Coalition for a Sustainable Delta

May 12, 2010

VIA E-MAIL

Phil Isenberg
Chair, Delta Stewardship Council
650 Capitol Mall
Sacramento, CA 95814

Re: Interim Delta Plan

Dear Chairman Isenberg,

The Coalition for a Sustainable Delta ("Coalition") respectfully submits the following recommendations to the Delta Stewardship Council ("Council") regarding the development of the Interim Plan, required under Water Code Section 85084. Recommendations focus on early actions, projects and programs that can be implemented by January 2012, before completion of the final Delta Plan.

The Coalition consists of persons and entities engaged or interested in agricultural activities in the Central Valley, and its members depend on the Sacramento-San Joaquin river systems for a large portion of their water supplies. The Coalition is engaged in a wide array of activities to protect the Delta and its native species and is committed to promoting a strategy to ensure its sustainability.

Below, we discuss suggestions for the structure and focus of an Interim Plan and provide specific examples of actions that can be taken in the short and medium term. Suggestions focus on the use of adaptive management, the structure of the Delta Science Program, the new Delta paradigm and the importance of enforcement of existing laws that directly pertain to environmental quality in the Delta.

Executive Summary

The keystone of any Delta plan—interim or otherwise—must be adaptive management. Adaptive management relies on an integrated, science-based conceptual foundation and framework and a robust monitoring and evaluation program that allows the testing of hypotheses about environmental and biological responses to program actions. A successful adaptive management program will allow managers to identify uncertainties, risks and opportunities for management action; direct monitoring to resolve uncertainties; and alter the planned course of action depending on how the levels of risk, uncertainties

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and conditions resolve over time. Adaptive management is a powerful tool that ensures that plan actions can consistently benefit from new guiding information over time.

A second important component of the Interim Delta Plan should be the effective management of a science program to support actions and policy decisions under the plan. The new Delta Science Program offers the Council the opportunity to rethink organizational structure and management to avoid the pitfalls of the preceding science program, CALFED. According to a recent assessment in *The State of the Bay-Delta Science*, CALFED failed to deliver on the most pressing questions facing Delta managers—what are the potential causes of the pelagic fish declines, how important are the candidate causes, and what are the qualitative benefits of candidate solutions? (Calfed Science Program 2008.) Creating an effective Delta Science Program requires rethinking the interrelationship between academic researchers, agency technical staff, and environmental regulators to ensure that independent science is available to inform Delta management and policy. Without compromising the independence of the scientists, resource managers can and should be actively involved in identifying areas where empirical research is needed.

A third component of the Interim Delta Plan should be the recognition of the new Delta paradigm. Declines in Delta fish populations are not caused by a single factor. Moreover, those multiple factors affect different fish species in different ways. The Delta must be managed for multiple species and address multiple causes of decline. This new paradigm promotes ecosystem-based management where species are part of a larger system and where the full complement of environmental stressors is considered by management planners. Under this new paradigm, habitat cannot be described only by flows, or by a single measurement such as X2 (the distance in kilometers from the Golden Gate Bridge to the 2 psu isohaline). The National Research Council (NRC) in its report, *A Scientific Assessment of Alternatives for Reducing Water Management Effects on Threatened and Endangered Fishes in California's Bay Delta*, recognized the complex challenges of managing the Delta ecosystem. The Council should consider recommendations in the NRC's report, which we discuss further, below. Additionally, a more comprehensive approach to Delta sustainability must be pursued by addressing other stressors in the Delta such as increased contaminant loads, changes to the food web and invasive species. Short term actions to address multiple stressors include:

- Establishment of a delta smelt hatchery;
- Improved management of hatchery produced salmon and steelhead;
- Management of striped bass and largemouth bass to reduce predation;
- Protection and enhancement of existing habitat;
- Development of an inter-agency initiative to strengthen enforcement of water quality provisions; and
- Collection of information on in-Delta diversions and assessment of actions to reduce impacts to aquatic species.

Finally, enforcement of existing obligations is a logical starting point for action in the Interim Delta Plan. Ongoing violations of state laws regarding candidate, threatened and endangered species, fully protected species, lake and streambed alterations, water quality and water rights should be addressed. Many of these violations—such as the state's

striped bass management program that protects and enhances non-native striped bass in the Delta and its tributaries to the detriment of native, listed species; diversions in violation of the California Endangered Species Act; diversions without valid water rights; and illegal discharges of contaminants in the Delta—relate to the multiple stressors identified above. Enforcement of existing laws should be a component of the Interim Delta Plan. Action under this plan item should also include gathering information from state agencies regarding their enforcement responsibilities in the Delta. Gaps in enforcement can then be identified and remedied.

Discussion

A. Adaptive Management and Monitoring and Evaluation

The Interim Delta Plan should be based upon an integrated, science-based conceptual foundation and framework that incorporates an explicit adaptive management program. By connecting the dots between human actions, natural variation, environmental change and resulting biological responses, the conceptual model will enable the Council to identify uncertainties, risks and opportunities for management action; direct monitoring to resolve uncertainties; and plan for different courses of action at different levels of risk depending on how these uncertainties and conditions resolve over time. Such an approach has been adopted by other large restoration efforts in the Everglades, the Columbia River, and elsewhere. Importantly, the conceptual model also allows the Council to identify key uncertainties. These uncertainties should inform the design of a comprehensive monitoring and evaluation program to complement and assist the adaptive management framework.

In *Listen to the River: An Independent Review of the CVPIA Fisheries Program* (2008), an independent review panel concluded that the Central Valley Project Improvement Act (CVPIA) lacked an effective adaptive management framework. The review panel stressed the importance of a quantitative analytical framework or model that could be used to rank the importance of the most critical limiting factors at both the watershed and system level. The review panel found that the agencies identified local factors limiting natural production mostly through "best professional judgment" rather than on the basis of quantitative information and statistical analysis of ecological conditions. Even beyond the issue of how the local limiting factors were identified, the CVPIA program failed to collect statistical information or articulate and attempt to falsify an informed hypothesis regarding the biological potential that could be realized from addressing the limiting factors. Absent such data collection and analysis, the panel determined it would be impossible to prioritize activities or to evaluate the effectiveness and efficiency of CVPIA actions. In addition, it did not allow managers to distinguish between a scenario in which gains in one area were being offset by losses in another, and a scenario in which no gains were made at all.

The deficiencies identified by the independent science panel are common in past management approaches in the Delta. The NRC recognized the need to implement rigorous adaptive management and monitoring measures to assist in Delta management

activities. The lack of such measures was also starkly illustrated by the conclusions of a recent assessment of CALFED in *The State of Bay-Delta Science 2008*.

CALFED was initiated as a cooperative effort of more than 20 federal and state agencies with management and regulatory responsibilities for the San Francisco Bay and Sacramento-San Joaquin Delta. The mission of the program was to implement a long-term comprehensive plan to restore ecological health and improve water management for beneficial uses of the Bay-Delta system. (Calfed Bay-Delta Program 2000.) As part of that effort, the parties established the CALFED Science Program to develop the best scientific information possible to guide decisions and evaluate CALFED-directed actions. Irrespective of intentions of the participating parties, the CALFED Science Program failed to achieve its desired goals. Scientific research completed under the auspices of CALFED failed to address the critical uncertainties that constrain the efforts of resource managers to respond to the decline in populations of federally listed species and the diminishing ecosystem elements and processes that support them. CALFED and other Delta science efforts consistently failed to meet the goal of informing policy and management decisions through directed research and monitoring that addresses the specific environmental challenges confronting resource managers and regulators. Over more than a decade, this has resulted in a massive body of data and many dozens of academic journal articles, but few answers to the most pressing questions facing managers and policymakers.

The Record of Decision that enabled CALFED assigned its Science Program "the responsibility to assure a sound foundation for monitoring and evaluating all elements of CALFED." (Calfed Bay-Delta Program 2000.) Yet nearly a decade later in 2008, the framework for implementing that directive nearly was "still largely at the conceptual stage." (Calfed Science Program 2008.) Indeed, CALFED failed to implement even the most elementary program to assess the effects of regulatory actions, management efforts, and restoration projects. The Little Hoover Commission report on CALFED (Little Hoover Commission 2005) underscored the critical role for adaptive management in the Delta, but it noted "adaptive management has not become a way of doing business at CALFED." CALFED itself acknowledged "planning and evaluation in current practice are not typically structured as part of an overall adaptive management strategy." (Calfed Science Program 2008.)

Moreover, as described in *The State of the Bay-Delta Science*, the "connection between monitoring data and policy adaptation or termination is still rather ad hoc." The lack of effective monitoring during the period of most precipitous decline by the pelagic fishes of the Delta makes it now nearly impossible to counter those trends with focused management and restoration responses. The lost research opportunities are accompanied by a pelagic fishes monitoring program that is so poorly informed by scientific research and limited by sampling design that the imperiled delta smelt has nearly ceased to appear in targeted surveys, despite declining population numbers that still are in the hundreds of thousands. Despite an unprecedented investment in scientific research, the CALFED Science Program failed to provide the most fundamental information needs by failing to establish a robust environmental monitoring program in the Delta.

A science-based conceptual framework and adaptive management program must form the foundation of a new Delta Science Program and Interim Delta Plan. Likewise, a robust monitoring and evaluation program is needed to inform adaptive management. If management actions are, in effect, a series of experimental tests of hypotheses about environmental and biological responses to program actions, measurements provided by a monitoring and evaluation program will allow the comparison of predicted results to observed results. In other words, an effective program is a necessary component to refine hypotheses and ensure that the management program can "learn" over time.

In order to facilitate learning, the monitoring and evaluation program must be shared among program participants—i.e. local, state, and federal agencies as well as other interested stakeholders including corporations, trade associations, and non-profits. Archived information should be accessible via a centralized database providing information in a uniform format, preferably through a web portal featuring different levels of access. A standard set of protocols for conducting and reporting monitoring would assist in the effort. In *Listen to the River*, the independent review panel called for a database that includes a query (expert) system with simple analysis and summary capability to analyze status and trends in monitoring data by program participants; a graphical user interface to display information in an intuitive and compelling format; a simple modeling system that could be used for sensitivity and risk analysis in order to guide program decision making; and more sophisticated modeling tools to estimate the consequences of climate change or normal hydrologic variability on different restoration strategies.

Ideally, monitoring results will also provide measurements for a Delta Report Card, a sophisticated science-based scoring system that can measure and document institutional progress and program successes towards meeting explicitly identified measurable goals in the restoration of the Sacramento-San Joaquin Delta ecosystem. The design of a Delta Report Card is consistent with the Council's charge under SBX7 1 to develop performance measures for the assessment and tracking of progress and changes to the health of the Delta ecosystem, fisheries, and water supply reliability. The Chesapeake Bay Program's Bay Barometer, an annual report which tracks the Chesapeake Bay Program partnership's progress toward meeting its health and restoration goals is an example of a report card that provides a quantitative measurement of progress towards clearly defined ecosystem goals. The report offers scores as percentages, with 100 percent average health representing a fully restored ecosystem. Percentages for health and restoration are linked specifically to attainment of program goals. Information contained in the Bay Barometer is used to inform future actions by program managers and to educate the public on the progress of a significant and important restoration effort.

As part of the design and implementation of a monitoring and evaluation program, the Council should coordinate with ongoing initiatives, such as the Central Valley Regional Water Quality Control Board's development of a Delta water quality comprehensive monitoring program. The development of a comprehensive monitoring program for the Delta was identified in the Strategic Workplan for Activities in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, which was adopted by the State Water Board, Central Valley Regional Water Board, and San Francisco Bay Regional Water

Board. The short-term (1-2 year) goal of this effort is to establish a framework for the collection, compiling, assessment and reporting of readily available data currently being collected. The long-term (3-5 year) goal is the development of a Regional Monitoring Program for the Delta.

Under the Interim Delta Plan, the Delta Stewardship Council should assess ongoing monitoring activities in the Delta and identify deficiencies in current monitoring activities. The Council will need to work across agencies to ensure a comprehensive, Delta-wide monitoring and evaluation program. A centralized database to contain the monitoring results is an important component of any monitoring and evaluation plan. Under the Interim Plan, the Council can begin the process of designing and establishing that database. In conjunction with the monitoring and evaluation program effort, the Council should also determine the components of a Delta Report Card.

B. Structure and Management of the Delta Science Program

The creation of the Delta Science Program under SBX7 1 provides the Council with an opportunity to correct institutional deficiencies in the structure and management of the science program formerly known as CALFED while continuing to utilize the valuable institutional knowledge and expertise of the CALFED participating scientists. As detailed above, a commitment to adaptive management and an effective monitoring and evaluation program are critical to the success of any short or long-term management plan for the Delta. In addition, federal institutional arrangements in the Delta must be completely restructured to integrate reliable guidance from science into resource management and regulatory decision-making.

Under CALFED, a firewall between management and science hampered the progress towards obtaining scientific input that could inform an adaptive approach to Delta management and restoration activities. The firewall was continually reinforced by balkanized adherence to agency prerogatives, and the institutionalized and incorrect assumption within resource agencies that line staff can (and should) generate scientific research and then interpret that research on their own. The resulting failures of the CALFED program are underscored by the assessment of the authors of *The State of the Bay-Delta Science*, who state that it now appears not possible "to narrow the potential causes [of the pelagic fish decline] much, to assess the relative importance of the various candidate causes with existing data, or to specify the qualitative benefits of any potential solution." (Calfed Science Program 2008.) Despite billions of dollars and years of research, CALFED did not address the most fundamental questions needed for comprehensive Delta management.

This fatal flaw in the CALFED Science Program appears to be the result of an effort to protect the "independence" of scientists. But resource managers should—and indeed must—be involved in identifying the need for empirical research and monitoring. And scientists should not be left to independently identify the areas in which empirical research is needed; instead they should be afforded independence as they carry out empirical research in areas jointly identified by resource managers and themselves. This flaw in the CALFED Science Program approach is also a result of the blurring of the line

between those persons that conduct scientific research regarding the life history and status of a species as well as the factors that affect its abundance over time and persons that interpret such research and then make resource management decisions. This is manifest in the recent FWS biological opinion for delta smelt, which relies in substantial part on research generated by the authors and reviewers of that biological opinion. It is unrealistic to expect agency personnel to review and interpret their own empirical research with the same level of objectivity that they review and interpret the research of others. It is also inconsistent with the notion that an author or reviewer should not have a personal stake in the outcome of the review. (see for example Meffe et al. 1998.)

These criticisms of CALFED are not meant to reflect poorly on the scientists that study the Delta's ecosystems and species, but are meant to illustrate the need for a Delta science program that implements a new vision of how science can serve management and policy without compromising its independence. Specifically, policy should drive the science funded by the Delta Science Program. Managers and policy makers should identify specific areas of research and solicit proposals for qualified scientists to complete research. The Delta Science Program should also seek to draw on experience and knowledge throughout the scientific community (not just those that have been previously involved in Delta research) and promote an inclusive process and exchange of ideas through solicitation and proposals and funding of research activities.

C. A New Delta Paradigm and Addressing Other Stressors

Over the past several years, a paradigm shift has taken place in the Delta. The paradigm shift is captured most succinctly in two major reports regarding the Delta: the Public Policy Institute of California report *Envisioning Futures for the Sacramento-San Joaquin Delta* (2007) and the CALFED report *The State of the Bay-Delta Science*. In *Envisioning Futures for the Sacramento-San Joaquin Delta*, the authors describe a shift from an outdated paradigm that identified pumping associated with water exports from the Delta as "the biggest cause of fish declines in the estuary," to a new paradigm that identifies pumping as "only one of several causes of fish declines." (PPIC 2007.) In *The State of the Bay-Delta Science*, the authors build on this idea, stating that management approaches under the old paradigm have continued to focus on the needs of a single species—the delta smelt—and "to address primarily the factor linked to smelt declines that is most easily managed: water exports." (Calfed Science Program 2008.) According to the authors of the CALFED report, this single species/single factor approach "is neither the most practical nor the most effective way to address the broad problem of native species declines." (Calfed Science Program 2008.) Instead, it is necessary to understand that "species decline and, ultimately, species extinction is a consequence of a multiplicity of interlinked and interacting factors in the Delta." (Calfed Science Program 2008.) Against this backdrop, it is apparent that an ecosystem management approach is essential to inform any new paradigm. "Under ecosystem-based management, each species is seen as a component of a larger system rather than as an isolated entity. Ecosystem-based management also encourages a broad examination of ways to nurture species survival and well-being, rather than narrowly focusing on a specific stressor." (Calfed Science Program 2008.) The paradigm shift described in these two reports by a non-profit think

tank and by a collection of author-scientists assembled by the CALFED Science Program is remarkably similar.

Unfortunately, state and federal agencies continue to operate under the old paradigm. This may be a consequence of institutional inertia or, as described in *The State of the Bay-Delta Science*, a consequence of the fact that a single source of fish mortality—namely the export pumps—is both intensely monitored and readily managed. But this default to a singular management focus can no longer be tolerated, because of:

- the harm to species that results from misdirected conservation efforts that have little, if any, value and that result in under-regulation of environmental stressors that collectively have significant, adverse effects,
- the harm to society that has resulted from a human-induced drought, and
- the harm to our governance institutions that stems from their inability to adapt to new information, which leads segments of society to conclude that the government is incapable of effective resource management.

The pervasive adherence to the old paradigm was highlighted in the requirements of SB 1, which resulted in the State Water Resources Control Board (SWRCB) Information Proceeding to Develop Flow Criteria for the Delta Ecosystem Necessary to Protect Public Trust Resources (flow proceedings). For the proceedings, SWRCB stated as its goal the identification of the volume, quality and timing of Delta outflows necessary to protect public trust resources and largely limited its inquiry to the outflows necessary to protect certain fish species deemed to be desirable. However, such an effort cannot be divorced from consideration of the multitude of other factors that affect public trust resources. Trying to identify appropriate outflows without identifying other factors that must be addressed can be compared to flying a plane using a single instrument. Inflow and outflows are factors that must be considered, but current scientific understanding of the Delta ecosystem dictates that they should not be considered in a vacuum (PPIC 2007; Calfed Science Program 2008). As discussed in testimony to the SWRCB at its recent flow proceedings, habitat is both the physical space in which an animal or plant lives and the abiotic and biotic resources in that space (Fleishman 2010 (attached)). Delta outflow is only one component of this mix. The critical resources that define habitat also vary across species and time; few if any species use resources in exactly the same way. (Fleishman 2010.)

Clearly, consideration of flow criteria must be considered in the broader context of habitat needs. Moreover, given the variation in habitat components among multiple species, the use of a single species to identify management actions to protect public trust resources is not an effective approach. Instead, a careful consideration of the habitat needs of at-risk native fish must occur in the context of a broader ecosystem-management based approach to the Delta (Calfed Science Program 2008).

A recent report by the NRC highlights the shortcomings of attempting to manage the Bay-Delta ecosystem by focusing on a single Delta stressor—water exports. In *A Scientific Assessment of Alternatives for Reducing Water Management Effects on Threatened and Endangered Fishes in California's Bay Delta* (2010), the NRC was

asked to (1) examine the scientific bases for the reasonable and prudent alternatives (RPAs) in the U.S. Fish and Wildlife Service (FWS) Biological Opinion covering delta smelt and the National Marine Fisheries Service (NMFS) Biological Opinion covering salmon, steelhead and sturgeon (collectively "biops"); (2) assess whether the smelt and salmon RPAs conflict with one another; and (3) consider whether alternative measures may be available that could protect fish with lesser impacts on water users.

The committee report outlined the NRC's many concerns regarding the implementation of water export restrictions that were designed to protect listed species. Its contents illustrate the shortcomings of pursuing a single-stressor approach to Delta management and also provide recommendations that will be useful for the Council's Interim Delta Plan.

In its report, the NRC recognized the uncertainty of the science supporting the implementation of various RPA measures under the biops. Although it described most RPA measures contained in the delta smelt biop as based on a sound conceptual foundation, it concluded that the empirical basis for the RPA prescriptions was largely lacking, and the dictated actions were mostly not supported by available science. (See, e.g. the discussion of Old and Middle river (OMR) flows, X2 and habitat restoration, NRC 2010, pp.3-4.) The NRC came to similar conclusions regarding the RPA measures under the salmon biop. (NRC 2010, p.5.)

The NRC noted that the effects on delta smelt population dynamics of OMR flows and fish salvage at the export pumps—two metrics that are highly regulated under the FWS biop and that can result in significant water export reductions— are "not clear." (NRC 2010, p. 20.) The Committee also noted that "delta smelt are now largely absent from the central and southern delta, while a significant portion of the remaining population exists in the Cache Slough complex to the north. These changes increase the uncertainty surrounding current estimates of delta smelt population changes in response to alterations in delta hydraulics." (NRC 2010, p. 21.) Contributing to the challenge of designing appropriate RPA measures, nested sequences of statistical models were used by the agencies in the biops without full consideration of underlying uncertainties and how uncertainties in one model impact predictions in the next model. "As a result, some of the RPA actions, especially those involving X2 and OMR flow triggers, are based on less reliable scientific and modeling foundations than others." (NRC 2010, p. 25.) Moreover, the report called the relationship between delta smelt populations and the position of X2 "poor and sometimes confounding," and stated that "[t]he weak statistical relationship between the location of X2 and the size of smelt populations makes the justification for this action difficult to understand." (NRC 2010 pp. 40-41.)

In addition to providing recommendations related to the RPA measures, the NRC encouraged the agencies to implement rigorous monitoring and adaptive management measures to ensure that actions can provide for protection to fish species while reducing impacts to water deliveries. The criticisms contained in the NRC report signal the need for the agencies to reexamine the timing and severity of export restrictions under the RPAs. An integrated analysis of the RPA measures under the two biops is also necessary to ensure a more accurate accounting of benefits to species and impacts to water

deliveries. Improved, comprehensive and more realistic models could provide better tools to assess benefits and fine-tune RPA actions. (NRC 2010, p. 6.)

Finally, the NRC highlighted the importance of other stressors and expects to provide more information in its second report on the impact of other stressors and additional measures that can reduce risk to listed species. Noting that it lacked time for "full exploration" of the issue of other stressors in its initial report, the NRC agreed that "the adverse effects of all the other stressors on the listed fishes are potentially large" (NRC 2010, p. 6). Specifically, the NRC agreed that "[w]hile the CVP and SWP pumps kill fish, no scientific study has demonstrated that pumping in the south delta is the most important or the only factor accounting for the delta smelt population decline" and further noted that the effects of other stressors "are numerous and, in some cases, not only potentially very important but also undercharacterized." (NRC 2010, p. 33.)

In its report, the NRC provided specific recommendations for improving the understanding of management actions in the Bay-Delta ecosystem and ensuring that restrictions imposed on water project operations are supported by the best available science. The Stewardship Council should incorporate the NRC's recommendations into its Interim Delta Plan and work with the Department of Water Resources, the Delta Science Program, and federal partners to conduct the suggested analyses and develop improved modeling tools. The NRC suggests that addressing these issues in a coordinated manner between agencies, and with the involvement of interested stakeholders, will increase transparency and public trust. (See, e.g. NRC 2010, p. 40.) Specific recommended actions and analyses include:

1. Undertake a formalized, systemized, and integrated analysis that evaluates environmental benefits of required actions under the water project biops and evaluates resulting impacts to water supplies. "Clear and well-documented consideration of water requirements also would seem well advised because some of the actions have significant water requirements. Credible documentation of the water needed to implement each action and the combined actions would enable an even clearer and more logical formulation of how the suite of actions might be coordinated to simultaneously benefit the species and ensure water efficiency." (NRC 2010, p. 7)

2. Investigate the scientific basis for timing and magnitude of OMR flow restrictions (see, e.g. NRC 2010, p 39 "Given the uncertainties in any choice of a trigger point, a carefully designed study that directly addresses measures of the performance (effectiveness) of the action is essential.") and X2 measures (e.g. NRC 2010, p. 4, "[T]he committee concludes that how specific X2 targets were chosen and their likely beneficial effects need further clarification.").

3. Develop more flexible triggers for RPA actions that reduce water impacts while maintaining protection for listed species. RPA actions that could be modified to reduce water impacts include OMR flow restrictions ("[u]ncertainty in the effect of flow triggers needs to be reduced, and more flexible triggers that require less water should be evaluated." NRC 2010, p. 44); X2 requirements, and reduction of

Delta exports to increase the inflow-to-export ratio for the San Joaquin River ("Given the weak influence of exports in all survival relationships . . . continued negotiation offers opportunities to reduce water use in this specific action without great risk to salmon." NRC 2010, p. 45).

4. Conduct systematic analysis of watershed level actions—such as prescribed passage conditions at the Red Bluff Diversion Dam—in the salmon biop to determine to what extent, or whether, the collective actions will appreciably reduce the risk to anadromous fishes within the watershed or throughout the entire river system. ("[I]t is difficult to ascertain to what extent, or even whether, the collective actions will appreciably reduce the risk to the fishes within the watershed or throughout the entire river system. We suggest that inclusion of some type of quantitative analysis using a tool like Ecosystem Diagnosis and Treatment (EDT) model during the planning process may have provided an even stronger justification for the set of actions selected." NRC 2010, p. 43)

5. Develop ecological models that complement and integrate with hydrological and hydrodynamics models in order to provide a more comprehensive and integrated analysis of the two biops. (NRC 2010, p. 7.)

6. Develop multiple life-cycle models that incorporate full consideration of underlying assumptions and uncertainties; use of multiple models will ensure that results can be compared. (NRC 2010, pp. 25-26.)

7. Better document assumptions and uncertainties in existing models such as SALMOD, USBR's salmon mortality model (Hydrologic Consultants Inc, 1996), and Particle Tracking Models (PTMs). (NRC 2010, p. 26.)

Assessment of Multiple Stressors

An essential component of the long-term Delta Plan should be a comprehensive effort to catalog the stressors or causes of the declines in numbers of the Delta's listed, native fishes and rank them according to their likely impact on the survival and recovery of those fishes. As detailed above, a similar effort is being undertaken by the NRC's Water Science and Technology Board, in the second report on Sustainable Water and Environmental Management in the California Bay-Delta. This report is due in November 2011 and should be incorporated into Council efforts under the Delta Plan.

In the meantime, the Interim Delta Plan should take a comprehensive, ecosystem based approach to addressing the multiple stressors on the Delta ecosystem and its fishes. Existing literature provides a basis to administer each of the specific short-term actions described below in order to contribute to the protection of the listed species. Many of these projects, including the establishment of a delta smelt hatchery and addressing pesticides and invasive species, are supported under the *Interim Federal Action Plan for the California Bay-Delta* (2009), the interim plan proposed by the U.S. Departments of Interior, Commerce, Agriculture, and Army, the Environmental Protection Agency, and the Council on Environmental Quality.

Specific Actions

The following projects realistically can be implemented in a one-to-five year time frame and provide protection for federally listed species.

Establishment of a delta smelt hatchery: The most recent delta smelt abundance data reported by the Interagency Ecological Program indicates that delta smelt are at an all-time low population level, well below the point at which the species was listed in 1993. Construction and operation of a delta smelt hatchery would both facilitate establishment of a refugial population to ensure that there are fish available for restoration should the populations in the wild go extinct and provide a source for supplementation of wild populations should such action be desired. The University of California, Davis, Fish Conservation and Culture Laboratory, largely funded by the California Department of Water Resources, has successfully reared delta smelt through its entire life cycle. This work was originally conducted to provide delta smelt for experiment and research without depleting wild stocks, but the hatchery now provides a small, but important refugial population. Upgrades are needed to support continued operation of the facility, redundancy and safety. The State, United States Fish and Wildlife Service and the City of Rio Vista are involved in an ongoing effort to develop a permanent facility—the Bay Delta Center for Collaborative Science and Restoration Propagation of Native Imperiled Aquatic Species—in Rio Vista, CA. Engineering design, planning and environmental compliance, and requisite funds are needed. Consistent with existing federal plans, state agencies should establish a delta smelt hatchery of sufficient size to prevent the loss of genetic diversity. In light of the precarious status of the species, further research should be conducted to evaluate the potential for supplementation of extant wild delta smelt populations.

Improved management of hatchery produced salmon and steelhead: To prevent the loss of genetic diversity and fitness in wild salmon and steelhead populations, the Interim Delta Plan should work with federal agencies to implement hatchery reform, including establishing the practices of mass marking, selective harvest of hatchery fish through a mark select program, and the use of weirs to enhance reproductive success of natural origin spring-run Chinook salmon and steelhead. Efforts should also be undertaken to obtain more reliable numbers for natural production and hatchery straying. Because steelhead are already mass marked, the mark-select program for steelhead can be implemented immediately. Mass marking fall run Chinook salmon can begin as early as next year, with management benefits from a mark select program within three years.

Management of striped bass and largemouth bass to reduce predation. Striped bass and largemouth bass predation accounts for mortality of a substantial proportion of the populations of delta smelt, steelhead, and salmon in the Delta. These non-native sport fish were introduced into the Delta intentionally to promote sport fishing. Predation by striped bass and largemouth bass is particularly problematic in specific locations and at certain times of year. Therefore, consistent with the goals of the Interim Delta Plan, it would be appropriate for the Council to direct the Fish and Game Commission and the

Department of Fish and Game to assess options available to manage these predators both on a continuous, Delta-wide basis and through more narrowly tailored measures.

Protection and enhancement of existing habitat: More than a century of land use changes have significantly decreased shallow freshwater and tidal habitat essential for persistence of listed fish species and other desired organisms in the Delta. The Interim Work Plan should explicitly identify and incorporate measures to protect and enhance existing Delta habitat. Short-term actions include the identification of physical habitat that supports important biological functions (such as breeding and rearing habitat and migratory corridors) for desired species. Consistent with those determinations, potential restoration and enhancement targets should include flood plain habitat, seasonal shallow water habitat, tidal marsh, enhancement of channel margins, riparian forest and scrub. Potential sites for restoration and enhancement include Sherman Island (Resources Agency 2005), perimeters of Honker and Suisun bays, the Mein's landing Restoration Project in Suisun Bay (Resources Agency 2007), Yolo Bypass, and Cache Slough. A set of feasibility and performance measures should be identified for each potential restoration and enhancement site. Categories of recommended planning and management metrics include: biological function, project cost, feasibility, likelihood of success and spatial extent affected. Actions should also be considered that would serve to modify beneficial abiotic attributes of Delta waters, such as local turbidity during key migration and rearing periods for delta smelt and juvenile salmonids.

Development of an inter-agency initiative to strengthen enforcement of water quality provisions: Water quality degradation caused by the introduction and accumulation of a variety of contaminants into the Delta and its tributaries is well documented; and, the acute and chronic effects of numerous contaminants on aquatic organisms is also well documented. While the data on the direct and indirect effects of contaminants found within the Delta on aquatic organisms that reside in the Delta are limited, the available information strongly suggests that contaminants are a substantive contributor to ecosystem disruption and the decline of pelagic fishes in the Sacramento-San Joaquin Delta (e.g., U.S. Fish and Wildlife Service 1996) and action is warranted. Impacts from stormwater runoff, in-Delta agriculture and wastewater treatment facilities must be considered. Improved modeling to address the fate of contaminants in the Delta would assist in this effort and would provide much needed guidance for an adaptive management approach to addressing contaminants on an ecosystem level. Additionally, the commitment of additional resources to investigate water quality violations and pursue enforcement actions would have positive direct and deterrent effects.

Collection of information on in-Delta diversions and assessment of actions to reduce impacts to aquatic species: Provisions in SB 8 to close the information gap in water reporting, impose fines for failure to report and provide funds for water rights enforcement is a step in the right direction. Information collected can be used to aid near-term efforts to assess impacts to aquatic species and identify appropriate measures to minimize those impacts.

This list highlights certain short-term, high impact actions to address the Delta decline. Additional near term actions should be considered to address changes to the Delta food

web, harmful algal blooms, invasive species, future impacts from climate change and changing ocean conditions.

D. Robust Enforcement of Existing Laws

The design and implementation of the Interim Delta Plan should not neglect the important issue of enforcement of existing laws. Enforcement is an important component of any successful regulatory scheme, and one activity that has often fallen by the wayside in the management of Delta activities. Enforcement should be a key component of the Interim Delta Plan. As detailed below, the Council should gather information from state agencies regarding their enforcement responsibilities in the Delta in order to effectively incorporate enforcement into the final Delta Plan and identify whether there is a need for additional enforcement tools to protect the Delta ecosystem.

The current state of the Delta is attributable in large part to the failure of state and federal agencies to properly enforce existing laws and regulations. For decades, regulatory authorities have allowed a wide array of Delta actors to violate environmental laws, including state laws respecting:

- Candidate, threatened, and endangered species,
- Fully protected species,
- Lake and streambed alteration,
- Water quality, and
- Water rights.

Lax enforcement undermines the rule of law in two ways. First, inadequate enforcement gives an unfair advantage to persons engaged in illegal activity by allowing them to avoid the costs of compliance with the law that law-abiding citizens incur. Second, selective enforcement in the context of environmental laws can be even more insidious because persons subject to enforcement may be required to bear the costs of offsetting environmental harm caused by others, as well as themselves.

The enforcement authorities of the State are considerable, and, if brought to bear, those authorities could result in dramatic improvements in the Delta ecosystem. By way of example, the Water Boards have significant enforcement authorities that extend to both water rights and water quality (State Water Resources Control Board 2002). With respect to water rights, the State Board has statutory authority, for example, to appropriate water and investigate appropriations (Cal. Water Code § 1250 et seq.). In the area of water quality, the Water Boards' enforcement authorities cover National Pollutant Discharge Elimination System ("NPDES") permits and section 401 Water Quality Certifications issued pursuant to the federal Clean Water Act and Waste Discharge Requirements ("WDRs") issued pursuant to the Porter-Cologne Water Quality Control Act, and include a variety of enforcement tools such as the issuance of cease and desist orders, time schedule orders, and notices of violation (Cal. Water Code, § 13300 et seq.). Additionally, the Water Boards have the ability to refer matters to the state Attorney General for civil enforcement actions or to the appropriate county District Attorney or City Attorney for criminal enforcement (State Water Resources Control Board 2002, 24).

NPDES permits and WDRs issued by the Water Boards contain enforceable provisions related to protection of beneficial uses, which the Water Boards may use to bring an enforcement action against a discharger. Further, the Water Boards have the authority and administrative responsibility to implement and enforcement Total Maximum Daily Loads ("TMDLs") and other water quality standards in order to protect beneficial uses.

The underutilization of existing enforcement authorities has led to a proliferation of ongoing, illegal activities in the Delta. Cataloging these is beyond the scope of this letter. That noted, there a few that deserve mention.

Unfortunately, the State of California itself—through the Fish and Game Commission (Commission) and Department of Fish and Game (DFG)—is engaged in illegal activity in the Delta. The State has implemented a striped bass management program over the past two decades that protects and enhances non-native striped bass in the Delta and its tributaries to the detriment of native, listed species. Federal and state agency biologists have known of the conflict between the State's actions in support of striped bass on the one hand and the federal and California Endangered Species Acts on the other for decades, but the Commission and DFG are captured by sport-fishing special interest groups and therefore willing to violate federal and state law. Recently, NMFS approached the Commission to request changes to the striped bass management program because of the harm it is causing to salmonids that are protected by the federal and California Endangered Species Acts. But the Commission's response was predictable; the President of the Commission instructed DFG to study the issue ***for the next decade***. As a result, the most flagrant violation of the federal and California Endangered Species Acts in the history of the State of California is being perpetrated by the very government institutions that are entrusted to protect at-risk, native species. For additional discussion regarding the impacts of striped bass predation on listed species, see the Coalition for a Sustainable Delta letter to the Commission, dated March 31, 2010 (attached).

It is well known that thousands of water diversions exist in the Delta (for example, Herren and Kawasaki (2001)), that most of these are unscreened and entraining unknown numbers of fish protected by the federal and California Endangered Species Acts, and that a substantial number are diverting water without valid water rights. Approximately 1.3 million acre-feet annually is diverted to support Delta agriculture (DWR 2005). The Department of Fish and Game and the State Board, through the Fish and Game Code and California Water Code respectively, both have enforcement authorities that authorize those agencies to address on-going legal violations at these points of diversion. Yet their willingness to exercise those authorities has been tentative at best.

Finally, discharges into the Delta in violation of the federal Clean Water Act and California Porter-Cologne Water Quality Control Act are commonplace. Although the federal and state governments have robust enforcement authorities under these statutes, they have largely abdicated their responsibilities. As a result, enforcement is generally left to non-profit groups, such as the Coalition, the Natural Resources Defense Council, and the California Sportfishing Protection Alliance. Unfortunately, these groups will never have the investigative and prosecutorial powers and resources available to the State. While the macro-level effects of contaminants on fish populations is uncertain,

recent research suggests that certain contaminants could have a profound influence on the foodweb. Furthermore, localized pollution events certainly have deleterious adverse effects locally.

Overall, efforts to halt illegal activities in the Delta are often non-existent or moving forward at a snail's pace. This fact threatens to undermine the credibility of the State's effort to develop and implement a Delta Plan. This is no trivial matter. For this reason, a principle focus on the rule of law through robust enforcement should be a central feature of the Interim Delta Plan. In addition, the Interim Delta Plan should include a request to state agencies with activities in the Delta to report to the Council regarding their enforcement obligations and activities. The agency reports should include enforcement obligations, ongoing enforcement actions, existing enforcement resources, and prioritized lists of both ongoing and desired enforcement activities. With this list, the Council can identify enforcement shortcomings, identify enforcement resources needed by the agencies, and can prioritize deployment of resources to augment enforcement activities. These activities should be part of the Interim Delta Plan, but they will also inform the enforcement component of the final Delta Plan.

Conclusion

The Coalition for a Sustainable Delta appreciates the opportunity to offer the foregoing recommendations. We urge the Council to develop an Interim Delta Plan that both recognizes the new Delta paradigm and avoids the mistakes of past efforts to manage and restore the Delta.

Coalition for a Sustainable Delta

By: William D. Phillimore, President

wdp:ck

Attachments (3)

Attachment 1 – List of References

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Revised summary of proposed testimony on development of flow criteria for the Delta ecosystem necessary to protect public trust resources

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I offer this summary of proposed testimony in my professional capacity as a conservation biologist who also is a citizen of California. I am motivated by the opportunity to present scientific information that is highly relevant to management of the state's public trust resources and the hope that diverse interests will achieve consensus on biological facts. In presenting this testimony, I am speaking as an independent scientist, not as a representative of any private or public entity. I have not requested, nor have I received, any financial or other compensation for provision of testimony, nor has any group requested or granted approval of the testimony.

About one percent of species listed under the U.S. Endangered Species Act have met recovery standards, generally understood as levels of abundance and reproduction at which the species can sustain itself without human intervention, and the protections of the Act no longer are necessary (Scott et al. 2005). Most listed species will, at best, require ongoing, species-specific management intervention to remain extant. The latter species, which likely include delta smelt (*Hypomesus transpacificus*), have been characterized as "conservation reliant" (Scott et al. 2005). Evidence suggests that longfin smelt (*Spirinchus thaleichthys*), striped bass (*Morone saxatilis*), and threadfin shad (*Dorosoma petenense*) in the San Francisco Estuary also are likely to require sustained management action to remain extant. Striped bass and threadfin shad are not native to the San Francisco Estuary, and therefore are not eligible for protection under the Endangered Species Act in that region. Nevertheless, the striped bass population in the San Francisco Estuary supports a popular sport fishery, and threadfin shad is an important prey species for some native fishes. Therefore, striped bass and threadfin shad are of regional management concern.

Scott et al. (2005) identified five criteria to determine whether the abundance of a species may remain stable or increase over time if management actions of proven effectiveness are implemented and sustained. Data on abundance are less informative than demographic data (birth, death, emigration, and immigration rates) for estimating probabilities of persistence, but reliable time-series data on demographic variables rarely are available for species of concern. The five criteria discussed by Scott et al. are

1. Threats to the species' continued existence are known and treatable

2. Threats to the species are pervasive and recurrent

3. The threats render the species at risk of extinction, absent ongoing conservation Management

4. Management actions sufficient to counter threats have been identified and can be implemented

5. Federal, state, or local governments—often in cooperation with private or tribal interests—are capable of carrying out the necessary management actions as long as necessary

Accordingly, determining whether a species may persist given ongoing management action first requires identification of major threats to its continued existence. Reduction in habitat quality is one of the most common and most substantial threats to persistence of imperiled species in the United States (Wilcove et al. 1998). Assessing habitat quality over time, in turn, requires that the concept of habitat be defined, components of habitat and drivers of those components identified, and the relation between habitat and individual or population-level measures of survival and reproduction quantified.

Concept of habitat. Habitat is the physical space within which an animal or plant lives and the abiotic and biotic resources in that space (Morrison and Hall 2002). Habitat is defined with respect to a given type of animal or plant; few if any species use resources in exactly the same way. The location, spatial extent, and quality of habitat for most species vary in time. The concept of habitat includes the assumption that resources are related in predictable ways to where an animal or plant occurs and to its survival and reproduction, which in turn affects the viability of a population and the persistence of a species.

Drivers of habitat quality for delta smelt and other pelagic fishes. Thomson et al. (in press) identified a non-exhaustive set of 19 abiotic and biotic variables that they expected, on the basis of expert knowledge and published studies, to directly or indirectly drive abundance of delta smelt, longfin smelt, age-0 striped bass, and threadfin shad and for which reliable data are available (Thomson et al. in press; see also Mac Nally et al. in press).

Some of the abiotic and biotic variables, such as average summer water temperature, turbidity, and average biomass of multiple sources of prey, typically would be considered as components of habitat for aquatic species. Other variables, such as the Pacific Decadal Oscillation Index, may affect abiotic and biotic components of habitat. Thomson et al. (in press) also identified variables that may affect the demography of declining pelagic fishes. For example, the volume of water exported by the California State Water Project and Central Valley Project was expected to serve as a surrogate measure of entrainment of juvenile and adult smelt and juvenile striped bass (MacNally et al. in press). The relative influence of different abiotic and biotic variables on habitat quality for fishes (as for other taxonomic groups), and the relative association of such variables with abundances of fishes, varies among species and in space and time (Kimmerer 2009). Data on components of habitat for declining pelagic fishes in the San Francisco Estuary often have not
been collected in the same places and times as data on the fishes, which makes it difficult to draw strong scientific inference about relationships.

Thomson et al. (in press) also noted the potential effect on abundance of declining pelagic fishes of the introduced clam *Corbula amurensis*, which ultimately reduces availability of prey (Alpine and Cloern 1992). Contaminants (e.g., nutrients, metals, pesticides, and other chemicals present

in the estuary) arguably are too numerous and dispersed, sometimes lacking measurements over a sufficient period of time, and potential effects on abundance or fitness of declining pelagic fishes too poorly known, for analyses to provide useful correlative information (Thomson et al. in press).

Relation between abiotic and biotic variables and measures of survival and reproduction. Recent analyses (Thomson et al. in press) indicated sharp declines in abundance of delta smelt, longfin smelt, threadfin shad, and age-0 striped bass in the early 2000s. Abiotic variables including water clarity, position of the 2 psu (practical salinity units) isohaline (X2), and the volume of freshwater exported from the estuary explained some variation in species' abundances over the period of record, but no selected covariates could explain statistically the post-2000 change-points for delta smelt, longfin smelt, threadfin shad, and age-0 striped bass. A change-point is a point in time at which an abrupt change occurred in the functional relationship between the mean abundance of a species and time. A change-point may be either a step change, which is an abrupt change in abundance; a trend change, which is an abrupt change in the temporal trend in abundance; or both.

Potential ability of management actions to counter threats. The ability to evaluate whether management actions are likely to counter threats to persistence of declining pelagic fishes depends on both identification of threats and assessment of human capacity to counter those threats. There currently is no strong empirical evidence that abiotic and biotic components of habitat or drivers of abundance, including water clarity, X2, and the volume of freshwater exports, fully explain the so-called pelagic organism decline. Mac Nally et al. (in press) note thatbefore delta smelt, longfin smelt, threadfin shad, and striped bass declined abruptly in the early 2000s, abiotic drivers of their distribution in the San Francisco Estuary were represented mainly as X2 because position of the salinity field was associated with measures of resource availability and abundances of many organisms (Jassby et al. 1995). However, several studies highlight the importance of other abiotic variables, including water clarity and water temperatures, in the estuary (Feyrer et al. 2007, Nobriga and Feyrer 2008). It has been suggested that management actions are unlikely to sustain declining pelagic fishes in the absence of improved understanding of how water exports may interact with abiotic conditions and the food web (Mac Nally et al. in
press).

Theoretical modeling suggests that abundances of pelagic fishes might increase somewhat and then stabilize if numerous and diverse drivers of habitat and abundance (11 modeled in this case) could be manipulated: for example, water temperatures and freshwater exports maintained at moderate levels within the historical record of variation, food availability increased, predation decreased (R. Mac Nally, personal communication). In reality, however, there are concerns that abundances are sufficiently low that populations are susceptible to demographic stochasticity (that is, so-called small population effects) and may not be highly responsive to environmental changes (R. Mac Nally, personal communication). Thus, it is unclear whether changes in water clarity, X2, and the volume of freshwater exports would have a high probability of stabilizing or reversing the decline. This does not mean there is no relationship between these components or drivers of habitat and abundance of pelagic fishes. Actions that affect these components well may have positive effects on the fishes. Nevertheless, in and of themselves, changes in water

quality, X2, and the volume of freshwater exports likely will not sustain pelagic fishes indefinitely.

Several feasible areas of future work might identify new or clarify currently understood components or drivers of habitat that are most strongly associated with abundance of pelagic fishes and that may be amenable to management. For example, Sommer et al. (2007) and Baxter et al. (2008) considered many hypotheses for declines in abundance, including changes in stock recruitment relations and food webs, mortality from predation and water diversions, contaminants, and changes in the physical environment. Formal statistical methods (e.g., Green 1995) could be applied to existing data on attributes of habitat and abundances of fishes at different life-history stages to compare weights of evidence for the different hypotheses (Thomson et al. in press).

Many management planning efforts have assumed that different abiotic and biotic attributes represent habitat for multiple species, then assumed that management of those attributes will benefit many species simultaneously (Hunter 2005). In theory, by emphasizing elements of the environment (for example, X2) or processes (for example, primary production) that provide resources for multiple species, the number of species that require individually tailored management interventions may be reduced. But the effectiveness of this strategy relies on identification of environmental components that are critical to many species, and prediction of the response of a high proportion of the species to perturbations in those key components.

Inference is strong that long-term declines of delta smelt, longfin smelt, threadfin shad, and striped bass have been caused in large part by human land uses that have altered California's ecosystems in potentially irreversible ways. Given these circumstances, it is reasonable to assume that the species are at best conservation reliant. Science can help estimate probabilities that alternative management actions will result in certain biological responses. Nevertheless, determining the level of resources that should be allocated to management of species of concern ultimately is not a scientific decision but a societal decision (Scott et al. 2005).

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VIA FEDERAL EXPRESS

March 31, 2010

Mr. Jim Kellog
President
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1416 Ninth Street
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Re: Fish and Game Commission April 7, 2010 Hearing Agenda Item 5

Dear Mr. Kellog,

Thank you for the opportunity to submit written comments and present oral testimony at the April 7, 2010 Fish and Game Commission hearing. We are submitting these comments and presenting testimony on behalf of our client, the Coalition for a Sustainable Delta. Both these comments and the testimony are directed at item 5 on the Commission agenda, entitled "Commission Consideration and Direction to Staff Regarding Possible Amendment of Striped Bass Sport Fishing Regulations." As an initial matter, we would like to note that while we believe that modification of the striped bass sport fishing regulations is urgently needed, the striped bass is not the only non-native predatory species that is harming the native species of concern. Instead, as the National Marine Fisheries Service recently explained to the Commission, there are a number of non-native predatory species, in addition to the striped bass, that need to be addressed.

The Commission has been delegated "the power to regulate the taking or possession of birds, mammals, fish, amphibian, and reptiles," (Fish & G. Code, § 200), and the regulatory authority to establish seasons, bag limits, and methods of take for sport fish. (*Id.* § 203.) Pursuant to its delegated authority, the Commission has established sport fishing regulations for non-native predatory fish, including, among others, striped bass, largemouth bass, small mouth bass, American shad, and black crappie.

As the Commission is aware, many of these non-native predatory fish, including the striped bass, prey on a variety of native, at-risk species, including the Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, delta smelt, and Central Valley steelhead. The fact that non-native predatory fish prey on species protected by the federal and California Endangered Species Acts is not a revelation. The Commission acknowledged such predation more than a decade ago when it requested take authorization from the United States Fish and Wildlife Service and National Marine Fisheries Service for its Striped Bass Management Program. Despite acknowledging this fact more than a decade ago, the Commission has done little to ameliorate the predatory impact of non-native fish species. In

fact, along with the California Department of Fish and Game ("Department"), the Commission has spent untold millions in an effort to protect these non-native species to the detriment of native species -- the same native species that the Commission is obliged by federal and California law to protect.[1] (See, e.g., Attachment A [Herrgesell Depo.] at pp. 93:17-94:4 [estimating that the Department spent between $500,000 and $800,000 annually on enforcement of the striped bass sport fishing regulations]; Attachment B [2001-2002 Department Budget Request] at p. 3 [requesting $135,000 in overtime for enforcement of striped bass sport fishing regulations].)[2] Such efforts have included the authorization and implementation of stocking programs in the face of alarmingly significant predation rates (see, e.g., Attachment C [NMFS Sept. 1996 Letter to the Department] at p. 1 [identifying a 10-18% predation rate]), as well as the enactment and enforcement of sport fishing regulations that had identified impacts on native species. (Attachment D [Biological Assessment] at p. 53 [sport fishing regulations increase predation].) In the past, despite numerous warnings from the National Marine Fisheries Service, the Commission and the Department ignored the negative impacts that their efforts could have on the problem of non-native predators. (See, e.g., Attachment E [NMFS Feb. 1997 Letter to the Department] at p. 6 ["the best available commercial and scientific information indicates that predation on salmon by striped bass can be very high"]; Attachment F [NMFS Apr. 1996 Letter to the Department] at pp. 1-2 [concluding that the Department "grossly underestimates" potential predation impacts, which could account for a "15-30% loss of the outmigrating winter-run smolts"].) In light of the evidence that has been uncovered through litigation initiated by the Coalition and others, however, the Commission and the Department can no longer simply ignore the consequences of their actions. This is especially true with respect to the enactment and enforcement of sport fishing regulations, which are admittedly promoting a number of non-native predator populations to the detriment of native, at-risk species.

For example, the Commission's current striped bass sport fishing regulations impose catch limitations, size limitations, and gear restrictions on striped bass angling. (Cal. Code Regs. tit., §§ 5.75, 27.85.) Numerous Department biologists and employees -- including Fish and Game Supervising Biologist Marty Gingras, Fish and Game Biologist Jason DuBois, former Fish and Game Bay-Delta Water Policy Advisor Dr. Perry Herrgesell, and Fish and Game Assistant Chief Tony Warrington -- have admitted that these restrictions result in a greater population of striped bass than there would be without the regulations. (Attachment G [Gingras Depo.] at p. 612:3-9; Attachment H [DuBois Depo.] at p. 83:5-8; Attachment A [Herrgesell Depo.] at p. 50:1-9; Attachment I [Warrington Depo.] at p. 78:2-10; *id.* at pp. 86:22-87:2.) This has, in turn, increased striped bass predation on native protected species. (Attachment G

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[1] The federal Endangered Species Act ("ESA") prohibits the "take" of endangered fish and wildlife without prior authorization. The "take" prohibition in section 9 of the ESA extends to any action by any person, corporation, or governmental agency that will either directly or indirectly "harass, harm, pursue, hunt, shoot, wound, kill, capture or collect, or attempt to engage in such conduct." (16 U.S.C. §§ 1532(19) [defining "take"], 1538(g) [prohibiting direct and indirect causes of take].)

[2] All attachments referenced in this letter are provided in full on the accompanying CD labeled "Documents Identified in Coalition Letter re Item 5."

[Gingras Depo.] at p. 485:10-13 [admitting that reducing striped bass abundance "would reduce total juvenile salmon predation and mortality, with a corresponding increase in juveniles salmon survival"]; Attachment J [Nobriga Depo.] at pp. 259:24-260:6 [admitting same]; Attachment G [Gingras Depo.] at p. 501:9-11 [stating that striped bass predation "is proportional to striped bass abundance"]; Attachment J [Nobriga Depo.] at pp. 292:16-293:5 [stating that fewer striped bass would increase salmon].) Individuals inside and outside of the Department have been warning of this problem for more than a decade now:

- "programs that encourage population increases and thus fishing opportunities for exotic predatory species such as striped bass (e.g., California Fish and Game Commission . . .) clearly conflict with CVPIA and ESA mandates to protect and rebuild depressed stocks of native salmonids" (See, e.g., Attachment K [Listen to the River: An Independent Review] at p. 47);

- admitting that due to the presence of several million juvenile and adult striped bass in the Delta, even a small predation rate by striped bass (e.g., 3 per 1000 striped bass stomachs) would kill many of the "listed species" (Attachment G [Gingras Depo.] at p. 626:7-14);

- "With the status of the Delta smelt and a few other natives in the tank, and recent 'back of the envelope' calculations indicating striped bass predation could be a very significant factor, we probably should not take steps to increase the abundance of anadromous striped bass" (Attachment L [Gingras Email Feb. 13, 2007]);

- admitting that the Commission could proactively address the issue of striped bass predation and reduce the extinction probability for delta smelt by eliminating the size and two fish bag limit for striped bass (Attachment G [Gingras Depo.] at pp. 504:7-505:1);

- warning that management activities "(e.g., sportfish regulation changes) can indirectly take listed species by increasing the size of the striped bass population, potentially causing take through increased striped bass predation on those species" (Attachment M [Department Strategic Framework] at p.10);

- "fishing regulations maintain striped bass abundance at a greater level than if fishing was unregulated," resulting in "greater predation on the species of concern" (Attachment D [Biological Assessment] at p. 53);

- "we should propose revising the striped bass policy to consider them a 'weed' like pigs or a similar pest" (Attachment N [Gingras Email Feb. 8, 2007]);

- "Last night a chill ran down my spine imagining that Delta smelt go extinct (or another Delta native forage fish get listed) on 'our' watch while we have done nothing proactive to address predation by striped bass" (Attachment N [Gingras Email Feb. 8, 2007]);

- calling for alterations to the striped bass sport fishing regulations so as to increase catch and reduce abundance of the age groups most likely to prey upon delta smelt if surveys indicate declines in delta smelt abundance or distribution below 1994 levels (Attachment O [1995 Letter from the United States Fish and Wildlife Service] at pp. 1-2.)

Striped bass predation, which has been identified as a contributing factor to the decline of numerous protected species, is particularly harmful in light of the Delta's degraded ecosystem. (Attachment G [Gingras Depo.] at pp. 552:25-553:3 ["striped bass predation is one of many factors contributing to the decline of the listed species"]; *id.* at pp. 607:24-608:6 [same conclusion]; *id.* at p. 607:18-20 ["predation by striped bass increases mortality on those listed species"]; Attachment P [Hanson Report] at 41; Attachment Q [National Marine Fisheries Service Public Draft Recovery Plan] at ES-2 [identifying "predation of Chinook salmon and steelhead from introduced species such as striped bass and black bass" as one of four major stressors on those species].)

While there is a shortage of reliable striped bass diet data (due in part to the Commission and Department's refusal to study striped bass predation during the last decade), there is a consensus that striped bass predation is a significant cause of mortality for protected species:

Expert	Estimate of Striped Bass Predation on Winter-Run Chinook Salmon	Estimate of Striped Bass Predation on Spring-Run Chinook Salmon
Marty Gingras (Department Biologist)	5%-25% (Attachment G [Gingras Depo.] at p. 498:13-21.)	5%-25% (Attachment G [Gingras Depo.] at p. 498:13-21.)
Matthew Nobriga[3] (Department Biologist)	6%-50% (Attachment J [Nobriga Depo.] at p. 119:1-8.)	6%-50% (Attachment J [Nobriga Depo.] at p. 119:1-8.)
Dr. Charles Hanson (Independent Biologist)	21% (Attachment P [Hanson Report] at pp. 4, 30-34.)	42% (Attachment P [Hanson Report] at pp. 4, 34-35.)
David Kohlhorst (Former Department Biologist)	30% (Attachment R [Kohlhorst 1995 Unpublished].)	N/A

3 (Attachment T [Nobriga & Feyrer Peer Reviewed Article] at p. 9 ["striped bass likely remains the most significant predator of Chinook salmon . . . and threatened Delta smelt"].)

Steven T. Lindley & Michael S. Mohr (NMFS Biologists)	9% (Attachment S [Lindley & Mohr Peer Reviewed Article] at p. 328 [Estimate limited to the Delta].)	N/A

It is because of the significant impact that non-native predatory fish, like the striped bass, have on protected species that the National Marine Fisheries Service recently requested that the Commission modify its sport fishing regulations. (See Fish & G. Commission Meeting (March 3, 2010) [requesting "that the Commission begin the process to consider proposed regulations directed at reducing, to the extent practicable, the adverse effects of non-native predators on federally listed anadromous species in California, especially in the Central Valley"].) This request is consistent with the Public Draft Recovery Plan developed by the National Marine Fisheries Service. (Attachment Q [National Marine Fisheries Service Public Draft Recovery Plan] at p. 157 ["Implement programs and measures designed to control non-native predatory fish (e.g., striped bass, largemouth bass, and smallmouth bass), including harvest management techniques"].)

The overwhelming weight of the scientific evidence establishes that the Commission's sport fishing regulations are contributing to the decline of numerous native, at-risk species. Given the delicate state of these species, and the fact that any additional delay may result in irreversible losses, there is an urgent need for the Commission to carry out its responsibilities under the federal and California Endangered Species Act. Therefore, we respectfully request that the Commission modify its sport fishing regulations so as to combat the significant problem of non-native predatory species. Further, because we concur with the National Marine Fisheries Service's conclusion that the striped bass sport fishing regulations are a "good place to start," we respectfully request that the Commission eliminate the existing striped bass sport fishing regulations. We believe that this regulation change will have an immediate and significant impact on striped bass predation pressure. (See Attachment G [Gingras Depo.] at pp. 504:7-505:7; Attachment I [Warrington Depo.] at p. 78:2-10; *id.* at pp. 86:22-87:2; Attachment U [Save a Salmon: Catch a Striper].)

Thank you for giving careful consideration to these comments.

Very truly yours,

Benjamin Z. Rubin
for Nossaman LLP

BZR/
Enclosures

cc: Anthony Morton, NOAA (via Federal Express, w/encls.)

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