CALIFORNIA COASTAL COMMISSION

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April 6, 2009

San Diego Regional Water Quality Control Board Dr. Richard Wright, Chair, and Board Members 9174 Sky Park Court, Suite 100 San Diego, California, 92123

RE: Comments on Tentative Order R9-2009-0038 – Poseidon Resources Corporation

VIA FACSIMILE 858-571-6972 / EMAIL RB9agenda@waterboards.ca.gov

Dear Dr. Wright and Members of the Board:

Thank you for the opportunity to comment on the above-referenced proposed Order and Poseidon's proposed <u>Flow</u>, <u>Entrainment and Impingement Minimization Plan</u> (the Plan). The Order and Plan are meant to address marine life impacts caused by Poseidon's proposed desalination facility in Carlsbad (the Project). The Project would use seawater drawn from an existing intake and discharge system at the Encina Power Station (EPS) to produce up to 50 million gallons per day of replacement water supply to local water agencies. We understand the Regional Board will be reviewing this Order and Plan at its April 8th hearing.

As you know, the Coastal Commission approved a plan similar to the one now before the Board. The comments herein are meant to help the Board determine whether the order and plan it might approve are compatible with the plan approved by the Commission, and to facilitate ongoing coordination between the applicant and the two agencies. We understand that your staff has been working with Poseidon to modify an earlier version of the Plan (from March 9, 2009) in part to make it more consistent with the plan the Commission approved.

Our comments are based on our review of a number of documents posted on the Board's website, including the March 27, 2009 redline/strikethrough version of the Plan, the March 27, 2009 Staff Report, and the April 1, 2009 Statement of Dr. Peter Raimondi regarding Poseidon's analyses of impingement effects and mitigation. We are providing several comments and recommendations regarding particular elements of the proposed Plan, including:

- 1) Impingement effects and mitigation
- 2) Project-related marine life mortality rate
- 3) Stewardship of Agua Hedionda Lagoon
- 4) Characterization of expected mitigation results
- 5) Timing of Project-related impacts and mitigation
- 6) Site selection

Our comments conclude by concurring with the Board's recognition of the need for ongoing Project review and possible future revision of Project-related requirements.

BACKGROUND

As you may know, the Coastal Commission in November 2007 approved Poseidon's desalination facility with a requirement that Poseidon develop a Marine Life Mitigation Plan (MLMP) for further Commission review and approval. The Commission reviewed the Project's anticipated effects on marine life both as a standalone facility and as operating in conjunction with the adjoining Encina Power Station (EPS). The Commission's mitigation requirement was based largely on Poseidon's reliance on co-location with the EPS intake and on the Project's anticipated entrainment effects during standalone operations when Poseidon would be using up to about 304 million gallons per day (MGD) of seawater from Agua Hedionda Lagoon.

In August 2008, the Commission approved the MLMP. In its approval, the Commission found that mitigation consisting of about 55.4 acres of wetland restoration similar to the habitats found in Agua Hedionda would provide 80% certainty that the project's entrainment impacts would be fully mitigated. It required Poseidon to provide mitigation in two phases – during Phase I, Poseidon is to provide no less than 37 acres of wetland restoration at up to two of eleven sites in Southern California; and during Phase II, Poseidon is to provide an additional 18.4 acres of similar restoration, or may propose alternative mitigation methods. Poseidon may also provide all 55.4 acres of restoration during Phase I. Both mitigation phases – including final site selection, site restoration plans, and other measures – are subject to additional Commission review and approval and will require Poseidon to obtain additional coastal development permits.

The timing of the mitigation phasing is as follows:

- Once Poseidon submits the remaining information needed for the Commission to issue the permit for the Project (as approved in November 2007), it will have up to 10 months from issuance to submit its preliminary proposed Phase I restoration site(s) and restoration plan(s) for Commission review and approval.
- Poseidon will have up to two years from issuance of that Project permit to submit coastal development permit application(s) for its final Phase I site and restoration plan(s). This period is meant to allow time for Poseidon's proposal to undergo CEQA review and for Poseidon to obtain necessary landowner approvals and other permits that may be needed for the restoration work. Once the Commission issues a permit for the Phase I restoration, Poseidon will have up to six months to start site restoration.
- Within five years of issuance of the Phase I permit, Poseidon must submit an application to the Commission for its proposed Phase II mitigation.

COMMENTS AND RECOMMENDATIONS

We have provided below a number of comments on the proposed Plan and Order, with specific recommendations to the Board in **bold text**.

1) IMPINGEMENT EFFECTS AND MITIGATION: Section 5.2 of the proposed Plan includes Poseidon's recent impingement analysis showing the Project would cause greater adverse impingement impacts than had been previously disclosed or evaluated. The Project is now expected to impinge, on average, several hundred fish per day, weighing a total of from about 4.7 to 7.2 kilograms per day. Please note that the Commission in November 2007 had found that the Project's expected impingement impacts would be *de minimis*; however, that finding was based

in part on previous information from Poseidon showing that expected impingement would be several times lower, at 0.96 kilograms per day. The Commission did not have these recently submitted higher figures available to it and the Commission's findings did not consider the resulting higher level of adverse impacts. Section 6 of Poseidon's proposed Plan includes an analysis showing that Poseidon expects its restored wetland acreage to address these more significant impingement impacts by providing adult fish productivity of about 1715 kilograms per year. Similar to the situation above, the Commission did not have this mitigation analysis available to it during its review and made no determination about whether the mitigation it approved would be adequate to address these higher impingement levels. The Commission's mitigation requirement was based on the Project's expected entrainment impacts and on an expectation of *de minimis* impingement impacts of 0.96 kilograms per day.

The Board also has before it an April 1, 2009 Statement from Dr. Peter Raimondi reviewing Poseidon's recent impingement impact and mitigation analyses. Dr. Raimondi's review illustrates a number of concerns and shortcomings in Poseidon's analyses, and suggests that the mitigation needed to address Poseidon's impingement impacts will likely need to be significantly greater than that proposed by Poseidon. Please note that the Commission relied heavily on Dr. Raimondi's expertise to evaluate the adequacy of Poseidon's entrainment study and to assess the level of entrainment mitigation needed for the Project. Several of the mitigation elements the Commission added to Poseidon's initially proposed mitigation plan were based directly on Dr. Raimondi's review and testimony, including the recognition of greater adverse entrainment effects than Poseidon had identified, an increase in the MLMP's total mitigation and level of certainty needed about the success of that mitigation, and the need for the mitigation site(s) to provide habitat similar to the habitat used by the affected species in Agua Hedionda Lagoon. If the Commission were to evaluate this new impingement information from Poseidon, Commission staff would likely ask Dr. Raimondi to provide a similar assessment to assist in the Commission's evaluation.

Given the problems Dr. Raimondi identified in Poseidon's recent impingement analyses and the substantial doubts he raises about the adequacy of Poseidon's impingement impact assessment and proposed mitigation, we recommend the Board not adopt Poseidon's analyses as the basis of a Board decision about the amount of mitigation needed to address the Project's impingement effects. As noted above, Poseidon's recent identification of higher impingement levels may not be consistent with the Commission's de minimis findings and are not included in the Commission's determination of adequate mitigation. We instead recommend the two measures described below to ensure impingement impacts are reduced and to allow consistency with the Commission's findings.

The Commission's findings related to impingement were based both on the expected 0.96 kilogram per day rate and on another aspect of the Project, which may provide the Board a means to condition Poseidon's permit in a manner consistent with the Commission's approval. The Commission determination of *de minimis* impingement impacts relied in part on descriptions from Poseidon and the CEQA lead agency that the Project would operate with intake water flows

Poseidon provided augmented information on this issue in its April 2, 2009 comments to the Board.

of 0.5 feet per second (fps) or less.² This flow velocity is based on guidance developed by the U.S. EPA (as referenced in Poseidon's Plan) that has been used as a standard to reduce impingement rates for all recent entrainment/impingement studies in California. Essentially, the Commission found that it would expect impingement levels to be de minimis when the Project causes impingement of 0.96 kilograms per day or less and operates with velocities at or below 0.5 fps. The Board's March 27, 2009 Staff Report also recognizes the importance of this standard when it suggests that a velocity at or below 0.5 fps at the intake rotating screens would reduce impingement. Your staff also recommends in that report that Poseidon be required to monitor actual impingement resulting from its operations and monitor actual adult fish productivity at its eventual wetland restoration sites. To provide consistency with the Commission's findings, we therefore recommend the Board adopt conditions that require Poseidon to operate at or below the above-referenced flow rate and to monitor its impingement and adult fish productivity. This would retain the reasoning behind the determinations of both the Commission and the CEQA Lead Agency of de minimis impingement impacts and would allow the agencies to determine later whether impingement exceeds the previously allowed 0.96-kilogram level and whether additional mitigation might be needed. This approach would also address the biological and mathematical uncertainty Dr. Raimondi identified in his review of Poseidon's analyses, and would also help the Project conform to Porter-Cologne Act Section 13142.5(b), which requires the use of best feasible technologies to reduce impacts.

See also at pages 46-47: "Poseidon showed in its draft Revised Flow, Entrainment, and Impingement Minimization Plan that its use of the power plant pumps would create intake velocities higher than 0.5 fps and that its preferred operating scenario – using the power plant's Unit 4 pumps—would result in rates between 1.8 and 2.8 fps, or from more than three to five times the acceptable rate. However, in Exhibit B of its November 9, 2007 letter to Commission staff, Poseidon states that water velocities at the intake bar racks during stand-alone operations would be less than 0.5 fps, which would conform to the U.S. EPA's "Best Technology Available" standard for minimizing impingement impacts. Additionally, as noted previously, Poseidon has stated it intends to apply for an "incidental take permit" from NMFS. With these measures, the project is not likely to cause substantial adverse impingement effects. Furthermore, Poseidon's Exhibit B and its Revised Flow, Entrainment, and Impingement Minimization Plan state that it will install variable frequency drives to further decrease water flow intake velocities. With these low velocities, the already de minimis impingement impacts that Poseidon's project may cause are expected to be further reduced and thus mitigated to an insignificant level and consistent with Coastal Act Sections 30230 and 30231."

² See, for example, the Commission's December 2008 Final Adopted Findings at page 39, which state: "The City of Carlsbad's EIR determined that under the stand-alone "No Power Plant Operation" scenario, the project would have an intake flow velocity that would not exceed 0.5 feet per second, which is consistent with the U.S. EPA guidance for "best available technology" for cooling water intakes, and that under these operating conditions the project "would not result in significant impingement effects."

See also page 40 of those Findings, which states, in relevant part: "Poseidon has documented that stand-alone operation of the facility would result in intake water velocities at or below 0.5 feet per second, which is consistent with the U.S. EPA guidance for "best available technology" for cooling water intakes... Based on the above, and with **Special Condition 8**, the Commission finds the impingement impacts and the potential for an incidental take associated with stand-alone operations will be consistent with the Coastal Act and fully mitigated."

We note that Poseidon has suggested deleting several references in the proposed Plan related to this flow velocity and to the Commission's *de minimis* impingement findings³, and suggests instead that the Board rely on Poseidon's recent wetland productivity analyses. This would be problematic because both the CEQA review and the Coastal Commission relied on the 0.5 footper-second maximum velocity as a key Project component for reducing impingement impacts. Poseidon's proposed removal of this velocity limit may require Poseidon to submit a request to the Commission for an amendment to its coastal development permit. However, if the Board adopts the two measures above – the 0.5 fps velocity maximum at the rotating screens and ongoing monitoring of the Project's actual impingement and the adult fish productivity at the mitigation site(s), we believe the Plan would be consistent with the Commission's findings.

To ensure Poseidon can meet the maximum 0.5 fps rate presented to the Commission, the Board may also wish to consider requiring Poseidon to construct a bypass channel between the power plant intake and discharge so that the Project can use water that does not need to go through the power plant before reaching Poseidon's pumps. As currently configured, the water Poseidon would use must go through the power plant pumps, filters, and condensers before reaching Poseidon's intake. Constructing a bypass channel would allow Poseidon to reduce impingement by providing better control over its intake velocities during times when the power plant is not operating.

2) RATE OF MARINE LIFE MORTALITY CAUSED BY THE PROJECT: The Plan in several places states that Project characteristics may reduce the expected mortality rate of entrained marine organisms below the assumed 100% mortality caused by the power plant. For example, descriptions in Sections 3.1, 3.6, 3.7, and 4.4 of the Plan state that entrainment associated with Project operations would be significantly lower than those caused by EPS operations at the same flow, due to differences in the two operations. For several reasons, the Coastal Commission found that this would not be the case, and we recommend the Board find that the Project is likely to result in 100% entrainment mortality.

The study and model Poseidon used to identify its expected entrainment impacts assume that entrained organisms experience 100% mortality, due to a variety of stressors from an intake, such as high pressures, turbulence, heat, and others. This mortality rate is based in part on U.S. EPA guidance and in part on a lack of any comprehensive, peer-reviewed studies showing these types of intakes cause anything less than essentially 100% entrainment mortality. All recent entrainment studies at facilities in California have used this 100% assumption, despite the wide variety of intake types, locations, operating parameters, and the particular stressors at each facility. At EPS, even with the power plant not operating, Poseidon's standalone operations would include a range of stressors that cause mortality. For some of these, Poseidon would

³ For example, Poseidon proposes to delete the following velocity-related language on page 5-3 of the Plan: "For the purposes of this analysis, the impingement effect is assumed proportional to the intake flow at velocities above 0.5 fps. If the intake through-screen velocity is below or equal to 0.5 fps, the impingement effect of the intake screens is considered to be negligible."

Similarly, Poseidon proposes the following edits on page 4-20 to delete a reference to the Commission's findings: "The impingement impacts of the proposed Project (0.96 kgs per day of fish species that are highly abundant in the area) have associated with the CDP's operations has been found by the Coastal Commission, CEQA lead and others agency to be insignificant."

replace a power plant stressor with another – for example, instead of the power plant's heated discharge, Poseidon's discharge would have higher levels of salinity, and instead of the heat treatments used by the power plant to clean the intake system, Poseidon would use scrubbing balls to remove marine organisms from the intake. Further, even if Poseidon's operations were to result in less immediate mortality, any organisms pulled from the Agua Hedionda estuary that might survive the immediate stressors in the intake would be discharged to the very different habitat conditions of the nearshore ocean environment, where they would be susceptible to other stressors expected to result in mortality.

Please note that the Commission considered these same stressors and intake characteristics in its Findings to determine whether the Project would result in a lower mortality rate, but found that Poseidon's use of the intake would result in essentially 100% entrainment mortality. We note, too, that Poseidon references these Commission conclusions in its March 27, 2009 Attachment 10 – Explanation of Modification to Entrainment Minimization Technology Measures, which states that Poseidon's withdrawal of its proposed screens as a mitigation element is due in part to the Commission findings that Poseidon's entrainment would cause 100% mortality. Absent acceptable studies that identify whether the different set of stressors in Poseidon's operations might result in a different mortality rate, we recommend the Board make its findings consistent with those of the Commission and find that the Project would cause 100% entrainment mortality.

3) STEWARDSHIP OF AGUA HEDIONDA LAGOON: Section 2.4 of the Plan refers to Poseidon's eventual stewardship of Agua Hedionda Lagoon and states that Poseidon's efforts would be focused on ensuring a long-term water supply. We have not yet been provided with information about Poseidon's ability to act as steward (e.g., its ownership of the Lagoon or approvals from landowners in and around the Lagoon to take on stewardship activities); however, should Poseidon take on this role, we recommend the Plan be modified to properly recognize the Lagoon's many other resources and beneficial uses, as shown below:

From pages 2-8 & 2-9 of the Plan: "Upon retirement of the EPS, Poseidon has committed to assuming responsibility for stewardship of Agua Hedionda Lagoon and the surrounding watershed, including maintenance dredging of the entrance to the lagoon to prevent its closure and deposit the sand dredged from the lagoon on adjacent beaches. Poseidon's lagoon preservation efforts will be aimed at maintaining and enhancing the Lagoon's beneficial uses, including marine and wildlife habitat, recreation, public access, and others, while ensuring the long-term health and vitality of the future water supply of 300,000 San Diego County residents. Agua Hedionda Lagoon and its associated beneficial uses will be the long-term beneficiaries of this preservation strategy."

⁴ See Section 4.5.1 of the Commission's December 2008 Final Adopted Findings, which describes the Commission's evaluation of the Project's intake temperatures, water volumes, velocity, turbulence, pressure, and predation, and its conclusion that the Project will result in 100% entrainment mortality.

4) CHARACTERIZING MITIGATION RESULTS: Section 6 of the proposed Plan describes Poseidon's mitigation approach. In several places, the Plan states that the mitigation will "fully offset" or will "zero out" the facility's entrainment impacts. Please note that although Poseidon's entrainment will affect a large number of species, the Commission's assessment of entrainment impacts and its mitigation requirement are based primarily on the Project's effects on three estuarine species and one open ocean species. While the expected restoration will benefit a variety of species, the compensatory mitigation approach used in the Plan should not be characterized as "fully offsetting" or "zeroing out" the facility's entrainment. We recommend the Board not adopt these characterizations and that the Board instead describe expected mitigation results in a manner consistent with the Commission's findings. We provide an example of suggested edits below from pages 6-7 of the Plan:

"The Coastal Commission adopted a more conservative approach, based on the ETM but using more conservative assumptions and higher confidence levels, to determine the amount of mitigation-wetland restoration needed to zero out-mitigate the CDP's estimated entrainment. The Coastal Commission concluded that by providing up to 55.4 acres of estuarine wetland restoration under the conditions and performance standards prescribed by the MLMP, it would have 80% confidence that the CDP's entrainment impacts will be would be fully mitigated and marine resources will be maintained, enhanced and restored in conformity with the Coastal Act's marine life protection policies."

5) TIMING OF PROJECT-RELATED IMPACTS AND MITIGATION: Poseidon's proposed Plan suggests that its facility will result in only de minimis impacts until the power plant shuts down permanently. However, because the power plant's operations have been highly variable and are expected to be reduced in future years, there are likely to be extended periods when the power plant is not permanently shut down, but is instead operating sporadically or operating with flows well below 304 MGD. During those times, the Project would likely cause the majority of adverse effects. We recommend the Board replace the Plan's references to permanent cessation of power plant operations with references to power plant operations of less than 304 MGD.

Regarding mitigation timing, the proposed Plan suggests that Phase I and Phase II mitigation requirements are tied to power plant operations. For example, the Plan states on page 6-5, "During Phase I, a period expected to correspond with EPS's continued operations, Poseidon will create 37 acres of wetlands. During Phase II, when CDP may be operating in stand-alone mode, the agencies will consider whether Poseidon will be required to create an additional 18.4 acres of wetlands..." Please note that the Commission recognized the uncertainty of future power plant operations and its full or partial shutdown, and so required mitigation at specific times associated with Poseidon's coastal development permit, not on the variables of power plant operation. We recommend the language cited above be deleted from the Plan.

⁵ For example, see references in the Plan at pages 6-1 & 6-5.

To accurately reflect the existing mitigation timing requirements and to clarify the Commission's review and permitting process, we recommend the Plan to be consistent with the Commission's requirements. We have provided an example below:

From Section 6.3, page 6-18: "The MLMP describes the completion of specified tasks on a timeframe based upon the Coastal Commission's issuance of a coastal development permit for the CDP – an event that is expected to occur in the second quarter of 2009. Within 9 10 months of receiving the coastal development permit for the CDP, Poseidon shall submit to the Coastal Commission for its review and approval a proposed mitigation site or sites, and a preliminary restoration plan for 37 acres of wetlands for its review and approval. Under this Minimization Plan, Poseidon shall make the same submission to the Regional Board for its review and approval. Poseidon may elect to complete all 55.4 acres of wetlands during this Phase I period, but must complete at least 37 acres. Within 6 months of the Commission's approval of the site and restoration plan, subject to Poseidon's having obtained the necessary permits, Poseidon must begin construction of the wetlands. Within two years of receiving the coastal development permit for the CDP, Poseidon must submit a complete An application for a coastal development permit for the Phase I site or sites must be submitted to the Coastal Commission within two years of receiving the coastal development permit for the CDP itself. Within 6 months of the Commission's approval of this application, Poseidon must begin construction of the restoration sites. Within five years of issuance of the Phase I coastal development permit, Poseidon must submit a complete application for its proposed Phase II restoration. With a showing of good cause, Poseidon may request the Executive Director extend these deadlines. Specific requirements for the coastal development permit applications for Phases I and II are detailed in Section 4.0 of the MLMP."

6) SITE SELECTION: Section 6.4 of the Plan describes Poseidon's proposed site selection process. The Commission's mitigation approval allows Poseidon to conduct its wetland restoration at up to two of the eleven identified potential sites between Ventura and the Mexican border (although with additional review and approval, Poseidon may conduct restoration at more than two sites or at different sites). We understand that the Board has expressed a preference that Poseidon conduct its mitigation within the San Diego region. Commission staff believes this would be consistent with the Commission's findings. Also, while not a requirement, it is generally preferred that mitigation sites be larger rather than smaller, and that they be part of a coordinated or comprehensive mitigation effort. We are aware of at least two opportunities in the San Diego area for such coordination – with Southern California Edison at its San Dieguito restoration site, and with CalTrans at several locations it is considering as mitigation for its I-5

⁶ From the Commission's approved Condition Compliance findings, December 2008: "Poseidon shall create or restore up to 55.4 acres of coastal estuarine wetland habitat within the Southern California Bight. For Phase I, within 10 months of issuance of the desalination facility's coastal development permit (CDP), Poseidon must submit proposed site(s) and a Preliminary Restoration Plan for Commission review and approval. Within two years of issuance of the CDP for the desalination facility, Poseidon must submit a complete CDP application to restore at least 37 acres of estuarine wetlands. For Phase II, Poseidon must within five years of issuance of the Phase I CDP submit a complete CDP application either to restore an additional 18.4 acres of estuarine wetlands or to propose reducing or eliminating this Phase II restoration requirement by instead implementing technologies not currently available or feasible that would reduce entrainment levels below currently anticipated levels or by undertaking dredging in Agua Hedionda Lagoon in a manner that warrants mitigation credit. Poseidon may apply to do all 55.4 acres of restoration during Phase I."

widening project. We recommend Poseidon and the Board consider opportunities to work with these entities and with Coastal Commission and State Lands Commission staff to create larger restoration areas.

7) NEED FOR ONGOING ASSESSMENT AND COORDINATION TO FURTHER REDUCE PROJECT IMPACTS: We concur with the Board's proposed approach to allow ongoing review of potential alternatives that may reduce the Project's adverse marine life impacts. The proposed Plan recognizes that approaches and technologies currently considered infeasible for this project may soon be feasible (see, for example, Sections 4.1, 4.3, and 7.4), and the proposed Order recognizes that circumstances are likely to change based on changes in power plant operations or during the additional review provided during permit renewal, the Commission's review of Phase II mitigation, or future State Lands Commission decisions.

The Coastal Commission in its November 2007 Project approval reviewed information provided by Poseidon to determine that alternative intakes and screening methods were infeasible. However, we soon expect to have results from studies now underway that will help determine if different types of intakes or screens can feasibly reduce entrainment at open water intakes and can be considered in the future at Poseidon's facility. For example, while Section 4.3.3 of the Plan states that wedgewire screens are currently infeasible, two studies being conducted here in California will help determine whether a new alloy and different screen sizes might result in those types of screens becoming a feasible option to use in the marine environment. Similarly, Section 4.2 of the Plan describes a type of subsurface infiltration gallery as infeasible due in part to its size and maintenance requirements; however, recent studies and information suggest that a similar gallery at Carlsbad could be less than half the size and need far less maintenance than described in the Plan.8 Based on both existing and anticipated information, we expect that additional technology may soon be feasible and may be part of the Commission's future mitigation reviews. We therefore concur with the Board's recognition of the need for future assessments, either through a permit re-opener, during Phase II of Poseidon's mitigation, or during the State Lands Commission 10-year project review.

⁷ These include projects being conducted by the West Basin Water District, and the City of Santa Cruz Water District.

⁸ The West Basin Water District and the Water Departments of the Cities of Long Beach and Santa Cruz are conducting studies to determine whether various types of subsurface intakes might be feasible, and a full-scale facility in Fukuoka, Japan has operated successfully for several years with far less maintenance than is described in Poseidon's Plan. Information from that facility suggests, too, that a similar system at Carlsbad could cover about 60 acres rather than the 146 acres described in the Plan.

CONCLUSION

Again, thank you for the opportunity to comment. We look forward to ongoing coordination with you and your staff on this proposed project. Please contact me at 415-904-5248 or tluster@coastal.ca.gov if you have any questions or would like additional information.

Sincerely,

Tom Luster

Cc: San Diego Regional Board – John Robertus

Poseidon Resources – Peter MacLaggan State Lands Commission – Gail Newton

Department of Fish and Game - Bill Paznokas

NOAA - Bryant Chesney