



Fact Sheet

Phase II Update of the Bay-Delta Plan: Inflows to the Sacramento River and Delta and Tributaries, Delta Outflows, Cold Water Habitat and Interior Delta Flows

The Importance of the Bay-Delta

The San Francisco Bay and Sacramento-San Joaquin Delta is one of the most important ecosystems in California as well as the hub of California's water system. As the largest tidal estuary on the western coast of the Americas, it nurtures a vast array of aquatic, terrestrial, and avian wildlife. The water that flows down the San Joaquin and Sacramento rivers into the Delta helps keep the taps running for more than two-thirds of Californians, supports industry, and irrigates millions of acres of farmland. It is the lifeblood of commercial and recreational fishing and boating businesses on the rivers, the Delta, the Bay, and into the ocean.

The Bay and Delta are also in ecological crisis. For decades, valuable habitat has been converted to farmland and urban uses, the quality of water in the channels has been degraded, there has been a substantial overall reduction in flows and significant changes in the timing and distribution of those flows, and species have been cut off from natal waters. This has led to severe declines, and in some cases extinctions, of native fish. The overall health of the estuary is in trouble, and expeditious action is needed on the watershed level to address the crisis, including actions by the State Water Resources Control Board (State Water Board or Board), fisheries agencies, water users, and others to address the array of issues impacting the watershed. The State Water Board is the primary agency responsible for addressing the flow and water quality issues. Other agencies are responsible for and are currently engaged in addressing habitat and other concerns. Those efforts should continue in an integrated way with the State Water Board's efforts. In particular, voluntary solutions that address flow and nonflow issues comprehensively are encouraged for their ability to achieve tailored, timely, and more durable efforts to improve ecosystem, water supply, and fishery benefits at the least cost.

Update of the Bay-Delta Water Quality Control Plan

The State Water Board is responsible for allocating surface water rights and protecting water quality, including drinking water, surface water, and groundwater, while protecting the public trust and public interest and preventing the waste and unreasonable use of water. These responsibilities all converge in the Bay-Delta where the State Water Board must balance many responsibilities and interests.

State law requires that the State Water Board and Regional Water Quality Control Boards (Water Boards) adopt Water Quality Control Plans that ensure beneficial uses of water in an area are protected. The Water Quality Control Plan for the Bay-Delta (Bay-Delta Plan) includes water quality objectives to protect municipal and industrial, agricultural, and fish and wildlife beneficial uses, among others. The State Water Board and Regional Water Quality Control Boards establish water quality objectives for the protection of beneficial uses of water and programs of implementation to achieve those objectives that seek to maximize all beneficial uses of water. The objectives are both narrative and numeric. Narrative objectives describe the general water quality and flow conditions that must be attained through watershed management. They also serve as the basis for the detailed numerical



objectives. Numeric objectives are exactly how they sound: specific numbers, for example, cubic-feet per second (cfs) of flow or percentages of unimpaired flow. There are also other flow-related requirements, like salinity, dissolved oxygen, and water project operational requirements to protect fish and other aquatic species.

The State Water Board has typically implemented the Bay-Delta Plan through changes to water rights. Currently, responsibility for meeting the Bay-Delta Plan objectives falls primarily on only two water right holders in the watershed: the Department of Water Resources (DWR) and U.S. Bureau of Reclamation (Reclamation) for the State Water Project and Central Valley Project (collectively Projects), respectively. The Bay-Delta Plan is implemented through the State Water Board's water right Decision 1641 (D-1641). In D-1641, the State Water Board accepted various agreements between DWR and Reclamation and other water users to assume responsibility for meeting specified Bay-Delta Plan objectives for a period of time.

The current Bay-Delta Plan and its implementation through a limited subset of water users on a limited subset of streams and for parts of the year has failed to protect fish and wildlife that require protection throughout the watershed and throughout the year. The current Bay-Delta Plan requirements, as implemented, result in overburdening some streams to the detriment of all beneficial uses in that stream while at the same time failing to protect beneficial uses in other streams and the watershed at large. The Bay-Delta Plan and its implementation require updating to address these issues in an expedited manner to halt and reverse the ecosystem collapse.

The State Water Board identified the need to update the Bay-Delta Plan and its implementation many years ago, and it plans to complete that process without further delay. In that effort, the State Water Board is planning to pursue expeditious completion of the update of the Bay-Delta Plan. The Board will also explore all available options for expediting implementation efforts. Because voluntary agreements may provide the most efficient and effective route to durable solutions to ensure the reasonable protection of fish and wildlife, the State Water Board is encouraging voluntary agreements that achieve and implement the objectives.

The Bay-Delta Plan is being updated in two separate phases. Phase I addresses flow requirements in the San Joaquin River watershed for the protection of fish and wildlife, and salinity requirements in the southern Delta for the protection of agriculture. Phase II addresses requirements for flows and cold water habitat in the Sacramento River, its tributaries and tributaries to the Delta (the Mokelumne, Cosumnes and Calaveras rivers); Delta outflows; and water project operations in the interior Delta.

Each phase involves developing a Scientific Basis Report (Science Report) identifying the best available science supporting potential changes to the Bay-Delta Plan. Based on that science, potential changes to the Bay-Delta Plan and alternatives are developed along with a Staff Report or Substitute Environmental Document (SED) that analyzes the potential environmental and economic impacts related to those potential changes. Then a Staff Report/SED is released for public review and comment. Following the comment period, the State Water Board reviews and considers the public comments and prepares responses and any needed changes to the proposed Bay-Delta Plan revisions and analyses.

The science, environmental, economic, and other assessments and public comments provide critical knowledge that informs the State Water Board's decisions on how to balance the needs of all beneficial uses of water, including fish and wildlife, municipal, agricultural, hydropower, and other uses, when determining what changes to make to the Bay-Delta Plan.

Phase I of the Bay-Delta Plan update is nearing completion, with responses to comments on the environmental, economic, and other analyses currently under development. Phase II recently completed the final Science Report process, including consultation and input from the Delta Independent Science Board (ISB). The State Water Board appreciates all of the helpful comments it received from the ISB and the public. Based on those comments, the Science Report and conceptual basis for proposed changes to the Bay-Delta Plan were revised. Chapter 1 of the final Science Report describes how the report and proposed conceptual basis for changes to the Bay-Delta Plan were modified to address specific comments from the ISB and the public. Those changes include clarifying the approach for the proposed flow requirements and adaptive management process for the flow requirements; bolstering the report's discussion of climate change, management of water temperatures, nonflow stressors, and scientific uncertainty; and incorporation of new science since the working draft Science Report was released. The final Science Report with these changes (available [here](#)) was submitted for independent blind peer review. The State Water Board received the peer review responses (available [here](#)) indicating that the Science Report is based on sound science. Accordingly, no substantive changes were made to the report. While not required, State Water Board staff prepared responses to comments and questions from the peer reviewers (available [here](#)).

State Water Board staff are now developing proposed changes to the Bay-Delta Plan as part of Phase II, including the project alternatives and associated environmental and economic analyses that will be part of the Staff Report/SED that is submitted for public review and comment. To help refine the potential Phase II changes to the Bay-Delta Plan, State Water Board staff posted a series of questions for public input on its website (available [here](#)). Any public input should be provided by November 9, 2017. A notice to the public on how to stay informed on the Phase II update of the Bay-Delta Plan has also been distributed and can be found on the State Water Board's website (available [here](#)).

The State Water Board has also posted the latest version of its Sacramento Water Allocation Model (SacWAM) (available [here](#)). The model allows staff to evaluate the potential effects of different possible changes to the Bay-Delta Plan on the watershed and water supplies. A prior initial version of SacWAM was released for public review and for review by a panel of experts assembled by the Delta Science Program (DSP). The DSP review panel provided comments on SacWAM in December, 2016 (available [here](#)). Based on those comments, the public comments and internal review, SacWAM was updated and responses to the DSP peer review were prepared (available [here](#)). The State Water Board appreciates the very helpful comments from the DSP peer review panel and the assistance of the public in informing the development of SacWAM.

The Science Report Documents the Ecological Crisis

The Science Report for Phase II of the Bay-Delta Plan update documents the current ecological crisis in the watershed, including a prolonged and precipitous decline in numerous native species, including spring-run and winter-run Chinook salmon, longfin smelt, Delta smelt, and Sacramento splittail. The species declines are attributable to numerous stressors in the ecosystem, including reduced and modified flows, loss of habitat, invasive species, and water pollution. The Science Report discusses the significant impacts non-flow stressors like habitat loss are having on the ecosystem and the importance of also addressing these stressors in order to protect the Bay-Delta ecosystem. Although the Report acknowledges the importance of addressing non-flow stressors to protect the ecosystem, it focuses on flows, because flows are the direct responsibility of the State Water Board, and because flows are an essential part of restoring healthy ecosystem functions.

With respect to flows, the Science Report explains how drastically the hydrology in the Bay-Delta watershed has been modified and how much further flows could be reduced without additional flow requirements. On average, annual outflow from the Delta into the Bay has been reduced by more than half and sometimes by much greater quantities at critical times for native species. Inflows from rivers into the Delta on many tributaries have been reduced by much greater amounts, with as much as 100 percent of flows diverted at critical times for native species. Additionally, because existing Bay-Delta Plan flow requirements are far below current flow levels most of the time, additional regulatory requirements are needed to prevent flows from being substantially reduced in the future.

Further, in most of the watershed, dams have deprived salmon species of access to the cold water that they need for survival, trapping them in lower warmer elevations resulting in failure to protect beneficial uses and failure to keep fish in good condition below dams per the requirements of the Fish and Game Code.¹ This sometimes fatal condition will be exacerbated by climate change and more limited water supplies. At the same time, once salmon and other species reach the estuary, they need protection from the effects of Project water diversions in the southern Delta. The diversions confuse the migratory signals that fish follow, trap fish at the export pumps where direct mortality occurs, create poor habitat conditions for native species, and increase predation due to favoring invasive species and inhibiting the ability of native fishes to evade predators.

Using the Science to Develop Proposed Phase II Changes to the Bay-Delta Plan

The Science Report recommends a holistic approach for developing instream flows in which the ecosystem as a whole is considered and flows generally resemble the natural flow regime to which native species are adapted. Based on the Science Report, new inflow and cold water habitat requirements and new and modified Delta outflows and interior Delta flow requirements are proposed with adaptive management provisions, as well as complementary actions to address other stressors and monitoring, evaluation, and reporting requirements. The approach proposed is flexible in recognition of the complexity of the watershed, additional complicating factors like climate change, and the need for expedient action.

Many of the streams under consideration have no inflow, cold water habitat, or Delta outflow requirements. Where requirements do exist they may only be for parts of the year or may be inadequate, particularly with respect to contribution to Delta outflows. The proposed inflow requirements would establish a unifying regulatory approach for instream flows for all tributaries that support salmon species in the Bay-Delta watershed for the entire year. The inflow requirements would be managed to meet the needs for flows and cold water in the tributaries and would contribute to needed Delta outflows. The approach addresses the existing altered hydrology and landscape, and the reality that flows need to address a variety of purposes. Under the proposed approach, a portion of the inflow to a watershed would be dedicated to environmental purposes. The ecosystem and water users would share the streams in wet times and dry times preserving the patterns of flows that native fish and other species evolved to.

The amount or budget of environmental flow water would be determined based on the unimpaired flow of each water body and would be implemented based on the specific needs and circumstances within

¹ Pursuant to Fish and Game Code section 5937, the owner of any dam shall allow sufficient water at all times to pass through, over or around a dam to keep fish in good condition below the dam.

each tributary. Unimpaired flow represents the total amount of water available at a specific location and time for all uses. In a regulatory setting, use of unimpaired flows allows the State Water Board to allocate a certain amount of the available supply of a stream to the environment while recognizing other uses of water. While unimpaired flow is not the same as natural flow,² it generally reflects the frequency, timing, magnitude, and duration of the natural flows to which native fish and wildlife have adapted. Where unimpaired flows may not optimally provide for natural flow functions, those flows may be shaped and sculpted under the proposed approach. Ranges for the unimpaired flows and flexibility in implementing flows are proposed to address specific needs within tributaries, climate change, drought, cold water needs, other factors, and the possibility that non-flow actions may reduce the needs for flows because they help fish and wildlife in other ways like providing habitat, temperature control, and other measures.

The inflow, cold water habitat, and Delta outflow requirements may be implemented in a variety of ways to provide maximum benefits to fish and wildlife. These include targeted pulses to cue migration, summer cold water releases, minimum flows, and other functions. Flows could be implemented in a manner that generally follows unimpaired flows in watersheds where there is little change from natural conditions to which native species are adapted. In more physically altered watersheds, the pattern of these flows would likely be modified from unimpaired to achieve specific purposes or functions. With increasing climate change, it is expected that further sculpting and shaping of flows will be needed. New and existing tools could be used for shaping the flows based on the availability of information for a watershed (e.g., specific instream flow studies, presence of reservoirs). Monitoring and special studies would then inform adaptive management of the environmental flows. Biological goals that incorporate “SMART” (specific, measurable, achievable, relevant, and time-bound) principles that are tied to controllable factors within specific watersheds are proposed to be developed. These goals can assist in measuring flow and other management actions for determining adaptive management solutions.

Coordination with other Science, Planning, and Regulatory Efforts

Some of the potential changes to the Bay-Delta Plan are related to efforts by other agencies and groups. Specifically, changes are proposed to the Bay-Delta Plan to incorporate existing federal and state endangered species act requirements, including biological opinions (BiOp) and incidental take permit requirements for the Projects in the Bay-Delta Plan. Any Bay-Delta Plan requirements that are related to these or other regulatory requirements would be coordinated to avoid redundancy and inefficiencies while ensuring that the State Water Board meets its obligations to protect fish and wildlife.

The State Water Board will continue to coordinate with the DSP and ISB as appropriate through completion and implementation of updates to the Bay-Delta Plan. The State Water Board is also committed to collaborating and coordinating with other science efforts including the Delta Plan Interagency Implementation Committee (information available [here](#)), Interagency Ecological Program (information available [here](#)), the Collaborative Science and Adaptive Management Program (information available [here](#)), and other efforts. In particular, the State Water Board is interested in input from these groups on adaptive management, monitoring, reporting, and analysis efforts.

² Natural flows are the theoretical flows that would exist without the changes to the flows and landscape in a watershed that have occurred over time including levees, dams, changes in vegetation, and water diversions. There are estimates of natural flows, but those estimates are highly uncertain given all of the changes that have occurred in the watershed over time. Given all of the changes, it would be impossible to return to these natural flow conditions but it is possible to produce more natural flows.

There are also other activities underway by other agencies that the State Water Board plans to coordinate and collaborate with including the: California Water Action Plan (information available [here](#)); species Recovery Plans; California EcoRestore (information available [here](#)); the Water Quality, Supply, and Infrastructure Improvement Act (information available [here](#)); and others. Successful implementation of these efforts is expected to complement the State Water Board's water quality control planning and implementation efforts and will inform adaptive management decisions regarding needed flows and operational measures.

Proposed Changes to the Bay-Delta Plan

The Bay-Delta watershed is an inextricably linked ecosystem--from streams where native fish spawn through to the ocean. Chemical, physical and biological processes in the Bay and Delta are shaped by flows and associated processes that originate hundreds of miles upstream and all along the way. The reverse is also true, with the tributaries intricately linked to conditions in the Bay and Delta. Migratory fish in particular depend on adequate conditions throughout the ecosystem from spawning grounds through the Delta and Bay. In recognition of this fact, proposed Phase II changes to the Bay-Delta Plan are meant to provide for a flow regime that supports a connected and functioning ecosystem linking and integrating inflow, cold water habitat, Delta outflow, and interior Delta flow requirements as well as habitat and other nonflow measures by others.

Tributary Inflows: The first element proposed to be changed in the Bay-Delta Plan to ensure comprehensive protection of the Bay-Delta ecosystem is the addition of new tributary inflow requirements. Currently the Bay-Delta Plan only specifies minimal flows for the mainstem Sacramento River for a small part of the year and does not address the critical importance to the ecosystem of flows within tributaries and connecting those flows with the Delta and out to the ocean. Proposed changes to the Bay-Delta Plan are structured using a holistic ecosystem approach that connects nesting areas for anadromous fish with the Delta and ocean. Specifically, new year-round inflow requirements are proposed from the Phase II project area to the Delta.

Specific functions provided by these flows include supporting habitat conditions for migration and rearing of native fish species (primarily Chinook salmon and steelhead) and contributions to Delta outflows to protect species in the estuary. Different runs of these native species are present in the Delta and its tributaries all year. Flows are needed that more closely resemble the conditions to which native fish species have adapted, including the frequency, timing, magnitude, and duration of flows, as well as the proportionality of flows from tributaries. These flow attributes support key functions that are important to native species. Those functions include providing for: floodplain inundation that improves growth and survival of native fish through improved food supplies and shelter; temperature control to prevent mortality and disease caused by high temperatures; and migratory cues for fish and other aquatic species going upstream and downstream that help fish to stay on the appropriate migratory route and avoid getting stranded without access to water or straying in the wrong direction. Flows that come from the entire watershed throughout the year are critical to the long term survival of native fish species. These flows support both genetic and life history diversity that allow native species to distribute the risks that droughts, fires, disease, food availability, and other natural and human-made stressors present to populations.

The proposed new inflow objective is both narrative and numeric and is intended to set the foundation for integrating inflow, cold water habitat, and outflow requirements. All three of these requirements are proposed to work together in an integrated fashion. Cold water management affects inflows, inflow

management affects outflows and vice versa. Thus, all three requirements must be considered together as part of a comprehensive package. The narrative portion of the inflow objective describes the needs for inflows to provide appropriate conditions in tributaries and to contribute flows to the Delta. The numeric portion requires inflows from the Sacramento River, its tributaries and the Delta eastside tributaries to remain in the stream for environmental purposes. The numeric requirements may be managed as a block of water for the environment. That block would be based on a percentage of the inflows to the watersheds (unimpaired flows), allocating a portion of the water in the watershed to the environment to be managed to optimize benefits for fish and wildlife for inflow and outflow purposes.

Through adaptive management, these unimpaired flows could be sculpted to provide maximum benefits to fish and wildlife, including targeted pulses to cue migration, summer cold water releases, minimum flows, floodplain inundation, and other functions. In some tributaries where flows are currently significantly impaired (reduced below unimpaired levels), these new inflow requirements are needed to improve conditions for fish and wildlife in those tributaries and to provide for connection with the Delta and contribution of flow to the Delta. In other tributaries where flows are less impaired, new inflow requirements are needed to ensure that those flows are not reduced in a way that is harmful to native fish.

The numeric inflow requirement would include a range for the flows to allow for adjustment up or down within the range to address the unique needs and conditions of the tributaries (including cold water needs), changing information (new science), and changing conditions (implementation of non-flow measures, drought, etc.). The science indicates that higher inflows up to and beyond 75 percent of unimpaired flows are most protective of the ecosystem. However, these flow levels are not necessarily reasonable or feasible given all of the competing uses for water in the watershed, including cold water habitat. The decision on the range for the inflow objective will be a balancing decision to determine reasonable protection considering competing uses of water, environmental, economic, and other considerations. The Board will make that determination by considering information in the Science Report, Staff Report/SED, and public comments. When determining the numeric inflow levels, instream tributary flow needs as well as cold water habitat and Delta outflow needs are proposed to be considered. The range under consideration is from 35 to 75 percent of unimpaired flows and generally does not provide for flows lower than existing conditions. This range is consistent with the Delta outflow range discussed below in recognition of the linkage between outflow and inflow.

To ensure that beneficial uses are protected in a meaningful timeframe, it is the State Water Board's intent that the inflow and cold water habitat objectives will be implemented in a timely manner and that tributaries will share in the responsibility to meet Delta outflows in the near term. Flexibility is proposed to be provided for implementing these objectives through voluntary agreements in which tributary or regional plans are developed provided that those voluntary agreements meet minimum criteria and can be developed expeditiously. All tributaries are proposed to be responsible for providing inflows within a specified range and are generally expected to meet a specific minimum flow level identified in that range. Voluntary agreements that are developed prior to the State Water Board's adoption of the objectives could be integrated into the program of implementation and implemented upon adoption. In the absence of these agreements, however, the State Water Board does not intend to delay implementation while voluntary agreements are developed. As such, the program of implementation will include provisions for implementing the inflow and cold water habitat requirements and for contributing to Delta outflows in a timely manner that will be effective unless and until adequate tributary plans are developed through voluntary agreements.

Cold Water Habitat: A necessary companion to the inflow requirements discussed above to ensure the protection of the ecosystem, and specifically salmon species in the tributaries, and to ensure that there are not redirected impacts from the new inflow and outflow requirements is the addition of cold water habitat requirements. Elevated temperatures during the early life stages of salmon species reduce survival. Needed temperature conditions throughout the year to protect against elevated temperatures depend on the race of salmon, the life stage, and other factors. Currently the Bay-Delta Plan does not include cold water habitat requirements. While some other State Water Board cold water habitat requirements and requirements of other agencies exist, those requirements are not comprehensive and are not integrated with inflow and outflow requirements and are not necessarily protective. To address these issues, a new narrative cold water habitat requirement is proposed to be added to the Bay-Delta Plan. The requirement would ensure that cold water flows from reservoirs are maintained and timed to provide for downstream temperatures to protect salmon species, or that alternate measures are implemented to protect fish from temperature impacts (e.g., passage above dams) to protect native fish and wildlife beneficial uses and to meet the requirements of the Fish and Game Code (section 5937).

Actions needed to manage temperatures in tributaries will depend on the specific circumstances of that tributary. Specific implementation actions will depend on the needs of the fish in each tributary and the actions that are available to protect salmon species from temperature effects. As such, a general narrative objective for cold water management is proposed that will be implemented with inflows as discussed above.

Delta Outflow: In addition to inflows and cold water habitat requirements, outflow requirements that recognize the imperative of providing for a connected watershed that integrates all of these requirements are proposed. Changes to outflow requirements are also proposed to address the fact that current outflow volumes are inadequate to protect the ecosystem and that even these inadequate levels will not be maintained with existing requirements. Current outflow levels are usually greater than requirements because of an inability to store and use that water. With additional storage and diversion facilities, the additional outflows that occur now will be reduced, potentially substantially, without additional regulatory requirements. Finally, new fall Delta outflow requirements are proposed to ensure that the Bay-Delta Plan provides for comprehensive protection of native species while at the same time coordinating and integrating with existing BiOp requirements.

Monitoring of fish and their food species that serve as an indicator of the health of the estuary continues to show the importance of Delta outflows in protection of the ecosystem. The dramatic declines in population size of these indicator species like longfin smelt indicate that current Delta outflows are not sufficient to protect the ecosystem. Freshwater outflow influences chemical, physical, and biological conditions through its effects on food, pollution, and the movement of flows not only in the Delta, but throughout the watershed and into the Bay and ocean.

The survival and abundance of many native species is closely related to Delta outflows and how those outflows affect the location where freshwater from the rivers mixes with seawater from the ocean. This mixing concentrates food and provides other functions that multiple life stages of a diversity of fish and other species depend. The quality, location, and extent of habitat in the estuary fluctuates in response to outflows and other factors. Generally, the further this mixing zone is downstream of the Sacramento and San Joaquin rivers due to increased Delta outflows, the better native fish and other aquatic species respond and the better habitat conditions are. Delta outflow is also an important factor in the migration of salmon and other species. While the exact mechanisms that drive all of these relationships are not perfectly understood, the evidence is expansive and perfect science is not required to move forward.

The changes to the Bay-Delta Plan are proposed to be implemented in a way that improves scientific understanding and adapts to that new understanding.

To protect the ecosystem and the native fish and wildlife species dependent on that ecosystem, new and modified narrative and numeric Delta outflow objectives are proposed. The narrative Delta outflow objective is proposed to describe the outflow conditions that protect native fish and aquatic species populations. Changes to the numeric Delta outflow requirements are proposed to integrate the Delta outflow requirements with the proposed inflow and cold water habitat requirements to provide for comprehensive integrated watershed management in a feasible and flexible way.

In order to ensure that minimum quantities of Delta outflow are provided to the estuary in all months and all years, minimum year round Delta outflows from the current Bay-Delta Plan would be maintained. Specifically, the existing July through January Delta outflow requirements in Table 3 of the Bay-Delta Plan that range from 3,000 cfs to 8,000 cfs based on water year type would be maintained. In addition, base February through June flows of 7,100 cfs would also be maintained (Footnote 11 to Table 3.) Under the existing Bay-Delta Plan, this requirement may also be met by achieving specified salinity levels. The methods by which this objective may be met are proposed to be reevaluated to ensure that intended protections are provided, while providing flexibility to reduce water supply impacts.

The remaining existing Delta outflow requirements included in Table 4 of the existing Bay-Delta Plan would be replaced with an “inflow-based Delta outflow” objective that integrates inflow and outflow requirements. This objective is proposed to achieve a higher level of protection than provided under the current requirements in terms of quantity, timing, and connectivity. The proposed new inflow-based Delta outflow objective is just that, an outflow objective that is based on the required inflows. Specifically, the proposed objective would require that the quantities of required inflows be provided as outflows. The objective would also include adjustments to address additional inflows and natural losses downstream, including adjustments for floodplain inundation that is encouraged.

Required inflows will be determined by considering the needs for tributaries to contribute to outflows, specific tributary needs, and the need to balance competing uses of water. In addition to tributary inflows contributing to outflows, water use downstream of the tributaries on the valley floor and in the Delta may be limited to achieve required outflow levels consistent with the unimpaired inflow approach on the tributaries and water right priorities. The required outflow would be calculated by adding up the required inflows and making appropriate adjustments for natural losses and gains scaled to the percent of unimpaired flow level. The Science Report identifies the outflows that would be achieved with different percentages of unimpaired inflows assuming those inflows go out to Delta outflow with adjustments for downstream natural accretions and depletions scaled to the percent of unimpaired flow level. The Science Report also identifies the frequencies that the percent of unimpaired inflow scenarios meet the flow thresholds that are associated with improved conditions for fish. The higher the percentage of inflow and the less water use that occurs downstream on the valley floor and in the Delta, the higher the outflow and the greater the benefits are for various species. When determining the required inflows and associated inflow-based Delta outflows, the benefits to species will need to be balanced with needs for water to support other beneficial uses, including municipal and agricultural uses, as well as cold water storage considerations. The Staff Report/SED will include information to help inform that decision.

The inflow-based Delta outflow objective acknowledges that outflows are a product of inflows and that proportional inflows will produce outflows necessary to provide both the quantity of needed flows and functioning migratory corridors. The approach recognizes that flow is the lifeblood of the watershed. It

is more than just a quantity of water but is a process that transports, distributes, mixes, and transforms chemicals, nutrients, aquatic organisms, sediments, gravel, and other materials up and down the watershed. The functioning of the upstream processes in the watershed is integral to the functioning of the downstream processes and vice versa. Limiting contributions to Delta outflows to part of the watershed results in overreliance on that part of the watershed and a failure to protect beneficial uses in that watershed and in the greater Bay-Delta watershed. In addition to not providing full protection for beneficial uses, relying on only a subset of the watershed that has control of a subset of the flows (the Projects) to provide Delta outflows will not be feasible as water use expands and climate change intensifies, particularly with higher outflow levels that are needed to protect fish and wildlife.

Flexibility is proposed to be provided through adaptive management of the inflow-based outflow objective to address the complexities of the watershed in the most effective and feasible ways. At the same time, it provides for rigor to protect beneficial uses. The flexibility is intended to be compatible with the flexibility provided for inflows, and to allow for voluntary solutions that allow water users to help shape how responsibility for flows needed to meet the narrative objective and protect beneficial uses is distributed. Flexibility could allow for implementation of nonflow measures that reduce the need for flows and allow for transfers, exchanges, purchases, and other agreements.

The science generally indicates that higher outflows, up to and beyond 75 percent of unimpaired Delta outflows, provide better conditions for the estuary (i.e., the higher the inflow-based outflow the better for native fish and other species). However, there are many other important competing uses for water in the watershed; so the decision on required outflows will need to be balanced with these other considerations, including cold water needs. Like inflows, the decision regarding required outflows for the reasonable protection of fish and wildlife will be based on the science as well as consideration of these other needs for water, environmental, economic, and other considerations. The inflow-based Delta outflows under consideration are consistent with the range of inflows discussed above. With respect to the quantity of San Joaquin River flow that would contribute to the inflow-based Delta outflow, it would be consistent with whatever the current requirement is in the Bay-Delta Plan. This includes any changes to the San Joaquin River inflow requirements that may result from the Phase I update to the Bay-Delta Plan when those changes become effective ensuring that required San Joaquin River inflows are protected and contribute to outflows.

In addition to the above, to ensure that the Bay-Delta Plan comprehensively protects fish and wildlife, additional fall Delta outflow requirements are proposed. The State Water Board has an independent obligation to reasonably protect beneficial uses of water in the Bay-Delta regardless of federal and state endangered species act requirements. As such, fall Delta outflow requirements from the U.S. Fish and Wildlife Service (USFWS) BiOp that are needed to reasonably protect fish and wildlife are proposed to be incorporated into the Bay-Delta Plan. These requirements include additional Delta outflow requirements in September through December when the preceding period was a wet or above normal water year. The fall Delta outflow requirements that would be added to the Bay-Delta Plan would be integrated with existing BiOp requirements and would include flexibility to address potential changes that may occur to the BiOp requirements while ensuring that the Board's independent obligations to protect beneficial uses is met.

Interior Delta Flows: Finally, to complete the package of measures needed to provide for an integrated and comprehensive functioning flow regime in the Bay-Delta watershed, changes to interior Delta flow requirements in the Bay-Delta Plan are proposed. Changes are proposed to provide for more natural flow patterns from spawning streams out to the ocean and to provide more natural ecosystem functions. Diversions in the south Delta and associated operations cause unnatural flow patterns with

inflows traveling toward the Project export facilities, rather than toward the ocean. Fish that travel into the interior Delta have very low survival levels due to operation of the pumps and the poor habitat surrounding the pumps. This includes large numbers of predators and warm channels devoid of food and shelter. Interior Delta flow requirements are needed to keep migrating fish out of the interior Delta and on the correct migration pathway.

The proposed narrative interior Delta flow requirement would establish the overall needed flow conditions in the interior Delta to reasonably protect native fish populations migrating through and rearing in the Delta. Changes to numeric objectives are proposed to be consistent with requirements that are already included in the USFWS BiOp, National Marine Fisheries Service (NMFS) BiOp, and California Department of Fish and Wildlife (DFW) Incidental Take Permit for the current operations of the Projects including: new Old and Middle River reverse flow limitations and changes to Project export and Delta Cross Channel gate restrictions to expand the level of protection for those existing requirements in the Bay-Delta Plan. Similar to the existing process, the interior Delta flow requirements for Old and Middle reverse flows, export limits, and Delta Cross Channel gate closures are proposed to be determined and based on monitoring of fish presence and a consultation process involving staff from the fisheries agencies, DWR, and Reclamation, with the addition of the State Water Board.

All of the interior Delta flow requirements would include adaptive management provisions to allow the requirements to adapt to new scientific knowledge as it becomes available, through various efforts. New or modified requirements include: additional Delta Cross Channel gate closures in October consistent with the NMFS BiOp; new Old and Middle River reverse flow limits from December through June consistent with the USFWS and NMFS BiOps; and modified export constraints based on San Joaquin River flows that apply from April through May consistent with the NMFS BiOp with flexibility to shift the constraints during the February through June time period to maximize protection for fish species if agreeable to NMFS.

Adaptive Management

The Bay-Delta ecosystem is exceedingly complex, and there will always be uncertainty. To address this uncertainty and respond to new and changing information over the long term and in real time, adaptive management is a component of all of the recommendations for potential changes to the Bay-Delta Plan. Adaptive management actions are proposed to be guided by measuring success at achieving biological goals specific to tributary and estuarine needs. Specifically, adaptive management provides opportunities to shift and sculpt flows to more effectively achieve functions for fish and wildlife and perform experiments to improve understanding of the underlying biological mechanisms.

Voluntary Agreements

The State Water Board encourages the ongoing efforts of various stakeholders to develop voluntary agreements that would implement updated Bay-Delta Plan objectives. The State Water Board recognizes that voluntary agreements can help inform and expedite implementation of the water quality objectives and can provide durable solutions in the Bay-Delta watershed. Subject to acceptance by the State Water Board, a voluntary agreement may serve as an implementation mechanism for some of the tributaries or for the Phase II project as a whole, or some combination thereof. The Phase II changes to the Bay-Delta Plan, like the Phase I changes, are proposed in a way to allow for stakeholders to come together through voluntary agreements to identify ways to help restore fish and wildlife in a more real time, measurable manner.

Voluntary agreements may be proposed in both processes that include commitments to meet the flow requirements and to undertake non-flow actions. If the voluntary agreements include non-flow actions recommended by the State Water Board or by DFW, the non-flow measures may support a change in the required percent of unimpaired flow, within the range prescribed by the flow objectives. Any such changes must be supported by DFW and satisfy specific criteria for adaptive management. At a minimum, to be considered by the State Water Board, voluntary agreements must include provisions for transparency and accountability, monitoring and reporting, and for planning, adaptive management, and periodic evaluation. The State Water Board encourages parties to present any executed voluntary agreements related to Phase II to the State Water Board for its review as soon as feasible to improve conditions in the watershed.

For more information on the key attributes of successful voluntary agreements go [here](#).

Additional Information

For additional information concerning the State Water Board's review of the Bay-Delta Plan, please visit the State Water Board's website at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/.

If you would like to receive updates on the process to revise the Bay-Delta Plan please sign up for the State Water Board's email distribution list at http://www.waterboards.ca.gov/resources/email_subscriptions/swrcb_subscribe.shtml.

If you would like to provide input on the further development of the Bay-Delta Plan, please see the notice available [here](#) and provide responses by November 9, 2017.

The State Water Board appreciates the continued efforts and public input as reconciliation of the Bay-Delta ecosystem will require an unprecedented level of coordination and cooperation with interested parties, including the Delta Stewardship Council, fisheries and water management agencies, water users, environmental groups, and other stakeholders.

(This fact sheet was updated on October 4 2017)