

Chapter 6. Plan Implementation

Note to Reviewers: This document provides a revised version of section 6.3.2 Changed Circumstances a portion of Chapter 6 Plan Implementation. The last version of this section was dated November 17, 2009 (the section was re-distributed to the Steering Committee on January 7, 2010, and July 29, 2010 without revisions).

6.3.2 Changed Circumstances

Ecological conditions in the Delta are likely to change as a result of future events and circumstances that may occur during the course of the implementation of the BDCP. The BDCP identifies changes in circumstances that are reasonably foreseeable and that could adversely affect species and natural communities covered by the plan, consistent with the “changed circumstances” provisions of ESA regulations and in the NCCPA.¹ To ensure successful implementation of the BDCP conservation strategy, the plan further sets out measures designed to respond to these anticipated future changes.

The changed circumstances provisions of the BDCP are intended to address reasonably foreseeable events, both inside and outside of the Delta, that may impede or prevent the BDCP from achieving its biological goals and objectives within the Plan Area. The BDCP identifies a broad range of potential changed circumstances, including events or conditions that may cause population-level declines in covered species, such as new invasive species and significant releases of pollutants, or that may substantially degrade habitat functions, such as flooding and climate change.

Responses to the changed circumstances provided for in the BDCP will largely be developed and implemented as part of the adaptive management program.² For certain specified changed circumstances, measures beyond the scope of the adaptive management program have been developed, as described in this section. The responsive measures set out in the plan reflect approaches that are both practicable and roughly proportional to the impacts of covered activities on covered species and habitat.

Changed circumstances provisions are not intended to remedy events or conditions that are beyond the control of the permittees. Rather, these provisions are intended to protect the plan’s operating conservation program in the face of such events. Thus, for example, in the event of changes in water temperatures in the Delta, the BDCP would not provide for actions to moderate such temperature changes. The BDCP, however, would require that the Management Entity implement responsive actions or contingency plans that provide for a recalibration of habitat restoration strategies or other actions within the context of the defined range of the adaptive management program. Similarly, an occurrence of a major flood event that results in substantial loss of tidal marsh habitat restored under the BDCP would trigger actions under the adaptive management program to restore functions of tidal marsh habitat for covered species.

¹ USFWS and NMFS regulations define changed circumstances as “changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the [USFWS and NMFS] and that can be planned for...” (50 C.F.R. §17.3; 50 C.F.R §222.102). The NCCP Act defines changed circumstances as “...reasonably foreseeable circumstances that could affect a covered species or geographic area covered by the plan.” (Fish and Game Code §2805(c)).

² See generally, U.S. Fish and Wildlife Service and National Marine Fisheries Service Habitat Conservation Planning Handbook, page 3-28 (November 1996).

1 To address the potential for changed circumstances, the BDCP sets out funding commitments for
2 remedial measures that may be implemented as part of the adaptive management program (see Section
3 3.7, *Adaptive Management*). The BDCP also identifies contingency funding to implement measures to
4 address those changed circumstances not contemplated in the adaptive management program, as
5 described in Chapter 8 *Implementation Costs and Funding Sources*. In the event that changed
6 circumstances occur, the Management Entity will implement the remedial measures identified in this
7 chapter. However, the BDCP sets out the range of financial commitments of the participating entities,
8 which includes limitations on funding to remediate changed circumstances. As such, remedial measures
9 for changed circumstances will be implemented within the levels of funding set out in the BDCP for these
10 purposes. [*Note to Reviewers: The levels of funding for remedial measures have not yet been determined.*]

11 In the event of such changed circumstances, the BDCP Management Entity would implement the
12 responsive measures described in this chapter. The following describes the process for identifying the
13 occurrence of changed circumstances, the changed circumstances that would be addressed by the BDCP,
14 and the measures that would be implemented in response to such occurrences.

15 **6.3.2.1 Process to Identify Changed Circumstances**

16 For changed circumstances that are anticipated in the BDCP, the Management Entity, in conjunction with
17 the fish and wildlife agencies, will develop thresholds and triggers as part of the adaptive management
18 program that will be used to signal the onset of changed circumstances. The occurrence of a changed
19 circumstance will generally become apparent to the Management Entity through information gained from
20 systems or effectiveness monitoring, scientific study, or by notification received from another party (e.g.,
21 a levee failure reported by a reclamation district). Upon an indication that a changed circumstance has
22 occurred, or is likely to occur, the Management Entity will take immediate steps to investigate and
23 confirm the occurrence of such an event. If a changed circumstance appears to have occurred, the
24 Management Entity will contact the appropriate fish and wildlife agencies to confirm the changed
25 circumstance. The Management Entity will notify the BDCP Authorized Entities, relevant Supporting
26 Entities, and the Implementation Committee of the changed circumstance.

27 After establishing an occurrence of a changed circumstance identified in this chapter, the Management
28 Entity, in coordination with the fish and wildlife agencies, will determine specific remedial actions that
29 are consistent with the responses described in Section 6.3.2.2, *Changed Circumstances Addressed by the*
30 *BDCP*, for the particular changed circumstance and develop a schedule for implementation. For those
31 actions that are to be implemented through the adaptive management program, the decision-making
32 process described in Section 3.7, *Adaptive Management*, will be used. For other responsive actions, the
33 Management Entity will implement the identified measures after conferring with the relevant fish and
34 wildlife agencies. After implementing remedial actions, the Management Entity will monitor the
35 effectiveness of the measures and report the associated results and findings.

36 **6.3.2.2 Changed Circumstances Addressed by the BDCP**

37 **1. Availability of Land Necessary for the Implementation of Habitat Conservation Measures**

38 *Nature of the Changed Circumstance*

1 The BDCP Conservation Strategy assumes that sufficient land will be available within the Plan Area to
2 implement the habitat conservation measures set out in the Plan. In the event that land suitable for these
3 purposes is not available, these changed circumstances will be addressed as set out in this section. A
4 shortfall in available land necessary to implement habitat conservation measures will be deemed to have
5 occurred if land with suitable site conditions and characteristics (e.g., topography, soils, hydrology,
6 proximity to occupied covered species habitats) and in appropriate locations within the Plan Area cannot
7 be feasibly obtained.

8 *Planned Response*

9 During the course of BDCP implementation, the Management Entity may determine that land suitable for
10 meeting one or more of the habitat restoration and protection targets is not available within the Plan Area.
11 In such instances, the Management Entity, through the adaptive management process and with the
12 concurrence of the fish and wildlife agencies, will: (a) undertake habitat restoration or protection of
13 habitat in areas outside of the BDCP designated Conservation Zone(s), including tidal habitat restoration
14 opportunity areas (ROAs), but within the Plan Area, at locations that would benefit the affected covered
15 species, (b) restore or protect habitat in suitable locations outside of the Plan Area, in coordination with
16 local governments, to benefit the associated covered species, or (c) identify and implement alternative
17 conservation measures that would provide equivalent or greater benefits to the affected covered species.

18 **2. Levee and Dike Failures**

19 *Nature of Changed Circumstance*

20 During the course of BDCP implementation, it is expected that levee and dike failures will occur within
21 the Plan Area, and that such failures may affect benefits to covered species provided by the BDCP. To
22 address such circumstances, the BDCP identifies a range of actions that will be carried out by the
23 Management Entity to respond to such events. To guide responses to such events, levee and dike failures
24 will be considered a changed circumstance under the BDCP if the failure a) diminishes significantly the
25 function of BDCP restored and protected natural communities as habitat for covered species, as jointly
26 determined by the Management Entity and the fish and wildlife agencies, b) precludes implementation of
27 habitat conservation measures, and/or c) impedes the implementation of water operations conservation
28 measures. *Planned Responses*

29 The following sets out several foreseeable scenarios involving the failure of levees and dikes that may
30 adversely affect ecological benefits provided by the BDCP, and describes the response that would be
31 provided for under the BDCP.

32 ***Failure of levees constructed as part of a BDCP activity result in substantial reduction of the level of***
33 ***benefits to covered species produced by restored tidal habitat.*** To reduce the potential for failure of
34 BDCP levee, BDCP levees will be designed to appropriate standards. However, notwithstanding the
35 integrity of constructed levees, the BDCP Management Entity may encounter circumstances in which
36 levees constructed pursuant to a BDCP activity subsequently fail. In such an event, the Management
37 Entity will be responsible for undertaking actions to restore the functions of habitat degraded or lost as a
38 result of the failure. If such restoration of habitat functions is not practicable, the Management Entity
39 will, through the adaptive management process, restore habitat of comparable biological value elsewhere
40 in the Plan Area or at other locations to replace lost or degraded habitat functions, as provided for under

1 Changed Circumstance No. 1. The affected habitat may also be replaced at the location of the levee
2 failure site if the breach results in newly created habitat of sufficient value to replace the lost habitat and
3 the new habitat area is available to the Management Entity for protection.

4 ***Failure of levees not constructed as part of a BDCP activity reduce the benefits to covered species***
5 ***produced by restored tidal marsh.*** Although there are currently no regulatory requirements to remediate
6 damages resulting from levee and dike failures not constructed as part of a BDCP action, the Management
7 Entity, including DWR, will collaborate with local Reclamation Districts, other flood control entities, and
8 landowners as appropriate to determine if there is sufficient justification for repair of failed levees and
9 dikes and restoration of damage to the function of BDCP habitats. Following repair of the levee, the
10 BDCP Management Entity will, to the extent practicable, identify and undertake actions through the
11 adaptive management process to restore the degraded or lost habitat. The Management Entity will
12 coordinate with the party responsible for the failed levee to restore habitat functions provided by the
13 affected habitat.

14 ***Failure of levees unrelated to BDCP actions that inhibit implementation of water operations***
15 ***conservation measures or reduce the covered species and ecosystem benefits that would result from***
16 ***such conservation measures.*** Although there are currently no regulatory requirements to remediate
17 damages resulting from levee and dike failures not constructed as part of a BDCP action, the Management
18 Entity, including DWR, will collaborate with local Reclamation Districts, other flood control entities, and
19 landowners as appropriate to determine the responsibility for repair of failed levees and dikes and damage
20 to the function of BDCP habitats. In the event of a levee failure that affects the implementation of BDCP
21 water operations conservation measures, the Management Entity will invoke the adaptive management
22 process to determine, in coordination with the Authorized Entities and the fish and wildlife agencies,
23 appropriate adjustments to water operations, on a temporary basis and within the established adaptive
24 range of water operations, necessary to minimize adverse effects of the levee failure(s) on covered
25 species. Once the circumstances affecting the implementation of the water operations conservation
26 measures have been addressed, the Projects will resume operations under the parameters that were in
27 place prior to the levee failure.

28 ***Failures of levees unrelated to BDCP activities that are not repaired by the responsible flood control***
29 ***entity and inhibit the implementation of water operations conservation measures or reduce the covered***
30 ***species and ecosystem benefits that would be provided by the conservation measure.*** Should a levee
31 failure occur with no subsequent repair, the BDCP Management Entity will, through the adaptive
32 management process and subject to the specific circumstances of the event, implement one or more of the
33 following actions to obtain the intended benefits of water operations conservation measures precluded by
34 levee failures: (a) adjust water operations within the permitted adaptive range of water operations to
35 restore benefits to covered species and habitat provided by the measures, to the extent practicable or (b)
36 identify and implement, within the context of the adaptive management program, alternative conservation
37 measures (e.g., additional restoration of physical covered fish species habitats, increase in magnitude of
38 other stressors conservation measures) that will provide similar types and levels of covered species
39 benefits intended by the affected conservation measures.

40 ***Failure of multiple Delta levees substantially alter aquatic conditions such that conservation measures***
41 ***cannot be implemented and/or the covered species habitat benefits provided by conservation measures***
42 ***are substantially reduced as a result of altered aquatic ecosystem conditions or changes in the behavior***
43 ***or distribution of covered fish species.*** A widespread or catastrophic change in ecological conditions

1 within the Plan Area due to multiple levee failures would be at such magnitude so as to render most
2 responses through the BDCP infeasible. As such, in the event of this changed circumstance, no specific
3 responses would be required under the BDCP; the Management Entity, however, will meet and confer
4 with the fish and wildlife agencies to determine the efficacy of a response.

5 To the extent that actions can be undertaken within the parameters of the BDCP adaptive management
6 program that would help to moderate the ecological effects of multiple levee failures, the BDCP
7 Management Entity would identify and implement such measures. For instance, such adaptive
8 management responses may include identifying alternative locations for habitat restoration actions.

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1 3. Failure of water operations infrastructure

2 *Nature of Changed Circumstance*

3 For the purpose of this provision, a failure of water operations infrastructure will be deemed to have
4 occurred if a malfunction or breakdown of water operations conveyance facilities, including the
5 pipeline/tunnel, intake and fish screen facilities, pumping facilities, upstream reservoir operations
6 facilities, and other appurtenant facilities, and the failure precludes or substantially inhibits the ability to
7 manage water operations within the adaptive ranges as defined in the BDCP Conservation Strategy.

8 *Planned Response*

9 The water operations infrastructure of the CVP and the SWP are routinely and diligently maintained to
10 greatly reduce the potential for failure. In the unlikely event of such a failure, the Management Entity
11 would request that DWR and/or Reclamation repair the affected facilities or make adjustments or
12 modifications to other facilities to restore full operational capacity necessary to implement BDCP
13 conservation measures, as soon as feasible, and temporarily adjust water operations within the adaptive
14 range of water operations if such action is deemed necessary to minimize adverse effects on covered
15 species. Upon completion of facility repairs or alternative modifications to other infrastructure,
16 operations would return to pre-existing levels and parameters. If the infrastructure failure does not permit
17 operations within the adaptive management range the Management Entity will operate under the
18 emergency procedures described in Chapter 4, *Covered Activities*.

19 4. Fire

20 *Nature of Changed Circumstance*

21 Fire is defined as any fire not prescribed by the Management Entity on BDCP protected lands that
22 removes a sufficient extent of vegetation such that the intended habitat functions of the protected land for
23 covered species is substantially degraded, as jointly determined by the Management Entity and fish and
24 wildlife agencies.

25 Fire may substantially degrade the intended habitat functions of natural communities and covered species
26 habitats protected and/or restored under the BDCP. However, the non-aquatic lands within the BDCP
27 Plan Area are primarily characterized by intensively managed agriculture, which generally does not
28 provide the conditions for uncontrolled or extensive fire events. Moreover, within the BDCP Plan Area,
29 the extensive network of waterways serves as barriers to the rapid spread of fire. While fire is typically a
30 natural component of grassland communities, which represent approximately 8 percent of the BDCP Plan
31 Area, most natural communities in the Plan Area, including valley/foothill riparian, wetlands, and
32 agriculture, are typically not prone to fire.

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1 *Planned Response*

2 To minimize the risk of fire, the Management Entity will identify protected lands that pose a high risk of
3 fire (e.g., grasslands situated near roadways) and carry out a number of preventative measures on those
4 lands. The Management Entity will ensure that fuel breaks are established and maintained around such
5 lands, that steps are taken to coordinate efforts with state and local fire agencies to improve fire
6 suppression preparedness for protected lands, and that post-fire monitoring plans are developed.

7 In the event of a fire, the Management Entity will assess the proportion of the protected habitat area that
8 has burned and its likely effects on habitat use by covered species, will make an initial determination of
9 whether or not a changed circumstance exists, and will notify the fish and wildlife agencies of the fire
10 event. If a changed circumstance is determined to exist, the Management Entity will implement the
11 appropriate post-fire monitoring plan for a two-year period following the fire. If over the course of the
12 monitoring period it is determined that vegetation is not recovering sufficiently in the burned area to
13 reestablish the original functions of the affected habitat, the Management Entity will develop and
14 implement through the adaptive management program a habitat restoration plan to enhance recovery of
15 the affected habitat area. Elements of habitat restoration plans may include provisions for planting and
16 caring for native vegetation and controlling the establishment of invasive plant species.

17 **5. Conflicts Related to State or federal environmental laws or regulation**

18 *Nature of the Changed Circumstance*

19 In the course of implementing the BDCP, the Management Entity will seek to obtain various State and
20 federal permits and authorizations necessary to carry out certain conservation actions. The Management
21 Entity may discover that, in some instances, the implementation of a conservation measure may conflict
22 with the requirements of a State and/or federal law or regulation. The apparent conflict could necessitate
23 changes to the conservation measure or an elimination of the measure altogether.

24 *Planned Response*

25 In the event that it is determined that the implementation of a conservation measure would likely conflict
26 with a State or federal environmental law or regulation, the Management Entity will pursue one or more
27 of the following actions through the adaptive management process: (a) modify implementation of the
28 conservation measures to ensure compliance with all applicable State and/or federal laws or regulations;
29 (b) identify and implement alternative conservation measures that provide equivalent ecological benefits
30 for the affected covered species. In the alternative, the Management Entity may also sufficiently
31 reconcile the apparent regulatory conflict in conjunction with the relevant State and/or federal agency and
32 proceed with the implementation of the conservation measure(s).

33 **6. New Species Listings**

34 *Nature of the Changed Circumstance*

1 The USFWS, NMFS, or DFG may list additional species as threatened or endangered under the ESA or
2 CESA³ that are not BDCP Covered Species. In the event that a fish and wildlife agency lists a species not
3 covered by the BDCP, the provisions of this changed circumstance will be automatically triggered.

4 *Planned Response*

5 Upon a new listing of a species under State or federal endangered species laws, the Management Entity
6 will undertake the following measures:

- 7 • Evaluate the potential impacts of covered activities on the newly-listed species and conduct an
8 assessment of the presence of suitable habitat in areas of potential effect.
- 9 • Implement measures to avoid impacts to the newly listed species until such time as the BDCP has
10 been amended to include the newly listed species as a covered species.

11 In the event that a species not covered by the BDCP becomes listed as threatened or endangered or
12 designated as a candidate species, or is proposed or petitioned for listing, the Management Entity, on
13 behalf of the Authorized Entities, may request that the appropriate fish and wildlife agency add the
14 species to the relevant take authorizations issued pursuant to the BDCP. In determining whether to seek
15 take coverage for the species, the Management Entity will consider, among other things, whether the
16 species is present in the Plan Area and if the covered activities could result in the take of the species. If
17 such take coverage is sought, the BDCP and its authorizations will be amended. Alternatively, the
18 Management Entity, on behalf of the Authorized Entities could seek new and separate take authorizations.
19 The procedures for Plan modifications and amendments are described in Section 6.4 *Permit Duration,*
20 *Amendment, Renewal, and Enforcement.*

21 **7. Invasive Species**

22 *Nature of Changed Circumstance*

23 A changed circumstance that involves the introduction of an invasive species will be considered to have
24 occurred if the Management Entity and the fish and wildlife agencies jointly determine that such a species
25 is present and has been established within the Plan Area and that the presence of the invasive species will
26 substantially diminish the benefits to covered species provided by the BDCP conservation measures.

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³ A species designated by the State as a “candidate” for listing also receives regulatory protection during the pendency of the candidacy. As such, the provisions set out in this changed circumstance will apply to State-designated candidate species.

1 *Planned Response*

2 As described in Section 3.6, *Monitoring and Research Plan*, the Management Entity will take steps to
3 detect, through the monitoring program and through collaboration with other responsible entities, the
4 establishment of new invasive species in the Plan Area. If a new invasive species is discovered, the
5 Management Entity in coordination with the fish and wildlife agencies, will conduct an assessment to
6 determine the possible threats of the invasive species to covered species and the Delta ecosystem. Based
7 on results of the assessment, the Management Entity will implement the following responses:

8 ***Introduction of new, invasive non-native species diminishes benefits to covered species produced by***
9 ***conservation measures related to habitat restoration and protection.*** The BDCP Management Entity,
10 through the adaptive management process, will identify and implement measures to reduce and/or control
11 the adverse effects of new non-native species on the functions provided by habitat restored and protected
12 under the Plan (e.g., control of non-native plant species in restored tidal marsh that affect food web
13 functions). If methods to adequately reduce and/or control adverse effects of the non-native species are
14 not available or practicable, the Management Entity will identify alternate design, implementation, and
15 management approaches to future habitat restoration actions to avoid or minimize potential adverse
16 effects of the invasive species on covered species. If such modifications are not practicable, the
17 Management Entity, through the adaptive management process, will identify and implement alternative
18 conservation measures that provide equivalent levels of benefit to applicable covered species.

19 ***Introduction of a new, invasive non-native species diminishes benefits to covered species provided by***
20 ***conservation measures related to water operations or other stressors.*** The BDCP Management Entity,
21 through the adaptive management process, will identify and implement measures to reduce and/or control
22 adverse effects of a new non-native species on the beneficial outcomes associated with water operations
23 or other stressors conservation measures. If methods are not practicably available to reduce and/or
24 control such effects, the BDCP Management Entity, within defined adaptive management ranges, will
25 identify and implement alternative conservation measures that provide equivalent or greater benefits to
26 covered species and their habitats.

27 **8. Toxic or Hazardous Spills**

28 *Nature of Changed Circumstance*

29 Toxic or hazardous spills will be considered a changed circumstance if the spills of chemicals into Delta
30 waterways or BDCP restored and protected habitats could substantially and adversely affect habitat
31 restored and/or protected through the BDCP, as jointly determined by the Management Entity and the
32 Fish and Wildlife Agencies.

33 *Planned Responses*

34 The Management Entity will respond to toxic or hazardous spill events that occur in habitat areas that
35 have been protected, enhanced, or restored through BDCP actions. To minimize the potential effects of a
36 toxic or hazardous spill, the BDCP Management Entity will develop a toxic and hazardous spill response
37 plan in coordination with responsible regulatory entities (e.g., local, state and federal specialized response
38 teams) to guide its initial responses on detection of a spill event.

1 For a spill event that is caused by a BDCP action, the BDCP Management Entity will coordinate its
2 response with DFG's Office for Oil Spill Prevention, the Regional Water Quality Control Board, and
3 other state or federal regulatory entities as appropriate to the nature of the spill event to curtail the
4 immediate spread and minimize the effects of the spill. The Management Entity will also identify and
5 undertake management measures sufficient to remediate the effects of the toxic substance on covered
6 species and affected habitats (i.e., removal or isolation of the material) and restore the ecological
7 functions of the degraded habitat. If the affected habitat areas cannot be feasibly and effectively restored,
8 the Management Entity, through the adaptive management process, will identify and implement measures
9 to contain the ecological effects of the spill and either compensate for the loss of habitat functions at other
10 locations or implement alternative conservation measures (e.g., expanded or additional contaminant
11 reduction measures) that provide equivalent or greater ecological benefits to the affected covered species.

12 If the spill event is not caused by a BDCP action, the BDCP Management Entity, would coordinate with
13 responsible regulatory agencies and the party(ies) responsible for the spill event to identify the measures
14 that will need to be funded and/or undertaken to adequately remediate the effects of the spill and restore
15 the ecological functions of the affected habitat. The Management Entity will ensure that any such
16 remediation and restoration actions are conducted in an appropriate manner.

17 **9. Climate Change**

18 *Nature of Changed Circumstance*

19 Changed circumstances related to climate change will be considered to have occurred in the event that
20 changes in sea level and watershed hydrology are of greater magnitude or significance than was assumed
21 during the development of the BDCP conservation strategy, such that conservation measures cannot be
22 implemented or such measures would be unlikely to yield significant benefit to covered species or natural
23 communities (e.g., climate change conditions affect availability of suitable restoration sites).

24 BDCP conservation measures were developed based on modeled estimates of future changes in sea level
25 and watershed hydrology over the term of the BDCP. If actual changes in sea level or in watershed
26 hydrology exceed climate change estimates used to develop the conservation measures, the ability to
27 implement conservation measures and/or their efficacy for producing covered species benefits could be
28 diminished. The existence of this changed circumstance will be determined through actual measurements
29 of climate change effects over the term of the BDCP and results of conservation measure effectiveness
30 monitoring.

31 *Planned Response*

32 In the event of this changed circumstance, the BDCP Management Entity would identify and implement
33 actions through the parameters of the adaptive management program to the extent such actions could be
34 effective at moderating the ecological effects of these hydrological changes. Such adaptive management
35 responses may include expanding the range of environmental gradients to provide for shifting species
36 distributions and habitats. Measures beyond those contemplated by the adaptive management program
37 would likely be impracticable and ineffective given the magnitude and pervasiveness of such changes
38 within Plan Area and, as such, are not provided for under the BDCP.

39 **10. Water Temperature Changes**

1 *Nature of Changed Circumstance*

2 Changed circumstances related to water temperature changes are defined as those changes in water
3 temperatures within the Plan Area that exceed the tolerance level for one or more covered fish species,
4 such that one or more of the following conditions occur: (a) a covered fish species no longer inhabits
5 BDCP restored habitats; (b) a covered fish species is no longer present in the Plan Area; (c) a covered fish
6 species no longer accrues benefits from BDCP water operations, habitat restoration, or other stressors
7 conservation measures; and/or (d) a covered fish species' population demonstrates a sustained downward
8 trend in abundance.

9 *Planned Response*

10 Significant changes in water temperature within the Plan Area would likely have widespread, catastrophic
11 impacts on ecological conditions within the Plan Area. As such, the effects of water temperature changes
12 would be of such magnitude as to render any response through the BDCP infeasible. As such, in the
13 event of this changed circumstance, no specific responses would be required under the BDCP; the
14 Management Entity, however, would meet and confer with the fish and wildlife agencies to determine the
15 efficacy of a response. To the extent that actions can be undertaken within the parameters of the BDCP
16 adaptive management program that would help to moderate the ecological effects of water temperature
17 changes, the BDCP Management Entity would identify and implement such measures. For instance, such
18 adaptive management responses may include identifying alternative locations for habitat restoration
19 actions.

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11. Changes in Ocean Conditions

Nature of Changed Circumstance

Changed circumstances that involve changes in ocean conditions are defined as changes in ocean habitat conditions (e.g., water temperature, upwelling) and ecosystem processes (e.g, food web productivity) that support covered anadromous fish species to a degree that biological goals and objectives cannot be achieved for covered anadromous fish species within the Plan Area. For example, changed ocean conditions could result in lower survival of Chinook salmon in the ocean, resulting in fewer adults returning to spawn upstream of the Delta, which could result in population declines.

Planned Response

Adverse effects on covered anadromous fish species and their habitats resulting from changed ocean conditions could not be feasibly addressed by the BDCP. Actions to remedy those effects would be well-beyond the capacity of the Management Entity or the Authorized Entities. As such, in the event of this changed circumstance, no specific responses would be required under the BDCP; the Management Entity, however, will meet and confer with the fish and wildlife agencies to determine the efficacy of a response.

Significant changes in ocean conditions could have widespread, catastrophic impacts on ecological conditions within the Delta. To the extent that actions can be undertaken within the parameters of the BDCP adaptive management program that would help to moderate the ecological effects of these changes in ocean conditions, the BDCP Management Entity would identify and implement such measures. Such adaptive management responses may include identifying alternative locations for habitat restoration actions.

12. Long-Term Changes in Precipitation and Temperature

Nature of Changed Circumstance

Long-term changes in precipitation and temperature will be considered a changed circumstance in the event that such changes in the timing and amount of rainfall and ambient air temperature in the Plan Area as a result of climate change are of a magnitude sufficient, as jointly determined by the Management Entity and Fish and Wildlife Agencies, to diminish the benefit to covered species provided by natural communities restored and protected pursuant to the BDCP conservation measures.

Planned Response

Changes in precipitation and temperature patterns may affect vegetation composition and structure of BDCP protected, enhanced, and restored habitat areas. In the event of this changed circumstance, the BDCP Management Entity will identify and implement actions through the parameters of the adaptive management program to the extent such actions would help to moderate the ecological effects of changes in precipitation and temperature. Such adaptive management responses may include expanding the range of environmental gradients to provide for shifting species distributions and habitats. Measures beyond those contemplated by the adaptive management program would likely be impracticable and ineffective given the magnitude and pervasiveness of such changes within Plan Area and, as such, are not provided for under the BDCP