to include the area from San Leandro with Hayward and from the Port of Oakland all the way down to the San Mateo Bridge. It's a very logical area.

We also have created a resolution cooperation to mitigate sea level rise that we are now distributing to the different agencies in the area that are affected hoping that they will pass this.

HASPA looks like the logical place for this work to begin. A JPA format makes a lot of sense for this kind of effort.

BCDC has a big role in this. It was your maps that originally triggered the whole concern about inundation.

When we start looking at possible solutions we find ourselves looking at many things that will run afoul of current best practices that relate to filling the Bay or actually changing the Bay Shoreline.

The hope is that BCDC will be able to direct staff to be open and ready to look at this as well as other sites that may need that kind of adaptation of your own regulations.

We'll be talking to the Regional Water Control Board, the Army Corps of Engineers, Fish and Game, Fish and Wildlife because they all have an interest on what there is to protect out there.

The key piece is that the sea level rise question is challenging all of our past paradigms. We really need to start thinking in a much more different way and also in a more cooperative way.

Hopefully you can support us in effort in the future.

Commissioner Carruthers commented: This is a fantastic presentation. I'm not clear which agencies are participating in HASPA and what's the geographic scope that HASPA represents.

Mr. Anderson responded: HASPA is the Hayward Shoreline Area Planning Agency and it involves the East Bay Regional Park District, the Hayward Area Recreation and Park District and the city of Hayward.

Commissioner Carruthers stated: So it's not San Leandro jurisdiction. Are there other projects like this underway?

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Mr. Lowe replied: We think this is actually one of the first times that a group has gotten together to look at sea level rise.

The other sea level projects around the Bay are mainly for a particular sector or particular city. This is the first time where we've got a piece of shoreline where the different groups who have an interest in that are working together.

Commissioner Carruthers added: I will be talking to the people at the Water District about your work so I would appreciate your cards.

Commissioner Nelson commented: I have a question about different adaptation strategies. I wonder if you were thinking about either the range of sea level rise for which these adaptation strategies would be most effective or the rates of rise for which they might be effective.

It seems to me that they might not all be effective at the higher end of sea level rise or natural marsh accretion might be more of a challenge if the rates are more rapid.

Did you evaluate the differential effect of this on those adaptation strategies?

Mr. Lowe answered: Well certainly the 16 inches by 2050 and 55 inches by 21 hundred certainly concentrates the mind.

Certainly this leading towards a more brackish marsh is an understanding that the existing tidal marshes that we have at the moment is that it is not a sufficient sediment supply.

If there's not sufficient sediment supply to the marshes, there's not sufficient organic material supply then those are going to start to drown.

And if they start to drown we're going to have the shoreline moving landward and because our structures are built in fixed places we're going to have a lot of problems.

So in looking at adaptation strategies which provided marshes more organic material and we could make more use of the sediment we have, we could accommodate higher rates of sediment rise.

These are just projections that we have. And we really don't know what those rates of change are going to be.

With marshes the advantage to them is they do have a natural system of maintaining their levels. If we provide sufficient organic material, if we provide sufficient sediment they should be able to start looking after themselves.

A small change in sea level rise is going to have a large change horizontally. So we can only buy a certain amount of time and be right up against urban areas and levees.

What we're looking for is to try and steepen the shoreline gradually and make it a more self-adapting system.

Commissioner added: I find this fascinating. I agree with you that we can't continue to look at things that are changing in the way that we've looked at things in the past.

The Audubon Society has looked at the historic amount of beaches in the Bay so engaging them actively would be a very good idea for HASPA.

Mr. Lowe responded: We have been engaged with them on several projects around the Bay and we think these things are in sync with historically what was out there and also into the future.

Commissioner Lai-Bitker stated: I also want to applaud the effort. It's wonderful to learn about some of these adaptation ideas.

In terms of your expanded scope of the Master Plan Area I think it is a real good idea. I will talk to our county staff and the Flood Control District about being part of this process.

Mr. Lowe answered her: That's exactly from the physical process point of view it makes sense regionally and getting cooperation between groups makes sense as well.

Commissioner Carruthers had a question for the staff: Is the work that is being done for the Delta addressing the issues of sedimentation deposits in the Bay or just simply water?

Mr. LaClair responded by saying: I know that there's some study of sediment transport. I don't know that there's any work on sediment on the policy side in the Delta.

Ms. Johnck addressed the Commission as follows: I was catalyzed by the question pertaining to the Delta. I have been involved in a program called The Long-Term Management Strategy for Dredged Material Relocation and Placement in the Delta which is really the LTMS for the Delta and we are coordinating that in conjunction with looking at the Department of Water Resources and Army Corps of Engineers program for levee stability as we go along.

We will be working with the Delta Conservancy and Joe with his role in representing BCDC.

Executive Director Travis commented: This presentation is way cool. It's sensational, what they're doing.

I would remind you that we have 55 local governments bordering the Bay.

And we'll also be bringing back to you, we hope, at the next meeting the Revised Bay Plan Policy. So we're trying to put all of this into a regional context.

What they're doing in Hayward is really wonderful for the shoreline they have in Hayward. The approach that they're doing there wouldn't work in San Francisco.

The biggest challenge we face is that the whole body of our regulatory structure is crafted based on a certainty that this is the edge of the Bay. This is the Bay. This is the shoreline. This is the property line.

And when we talk to the engineers and we say, we're going to have sea level rise, and they say, well just tell us how much and how high and when. And the answer is, we don't know.

So trying to develop a regulatory process, a planning process that, in effect, embraces uncertainty is an incredible intellectual challenge.

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And we are trying to meet that challenge and provide a body of policies in assisting local governments in the Bay area in meeting this challenge.

Commissioner McGlashan asked Executive Director Travis the following: Have you been tracking at all the update from the IPCC about the adjustments to their estimates for sea level rise on the basis of different tidal responses to the melting?

Executive Director Travis said: I think it's important to recognize that the IPCC is an international consensus of science.

In order to get from the studies in science through the research, the publication, the peer review and that consensus takes years.

So the IPCC is always way behind in terms of what the real system is.

We have two systems going here that go real slow.

One is the scientific consensus and the other is the politics of change.

And in the middle is the natural system that we are affecting unnaturally and it's spinning largely out of control and those other two aren't responding.

So that's why we are working and California has been working, the Governor has through an Executive Order and a contract has the National Research Council developing scenarios for California that are much more robust and more regionalized.

So we're looking at trying to get that information much more quickly than the IPCC. The only thing we're absolutely certain about on sea level rise projections is whichever one you choose, it's going to be wrong.

The other thing that seems to be certain is whichever one you choose, just wait a little bit and it'll get higher because they just keep rising up.

I found Dr. Cohen's presentation so compelling both because it's very interesting from a scientific perspective and his telling of the story is much like a murder mystery.

I hope that you will find this as enjoyable and compelling as I did.

12. Briefing on Bay Oysters. Dr. Cohen gave the following presentation: My research background in the Bay is mostly in exotic species. I have a longstanding interest in the history of the Bay.

So the story of native oysters in the San Francisco Bay is well known, the overall story.

They were hugely abundant at the time of European contact.

They were consumed in great numbers by Native Americans who left their shells filling the shell mounds and shell middens around the Bay.

They were initially harvested by the colonists in the early years who eventually did in the native oysters by a combination of over-harvesting, pollution and the smothering of oyster beds by sediment washing down from hydraulic mining in the Sierra Nevada.

So the oysters declined and disappeared as described in this agency briefing document. And that change in the Bay had substantial impacts on the Bay as described in this document worded as, "a cascading and sometimes catastrophic impact on habitats including associated habitats in San Francisco Bay, effects on water quality and multiple impacts on benthic and pelagic species that had relied on these habitats."

In 1999 headlines appeared in The San Francisco Chronicle announcing that the oysters were back.

As a result of this NOAA granted the first oyster restoration grant in San Francisco Bay. And over the years there have been a couple of million dollars put into restoration from state and federal agencies in San Francisco Bay to do research on the restoration of oysters to start up projects on the restoration of oysters.

In summary, the story of native oysters in San Francisco Bay is that they were abundant from in the 1700s and the early 1800s at the time of first contact, the early colonial period.

They then declined from a combination of over-harvesting, pollution and hydraulic mining debris. They were gone or essentially gone from the Bay for a long period of time.

They were re-discovered in the Bay in the late 1990s and we have subsequently been working on restoring them.

There were a couple of things about this history that didn't quite fit right.

The main part was this more recent history about their disappearance and then their re-discovery in the late 1990's.

In the early 1990's, I organized a number of surveys for exotic species bringing taxonomic experts from around the world to go around the Bay.

In the part of the Bay that has salinity appropriate for native oysters, we found native oysters everywhere. This is between 1993 and 1997, a period of six years before the Chronicle announced that they had been re-discovered by two fisheries biologists.

We found them in between 60 and 80 percent of the sites in common at some of those sites.

So clearly they weren't first re-discovered in 1999. It's possible that we were the re-discoverers but we hadn't realized that they were gone.

I looked at studies going backwards from our surveys, all the way back to the first benthic survey in San Francisco Bay which was the U.S. Albatross Survey in 1911, 1912. And in every year in which we had surveyed in the Bay people found native oysters usually at multiple sites.

Not abundant, but present and able to be found persisting in San Francisco Bay over the entire time.

So clearly there was no disappearance of oysters from the Bay and therefore no re-

discovery in the late 1999 no matter what The Chronicle headlines said.

And so that part of our history just wasn't right.

There was another part that I had some questions about as well. And that had to do with the explanations given for their decline.

In the literature that I had read these different factors were put forward as why the oysters had declined but there were never any citations to any studies, never any evidence or data given.

When pollution was listed there was never any statement about what type of pollution or what the source of pollution was. It was just, pollution.

That sounded kind of suspicious to me so I started thinking about and trying to figure out what of these three factors could have led to the decimation of a native oyster during the time when they supposedly did so.

So this would be the period between 1769 when the Bay was discovered, and 1912 when the Albatross Survey documented that they weren't abundant in the Bay.

And I found it useful to think of this in two time periods between the discovery of the Bay and the Gold Rush around 1850 and from the Gold Rush to the early 1900s.

Looking at that first period and focusing on mining debris as the possible cause it seems unlikely that mining debris could have gotten rid of the oysters before 1850 partly because we really didn't start mining until 1849. And it really didn't get going until the years after that.

And hydraulic mining, the source of the main debris didn't start until 1864 so there was no way sediment from those mining activities could have eliminated oysters before 1850.

But what about over-harvesting and pollution?

The city of San Francisco was known as Yerba Buena in 1849. There aren't a lot of buildings shown on this map of the time. It shows a very small sleepy town.

During this period and throughout all of the 1800s the colonial Caucasian population of the Bay Area more than half of the people lived in San Francisco.

This is not a population that could have depleted a major resource in the Bay by over-harvesting or by pollution. There simply were not enough people.

Over most of this period there were less than 1,000 people living in San Francisco, meaning less than 2,000 people living in the entire Bay Area.

And when you take into account the fact that the Native American population of the time of contact was estimated at 25,000 individuals and that population was decimated by disease and other factors over this period.

There are probably fewer people living in the Bay Area over most of this period than there had been before it was discovered in 1769.

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It seems very unlikely that a major resource in San Francisco Bay could have been depleted by the action of people over this period before 1850.

After 1850 we have more information on what's going on in the Bay Area. There was a wealth of information after this date.

Some of the important events that occurred during this period relative to this talk:

We're looking, again, at mining for the first part. The hydraulic mining started in 1864. It was banned in 1884 because the sediment was filling up the rivers and the navigational channels.

And the peak of flow of sediment into San Francisco Bay was estimated as being in the 1890s. It's a little late for having eliminated oysters during this period.

But more telling than the timing is the geography of it. The sediment that came down from the Sierra Nevada went into the upper part of the Bay, into Suisun Bay and San Pablo Bay.

There was virtually no change in South Bay and the loss of sediment in the Central Bay over this period. Central Bay and South Bay by salinity are the best places for native oysters to grow or to have grown.

Mining debris coming down that might have eliminated oysters in the very northern part of the Bay but it couldn't have eliminated them by smothering and burying in the southern and central part of the Bay because sediment simply wasn't accumulating there.

An important element of the so-called over-harvesting and pollution is immediately with the start of the Gold Rush we started importing oysters.

The first imports of oysters were the native species *Ostrea Lurida* but we were importing them from Washington State, primarily from Shoal Water Bay. This started in 1851 and there was an active culture of oysters in San Francisco Bay over that entire period.

In 1869 we began bringing oysters from Virginia and then we were growing two non-native species of oysters for market in San Francisco and California.

And all of the records we have on harvesting and consumption and marketing over that period indicates that this aquaculture of oysters brought in from elsewhere was the source of oysters that were eaten in the San Francisco Bay Area and generally.

We have not found any records of anyone actually harvesting native beds of oysters during this period.

There seems to be no evidence for anything that would even come close to a level of over-harvesting that would eliminate a native resource.

There is also a geographic signature that we looked for. Where we had seen impacts on resources from over-harvesting or from pollution it doesn't happen everywhere all at once.

The effect is greater where the impact is greatest and then it spreads out from there.

And so on this map in San Francisco Bay in 1890 and 1891 you'll note that there are two urbanized areas on the Bay, one large one in San Francisco and one over in Oakland.

And if either over-harvesting or pollution had been the cause of the demise of the oysters we would have expected to see the impacts on the beds nearer these urban areas first and then spreading through the Bay and finally spreading throughout the Bay. But, in fact, there is no record of anything like this.

What there is, is ultimately at some point we have records saying, the oysters aren't common. And that's really all we have.

And so, again, this doesn't seem to fit with either of these being the cause of the loss of oysters in San Francisco Bay. So another piece of our commonly understood history of the Bay seems to not be correct.

But if it wasn't over-harvesting or pollution or mining sediment that caused the loss of the oysters in San Francisco Bay then what was it?

As an exotic species specialist, I naturally thought that it might be an exotic species problem. I began looking into that. I thought it might be possible that some oyster disease might have been brought in with these oysters from elsewhere and that was the cause and we hadn't recognized it.

Eventually, something else occurred to me. I began to wonder, is it possible that the oysters were never abundant in the first place?

And these are the kinds of things that we would look for as evidence of past abundance. We would look for contemporary observations of oyster beds.

Did explorers or early settlers or anyone describe abundant oyster beds out in San Francisco Bay?

We'd look for harvest records. In Washington State where we know there were native oysters we have records of the harvest of them. Do we have records like that in San Francisco Bay?

If there's a viable resource out there people are going to get in a fight over it. So we looked to the laws and lawsuits for evidence of there being oyster beds in the Bay.

And finally we have physical evidence we look for. We look to the shell middens for evidence that Native Americans were harvesting these at the time of contact and geologic evidence.

We look for shell deposits that can be dated to that early period, the Pre-Colonial Period and see if that tells us about abundance of oysters there.

These are five publications about oysters in California, the historical change.

The two at the bottom in 1881 and 1893 are federal government reports. Three reports are from the 1900s that are Fish and Game published reports.

One was actually a master's thesis, the most recent one that Fish and Game published.

And with the exception of the Skinner Report in 1962 none of these say that oysters were

abundant in San Francisco Bay during the early Colonial Period or at the time of contact.

And none of them have anything to say about harvesting of these oysters out of the Bay despite the fact that in more recent writings that are being referenced for the disappearance of the oysters from the Bay.

The earliest references I could find to oysters being abundant, was in fact, that Skinner Report in 1962 in which he talks about talks about, "prodigious abundance of oysters" back at the time of contact. He provides no reference to go back and investigate and no data to support it.

And the earliest reference I could find to there being any commercial harvest of any significance of native oysters in the Bay was in a 1979 paper, which again, gave no references or evidence to support that statement.

What we do find is a few more references to these things in the 1980s and the 1990s and then starting in 1999 with that Chronicle report and development of restoration activities a large number of references in the literature and government reports, in media reports and elsewhere talking about the abundance of oysters in San Francisco Bay at the time of contact and about the over-harvesting that happened and so on.

So in terms of our literature references this is mostly a phenomenon since we started doing restoration in 1999.

As far as loss, the Thompson Paper of 1893 talked about the loss of existing oysters in different state, Washington and California.

Both Washington and California were culturing oysters and there are laws in both that dealt with cultivated beds of oysters.

In California we had laws about cultivated beds but nothing that dealt with native oyster beds and there have not been any laws on the books at any time as far as we've been able to tell.

As far as the physical evidence there are some photographs of shell mounds that existed around the Bay.

There are many recent reports that make reference to the abundant oysters in these mounds as evidence that Native Americans had harvested them.

As in turns out, most of these shell mounds have very few oysters in them. The shell material in them is mostly clams and mussels as has been well documented.

There are a couple of mounds in the central part of the Bay which do have oysters in them, most notably, the Emeryville Shell Mound shown here and the West Berkeley Shell Mound which persisted behind factory buildings in Berkeley until the 1950s.

These large mounds were investigated more carefully than some of the others. Vertical samples were taken and the shells identified and changes in shell type are documented to try to understand changes in the ecosystem or in the harvest of these shell fish by Native Americans.

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And in all of these mounds where this work has been done oysters are very, very abundant in the bottom of the mounds.

And then you get to a point where oysters essentially disappear and are rare thereafter and it's almost all clams and mussels.

And when these have been dated with radio-carbon dating we find that the transition occurs between 2,000 and 23 hundred years ago, around the time of Christ or earlier.

There is also geologic evidence. In the North Bay there are some beds in the outcropping on Rodeo or Mare Island, beds of native oysters.

Those beds are clearly Pleistocene in age. They date from the last inter-glacial period. So they're 100 or 120,000 years old. So they don't shed much light on the condition at the time of European contact.

In the South Bay there are more recent beds that are since the last glacial period. The radio-carbon dates show that the older bed is about 6,000 years old. The upper bed dates to 23 hundred to 24 hundred years old.

So dates, which again, tend to agree with the dates from the shell mounds.

There is one other study from up near Oyster Point down there at the San Mateo Bridge. And there the transition from oysters to clams and mussels was dated at about 2,000 years. So, again, agreeing broadly with the data from the shell mound data.

Native oysters were very abundant at some times, a couple of periods, at least, in the last 10,000 years but they have basically not been anymore abundant than we see them today for 2,000 to 24 hundred years and no evidence that they were abundant at the time of European contact.

This seems to have some implications for our restoration plans and our existing restoration programs in San Francisco Bay and I thank you for listening.

I'd be happy to answer any questions.

Commissioner Carruthers asked: Well, just what are the implications?

Dr. Cohen answered: Well I've had difficult conversations with some of the people and agencies who have been involved with these programs and they clearly don't see the implications the same way I do.

And so it seems to me that if the oysters were not here initially then this isn't a restoration program. You can define restoration so that it includes almost anything but as the public understands it, it's not a restoration program if they weren't here and if we're not undoing something that we've done to the environment.

And so it seems to me that the conversation that the agencies and the scientists and the media have been having with the public about what we've been doing in the Bay for the last 10 or 11 years needs to be reset.

If we're going to put oyster beds in the Bay it's not restoration. It's because for other

reasons we think they should be there.

But that's something very different from what we've been doing in the Bay to date. And I don't know whether there would be support for that or not but I think one needs to be blunt about what we've been telling the public for 10 years is wrong.

And if we think we should go forward with creating oyster beds in the Bay that's a very different conversation to have.

And people are understandably reluctant to let go of programs that they've been working on for 10 years and understandably reluctant to say, we got it wrong.

If what I've presented to you is correct and it should certainly be checked out. This is just my research. But if it's correct then it seems to me that is the implication.

Executive Director Travis added: Let me try to help you frame the debate on this a little bit because I find it interesting.

I've summarized Andy's presentation as, did the butler kill the guy and hide the body? And the answer is, no. The butler didn't do it because nobody hid the body because the guy was never around.

And I've also taken issue increasingly with the word, "restoration" because with climate change or one of those other things we know is that whatever the future is going to look like, it's not going to look like what the past looked like.

So what we need to be doing in our adaptation techniques is trying to anticipate these changes and put conditions in place that respond the way we want to the changes in the climate or of the future.

That's not restoration. We can't go back to the past. We shouldn't be trying to do so.

But we can enhance the Bay. And one of the things that oysters, native or otherwise, do, is they are an incredibly rich source of habitat and food for other species.

So even if they weren't here it might be a good idea to try to not restore them to the way they were but to enhance the volume, the number of them, so it could fix habitat for something else.

Commissioner McGrath commented: Andy, this is fascinating stuff and what I didn't get in your presentation was a geologic context.

Roughly 20,000 years ago, San Francisco Bay was still a river valley. And approximately 8,000 years ago the advancing ocean came into the Bay.

So what is your thinking about what may have been a precipitous cause for it to be relatively abundant as this transgression was going on and then stopped?

Dr. Cohen replied: Obvious explanations don't seem to hold up. There is a climate transition that various researchers talk about around 2,000 to 3,000 years ago.

The shift was from a wetter, cooler period to a dryer and warmer period.

And our understanding of oyster ecology in the Bay is that one of the limiting factors on them is too much fresh water coming down or hurting oyster beds and dumping sediment on the oyster beds periodically was a problem.

So a shift to a presumably more stable and saltier Bay should have been good for the oysters but, in fact, that's when we see them disappearing.

I've got some wild thoughts about that but I've done enough wild thoughts for the day.

Commissioner Jordan-Hallinan commented: This kind of reminds me of when I read stuff in the newspaper about investments. I call it investment pornography. You're not supposed to believe everything you read. This would be ecological pornography meant to be titillating, not true.

I have two questions. One was that you mentioned a couple of studies and a couple million dollars. I'm wondering, where were those million dollars coming from? Whose money is that?

And then just out of curiosity also, is there some benefit? I don't want to eat oysters out of the Bay; maybe some people would, but is there something else that they could do that would improve the Bay just like kind of a vacuum cleaner I guess.

Dr. Cohen answered: The couple of million dollars is my guess so don't pin anything on that particular number.

My understanding is that most of that money has come from NOAA or from the State Coastal Conservancy although there have been other contributors, either in-kind contributors or cash contributors of a wide variety.

There has also been a lot of volunteer work by the public on these projects. Many of them are run by environmental organizations who believe strongly in them. So it's a grand group of people.

The question about, what good are the oysters? Although Will Travis alluded to them as being an abundant resource and so on for things in the Bay and a lot of help, the actual data on them being of value to us given the current state of the Bay is strikingly weak.

And increasingly, even the scientists working on this project are hedging their phrasing on this. There are claims that they will improve the water quality of the Bay by filtering the Bay but, in fact, we have a big problem where it's perceived that we have a major problem because of too much filtering by bi-valves in the Bay because of exotic bi-valves, the Asian or Overbite Clam in the northern part of the Bay and so on.

And so it's not exactly clear why in that context increasing the amount of bi-valve filtering would be good for the Bay.

This is an oyster reef. There have been efforts to produce something that mimics an oyster reef in San Francisco Bay by using dried, Japanese oyster shells in bags and piling them

up in three-dimensional structures, pyramids and so on.

And a lot of restoration work has been around this. The problem is that Virginia Oysters live on built up reefs or Eastern Oysters which form three-dimensional reefs. These reefs are six to 10 feet high in some cases.

Our native oysters don't form reefs like this. The native beds were probably one, maybe two, maybe three shells thick if there was a really big settlement but mostly it's a mono-level of shells either on soft sediments or, more often, on gravel beds at the mouths of rivers.

That is a very different kind of habitat. And so in the Bay we've had some studies where these three-dimensional structures have been built up and people observe, usually anecdotally, more fish around them.

And then this has been claimed as a benefit of the native oyster reef. But if there were piles of debris or piles of shopping carts or piles of rocks or piles of car batteries leaking lead, fish would still cluster around them because fish are attracted to three-dimensional structures.

The native oyster itself has nothing to do with that structure.

So there is this pattern of claiming benefits for the oyster for which a careful scientific review would, say, well, maybe not.

Commissioner Gioia commented: Interesting presentation Andy, and you raise a challenge to the whole policy that has been followed recently which is to try to restore, quote, native oysters.

I know there's a lot of non-profits and agencies who have an interest in saying, well the research shows that they were here and therefore the policy should be to restore them.

And clearly it gets to the issue, what should the policy be if the science is in doubt?

Or if eventually it's conclusive that they were not here except 2,000 years ago then it drives what our policy discussions would be today about what really restoration is.

And if you want to introduce oysters then the question becomes, are there other values or other reasons to do that other than just restoration?

This sort of puts the burden on offering another reason to do it, if indeed there is another reason.

What are you finding the reactions are from the agencies or organizations involved in this work?

Dr. Cohen answered: I don't think I feel comfortable characterizing their response. I think they're going to have to respond for themselves.

It hasn't been, we need to run out there and tell the public that we're wrong and we need to restart the conversation which in my view that needs to be done.

But these are well-meaning, sincere people who are enthusiastic about a program that they believe is going to bring major benefits to the Bay.

And I think they're going to have to figure out how to deal with this.

Commissioner Gioia asked: What science are they arguing exists or what research or data exists to reach a different conclusion? Or are they pointing to anything?

Dr. Cohen replied: Well, I heard from one of the major scientists working on this after I first gave this talk in 2007 to the Oyster Restoration Workshop that was held in San Francisco Bay.

There wasn't any follow up I guess I would say.

I was hoping that there would be some enthusiasm for funding research into the history of these oysters. Well that never happened.

I ended up putting this story together a little more fully this spring when I was asked to talk at the same public seminar that Will Travis was asked to speak at that was about, learning from the past, looking to the future.

Since I've been giving this talk I heard from one of the main scientists. He insisted that he remembered a reference in one of these publications to there being harvest of native oysters in San Francisco Bay in the early Colonial years that I had missed that.

And this was months ago and I said, great, can you tell me where that is?

And it's been silence since.

And so this is sort of typical of the kind of response that there's been. It's been, I'm sure it's out there. I'm sure there's evidence out there but so far, as I said, three years since I first raised it and I haven't yet seen any contemporary reference, any other kind of evidence that they were abundant back then.

There is one other thing that I want to say because I gave an incomplete answer before about the implications.

Besides the prescriptive implications, the what should we do, what should our policy be?

There is also an implication about what we're capable of doing. What we have to come to grips with is that the Bay has not been a suitable environment for abundant oyster beds for at least 2,000 years.

And if that's the case why do we think we can make it a suitable environment for oysters? And what would we have to do, how much would we have to change the Bay environment in order to achieve that and is that something we're willing to do?

And I think those become the research questions then if you decide you want to go forward. And it's not clear that we could even do it or that it would be worth the cost of changing the Bay.

Part of doing this research is so we understand the Bay better. And if the my findings are true then we need to think about the Bay as a place which has not been a suitable habitat for abundant native oysters, they've always been here, but they've not been abundant for the past

2,000 years at least.

Commissioner Nelson added: Well, I had three questions when I started and I think I'm down to one.

Three questions occurred to me. What happened 3,000 years ago and you haven't figured that one out.

The second question is, does this mean there are ongoing conditions in the Bay that mean that restoration is an extremely difficult challenge today?

Even if we decide that restoration of oysters is the right policy objective are there factors in the Bay that are going to make that a very difficult thing to do?

This certainly runs counter to the common wisdom that I've received for 25 years.

Have you forced the scientific community to respond to your analysis? Have you submitted this for a peer review to sort of test the theory and see if anyone can find those footnotes that others think are out there?

Dr. Cohen answered: Well I think I have challenged the scientific community that's working on this issue in San Francisco Bay. They were all at the meeting in 2007 and they certainly know about this issue by this point.

I do plan, when I find the time, to write this up and publish it. If it's wrong, I was hoping to hear some of the contrary evidence before I rushed to publication and that was part of the reason for giving these presentations.

Commissioner Ziegler asked: Has there been any work in terms of identifying that what exists as native oysters actually are native oysters or has there been any genetic analysis? Are these, in fact, native oysters?

Dr. Cohen responded: These are a native species of oysters that we find regularly when we go out looking for them in San Francisco Bay and they're found up and down the Pacific Coast.

The question of nativity in the San Francisco Bay is an interesting one because recall that we were bringing in oysters from Willopah Bay, Washington from 1851 to the late 1800s and rearing them in large numbers in San Francisco Bay.

So genetically what we have in San Francisco Bay may be a hybrid of what was in Willopah Bay and what was in San Francisco Bay.

I don't know if genetic analysis is up to answering that question. We moved a lot of oysters around the coast and so we don't have a background read on what the distribution of genes was up and down the coast.

Commissioner McGrath commented: This is interesting in the context of the question that Ellen Johnck raised at the beginning of public comment which is the appropriateness of public review and possibly a public hearing on the Subtidal Goals Project.

It has two crucial elements. One is the expansion of eel grass and the other is the expansion of oyster habitat.

At some stage some finished product is going to form a template for how we might want to try to restore the Bay, gain resources. But we're also facing a changing world where the Bay's sediment environment is dropping dramatically.

My question to the Executive Director is, what's next to have the kinds of discussions across these with different parties. I certainly think it's a very important idea to develop a blueprint for what we want to accomplish.

I also think that the public review process and the comments of this Commission are probably an important piece of that.

Executive Director Travis responded: Well the Subtidal Habitats Goals Project is going to continue.

I think it's really important to understand that the critiques that have been offered of it are entirely justified because it is not intended to be a balancing process.

It is to offer, based on good, solid science, some recommendations for management if your goal is solely to preserve, protect and increase the natural resource.

What you do when you do Bay Plan amendments is you balance that with other uses of the Bay.

So the work that is coming out of Subtidal Habitats Goals is going to be extremely valuable to us and to other agencies but it's just a portion of what needs to be done before we develop management policies.

Commissioner McGrath replied: I'm sorry Trav. I didn't really make myself clear.

One of the difficulties is in what Dr. Cohen suggested, what can we do to the degree that we're working on something which is intended as a set of goals it has to be reworded in what we can do and what's the best way to spend public or private resources to try to get there?

That's the sense in which a broader public review may be appropriate, not in the sense that it's appropriate to have a set of lofty goals. I certainly agree with that.

But in terms of how we set our priorities in moving in that direction we want to make sure that we're not doing something that's already happening because of other changes such as the lowering of suspended sediment levels and that we're chasing something that we might actually be able to catch in terms of the bi-valve system or what kind of system is actually going to be practical in San Francisco Bay?

Executive Director Travis responded: Well, again, as was mentioned, there has been a great opportunity for the public to comment. I do sit on the Executive Team of the Habitats Goals Project and we will redouble our efforts to make sure that there is public review.

The question is, what do you do with all of that information and how is it vetted and

who makes the decisions?

I don't think it would be appropriate for BCDC to take on the role of developing the subtidal habitat goals by ourselves or as the policy making body.

Ms. Caitlin Sweeney stated: If I might add that Travis mentioned earlier that you will receive a briefing on the project and the Subtidal Goals Project is scheduled for September.

We also have the Subtidal Goals Project Manager here in the audience if you care to ask her any questions.

The objectives of the Goals Project are to achieve a net increase in ecosystem functions starting from today.

So Andy's points are quite interesting and are definitely taken into account when thinking about how to frame that in the sense that we are seeing that there are potential benefits to oysters from here on out; functions that we think are of benefit to the Bay but we need to learn more.

So we have science goals in there about what are those functions. Are they really achievable? Are we looking at the correct objectives for the Bay?

And then too it sets out a phased approach for restoration or a creation or enhancement of oysters that really is a step wise approach.

We do a little bit, we learn. We decide whether or not we want to do a little bit more.

So I would urge you to keep that frame of reference in mind when you review the document and your comments will be most helpful.

MOTION: Commissioner Carruthers made a motion to adjourn into committee, seconded by Commissioner Nelson. The motion passed unanimously by voice vote.

Commissioner McGlashan commented: I think the last couple of comments are very germane and based on what I've heard today I would very much like to consider having the Commission make some sort of comment for increased scrutiny of some of these basic assumptions we make.

The Regional Water Quality Control Board has changed its regulatory requirements based on the need to restore water quality to the level of oyster restoration.

And the Richardson's Bay Regional Agency had to go through a fairly extensive increase in testing costs and analytical processes and there's this thorny issue of dealing with the local governments who now have a much tighter bogey on storm water runoff with the intention of increasing water quality such that oysters can be restored.

It may be moot as the Executive Director mentions because we probably want to do these things anyway. But I think why we're doing them still matters.

And so as we go through the Subtidal Goals Report I would want to explicitly discuss the working assumptions that more bi-valve activity is actually good for the Bay before we use that as the basic framework that costs local governments lots of money.

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And I know that when I give my report back to the RBRA this is actually going to be a very controversial thing to bring up.

I think it matters and I think Dr. Cohen has given us a good example of the dangers of assuming that the intended outcomes are actually the right ones.

And so I think when we get the Subtidal Goals Report I would love some comments from us ending up on the record to make sure that we are always vigilant about the scientific approaches we use and therefore the way we frame policy objectives in whichever agency is doing that.

And I can tell you that the Regional Water Quality Control Board's decisions to increase water quality standards in this exact regard are having significant effects up in Marin County.

Commissioner Carruthers added: I want to support Commissioner McGlashan's comments in that regard.

For my own part, I'm as comfortable with the idea of enhanced re-promotion as I am with restoration whether they were there before or not is not as important as, are they beneficial?

Will they have a beneficial effect on the Bay in terms of water quality or in terms of quality of life by being able to eat them at the Ferry Building or do they place somewhere in the adaptation to sea level rise in mitigating the impacts of water movement on the shoreline and stabilization of this moving shoreline.

The other thing is I'd like to know that it's feasible. How is the Bay, either presently or becoming similar or different to the other areas along the Pacific Coast where the oysters are more prevalent?

I'd like to know, when they're in place and flourishing, what are they like physically as compared to the Virginia Shoals?

There are a lot of questions to be answered. And I don't care whether we call it restoration or promotion or enhancement or whatever.

Dr. Cohen added: Two things. One is about this issue if it doesn't matter whether we're restoring or not restoring and I think people can take different views on it.

My perspective is the public does care about how the Bay was and does have an interest, in as far as possible, having it look like it does.

Economists tell us that what's valuable is what people value. That's the basis of our monetary valuations and everything else.

And if it is true that a large part of the public would like us as one of our goals to try and make the Bay, to the extent that it is possible given changing conditions and all the rest, to have the Bay resemble the way it was before we started colonizing it then there's value in that and it has to be weighed against all these other values.

I make this comment tentatively and hesitantly because I haven't done much work on it, but I feel that I'd be remiss if I didn't mention it. Jim McGrath mentioned the eel grass restoration efforts.

In many regards the story with the eel grass resembles the story I just told you about oysters. There's no evidence that eel grass was more abundant in the Bay in the past than it is today.

The last several decades of studies indicate that it's been increasing radically in recent decades anyway. So it may be at its most abundant today.

Again, there are many different reasons for doing it. And if we assume that eel grass was much more abundant in the past then it doesn't seem to me we have a believable story about what we did to reduce it. We don't understand that at all.

We have less data about eel grass in the past than we do about oysters in the past for various reasons.

And this may be true of other restoration proposals. This aspect of questioning assumptions which is always valid as a scientist is important.

Always ask for what the evidence is. Where is the data? It all applies to other programs as well.

And although I know most of you are focused on the Bay the oyster questions for the Bay probably are valid questions for, at least, some other estuaries and bays in California and along the Pacific Coast.

Ms. Marilyn Latta commented: I'm the Project Manager for the Subtidal Habitat Goals Project. This is an inter-agency effort between Coastal Conservancy, BCDC, NOAA and the San Francisco Estuary Partnership.

I certainly agree with Andy. And our report agrees that there are multiple data gaps in terms of the historic distributions of native oysters.

We know that there's somewhere around 60 million cubic yards of fossilized oyster shells in the Bay.

So we do agree that they were abundant at some point and the reason for changes for distribution over time is not clear.

There are about 75 stakeholders that have participated in our process including multiple scientists that participate in the West Coast Native Oyster Working Group and a local Native Oyster Working Group.

And all of these folks have contributed to the Plan. There is a consultant report done by U.C. Davis that clearly outlines many of the points and many of the papers that Dr. Cohen presented here.

But I encourage you to read that. It's a great summary of what we do and don't know

about the history of oysters and then the value of what we see in terms of ecosystem services moving forward.

Many of these services have been well documented in other areas of the West Coast and not well documented here. So we recognize more work needs to be done and I just want to follow up on Caitlin's good comment that we're recommending a phased approach.

This starts with shoreline surveys and it goes up to simple monitoring studies to see what factors are influencing oysters and then moving up from there.

The last point I'd like to make is that there is one major native oyster project in the Bay and a second one just went in at the Berkeley Marina.

And the Coastal Conservancy has funded monitoring and research so far.

13. **Consideration of Strategic Plan Status Report.** Executive Director Travis commented: In the monthly report we note that there's one change needed in one of the deadlines and I would appreciate a motion, a second and approval of that.

MOTION: Commissioner Carrillo moved, seconded by Commissioner Reagan, the motion passed unanimously by voice vote.

14. **New Business.** There was no old business.

15. **Old Business.** There was no old business.

16. **Adjournment.** Acting Chair Goldzband entertained a motion to adjourn. Upon motion by Commissioner Carrillo, seconded by Commissioner Jordan Hallinan, the meeting adjourned at 3:20 p.m.

Respectfully submitted,

WILL TRAVIS
Executive Director

Approved, with no corrections, at the
San Francisco Bay Conservation and
Development Commission Meeting
of September 2, 2010

R. SEAN RANDOLPH, Chair

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