

## 4.3.22 Minerals

### **Impact MIN-1: Loss of Availability of Locally Important Natural Gas Wells as a Result of Constructing the Water Conveyance Facilities**

**NEPA Effects:** The locations of producing natural gas wells within the Alternative 4A construction footprint would be the same as indicated for Alternative 4. There are no producing wells within the construction footprint, the temporary construction work areas or the east-west transmission line alignment option.

Because no producing wells within the construction footprint would be permanently abandoned, construction of Alternative 4A would not result in reduced natural gas production in the study area. Alternative 4 would not affect any locally important natural gas wells or result in the loss of any portion of the area's natural gas production and the effects would not be adverse.

**CEQA Conclusion:** Because no natural gas wells would occur in the construction footprint there would not be any loss in active natural gas wells or change in the availability of natural gas production. The construction of Alternative 4A would not affect natural gas wells or gas production. No mitigation is required.

### **Impact MIN-2: Loss of Availability of Extraction Potential from Natural Gas Fields as a Result of Constructing the Water Conveyance Facilities**

**NEPA Effects:** The extent of construction and permanent footprint and resulting loss of extraction potential for natural gas fields would be the same as described under Alternative 4. Alternative 4A water conveyance facilities would permanently reduce the land surface available for vertical extraction of natural gas from directly underlying gas fields, however most of the affected gas fields could be accessed from other overlying areas. Similarly, effects on potential gas extraction resulting from construction work areas would be small and temporary and would not prevent recovery of natural gas. Therefore, there would be no short or long-term adverse effect on natural gas extraction potential from construction of Alternative 4A.

**CEQA Conclusion:** Although the Alternative 4 conveyance facilities would reduce the land surface available for vertical extraction of natural gas from underlying gas fields, the proportion of these gas fields affected would be small (less than approximately 3% of the areal extent of natural gas field areas intersected). Additionally, there would be no substantial loss of existing production or permanent loss of access to the resource because the gas fields would continue to be accessible using conventional or directional drilling techniques. Accordingly, this impact would be less than significant. No mitigation is required.

### **Impact MIN-3: Loss of Availability of Locally Important Natural Gas Wells as a Result of Operation and Maintenance of the Water Conveyance Facilities**

**NEPA Effects:** The operation of the water conveyance facilities under Alternative 4A would include moving water, both in infrastructure that would be constructed under this alternative and in the natural channels. These operations would not cause additional effects on natural gas wells beyond those related to water conveyance construction. Maintenance of the water conveyance facilities under Alternative 4A would be the same as discussed for Alternative 4. These activities would not affect natural gas wells or resource recovery. Accordingly, the operation and maintenance

1 associated with the water conveyance facilities under Alternative 4A would not result in adverse  
2 effects on access to or use of existing active wells. Accordingly, there would be no adverse effect on  
3 natural gas wells from operation and maintenance of Alternative 4A.

4 **CEQA Conclusion:** The operation and maintenance associated with the water conveyance facilities  
5 under Alternative 4A would have no impact on access to natural gas wells, either for operating and  
6 maintaining existing active wells, or modifying plugged inactive wells, because operation and  
7 routine maintenance such as painting, cleaning, repairs, levee and landscape maintenance, and  
8 similar activities would not cause the abandonment of wells, eliminate access to wells, or reduce  
9 production. Therefore, this impact would be less than significant. No mitigation is required.

10 **Impact MIN-4: Loss of Availability of Natural Gas Fields as a Result of Operation and**  
11 **Maintenance of the Water Conveyance Facilities**

12 **NEPA Effects:** The operation of the water conveyance facilities under Alternative 4A would include  
13 moving water, both in infrastructure that would be constructed under this alternative and in the  
14 natural channels. These operations would not cause additional effects on access to natural gas fields  
15 beyond those related to water conveyance construction. Maintenance of the water conveyance  
16 facilities under Alternative 4A would be the same as discussed for Alternative 4. These activities  
17 would not affect access to natural gas fields. Accordingly, the operation and maintenance associated  
18 with the water conveyance facilities under Alternative 4A would not result in adverse effects on  
19 access to or use of existing active wells, or accessing plugged inactive wells. Accordingly, there  
20 would be no adverse effect from operation and maintenance.

21 **CEQA Conclusion:** The operation and maintenance associated with the water conveyance facilities  
22 under Alternative 4A would have no impact on access to natural gas wells, either for operating and  
23 maintaining existing active wells, or modifying plugged inactive wells, because operation and  
24 routine maintenance such as painting, cleaning, repairs, levee and landscape maintenance, and  
25 similar activities would not cause the abandonment of wells, eliminate access to wells, or reduce  
26 production. Therefore, this impact would be less than significant. No mitigation is required.

27 **Impact MIN-5: Loss of Availability of Locally Important Natural Gas Wells as a Result of**  
28 **Implementing Environmental Commitments 3, 4, 6-12, 15, and 16**

29 The type of effects on locally important natural gas wells associated with Environmental  
30 Commitments 3, 4, 6-12, 15, and 16 would be similar to those described for Alternative 4. However,  
31 as described under Section 4.1, *Introduction*, of this RDEIR/SDEIS, environmental commitments  
32 occurring under Alternative 4A would affect much less land within the Plan Area when compared to  
33 Alternative 4. Therefore, the magnitude of effects of Alternative 4A on mineral resources within the  
34 Plan Area would be smaller than those disclosed under Alternative 4.

35 **NEPA Effects:** Because locations for these activities have not been determined, the extent of the  
36 effect of implementing restoration actions on locally important natural gas wells cannot be precisely  
37 determined. It is anticipated that restoration actions expected under Alternative 4A would result in  
38 adverse effects on locally important natural gas wells however to a lesser degree than under  
39 Alternative 4 because less land would be restored. Similar to Alternative 4, natural gas wells located  
40 in areas that would be permanently inundated could remain productive with the use of protective  
41 cages or platforms. However, for those instances, modification and maintenance of wells may not be  
42 cost effective. It is likely that any producing wells in proposed permanent inundation areas would  
43 need to be abandoned because modifications to these wells would not be feasible.

1 The number of active wells directly affected would vary, depending on the specific lands inundated  
2 by Environmental Commitments 4 and 10. The active wells that would be affected could be  
3 maintained in place if they were in seasonally inundated locations. In permanently flooded areas,  
4 the active wells could be replaced using conventional or directional drilling techniques at a location  
5 outside the inundation zone to maintain production. The likelihood of this replacement would  
6 depend on the availability of land for lease and the cost of the new construction. If a large number of  
7 wells had to be abandoned and could not be redrilled, there could be a locally adverse effect related  
8 to permanent elimination of a substantial portion of a county's active natural gas wells. Mitigation  
9 Measure MIN-5A is available to address this effect.

10 Natural gas wells in areas that would remain uplands could remain operational and unaffected if  
11 they are avoided when restoration activities are implemented and access to the gas well can be  
12 maintained. Maintaining access to an oil or gas well is defined by the California Department of  
13 Conservation as (1) maintaining rig access to the well, and (2) not building over, or in close  
14 proximity to, the well (California Department of Conservation, Division of Oil, Gas, and Geothermal  
15 Resources 2007).

16 **CEQA Conclusion:** Although the number of natural gas wells likely to be affected may be a small  
17 percentage of the total wells in the study area, and some wells may be relocated using conventional  
18 or directional drilling, there is potential to affect a significant number of locally important gas wells.  
19 Consequently, this impact is considered significant. Because implementation of Mitigation Measure  
20 MIN-5A cannot assure that all or a substantial portion of a county's existing natural gas wells will  
21 remain accessible after implementation of this alternative, this impact is significant and  
22 unavoidable.

23 **Mitigation Measure MIN-5: Design Environmental Commitments 4 and 10 to Avoid**  
24 **Displacement of Active Natural Gas Wells to the Extent Feasible**

25 During final design of Environmental Commitments 4 and 10, the project proponents will avoid  
26 permanent inundation of or construction over active natural gas well sites where feasible to  
27 minimize the need for well abandonment or relocation.

28 **Impact MIN-6: Loss of Availability of Extraction Potential from Natural Gas Fields as a Result**  
29 **of Implementing Environmental Commitments 3, 4, 6-12, 15, and 16**

30 **NEPA Effects:** Because locations of restoration actions occurring under Alternative 4A have not been  
31 determined, the extent of the effect of implementing these actions on natural gas fields within the  
32 Plan Area cannot be precisely determined. It is anticipated that restoration actions expected under  
33 Alternative 4A would result in adverse effects on the potential to extract natural gas from these  
34 fields however to a lesser degree than under Alternative 4 because less land would be restored.  
35 Similar to Alternative 4, some natural gas fields could be permanently inundated resulting in  
36 potential losses in production. However, most natural gas fields would still be accessible from  
37 outside the inundated areas using either conventional or directional drilling, although feasibility of  
38 access would depend on the exact configuration of inundation and the availability of adjacent  
39 drilling sites. Although the overall extent of affected natural gas fields in the region is low, there  
40 remains the potential for a locally adverse effect on access to natural gas fields because the resource  
41 may be permanently covered (inundated) or otherwise become inaccessible to recovery. Mitigation  
42 Measure MIN-6 is available to lessen this effect.

1 **CEQA Conclusion:** The areal extent of lands overlying study area natural gas fields that would be  
2 inundated by through restoration actions depends on final footprints for these measures. Most of  
3 these natural gas fields would still be accessible from outside the inundated areas using either  
4 conventional or directional drilling, although feasibility of access would depend on the exact  
5 configuration of inundation and the availability of adjacent drilling sites. Although the overall extent  
6 of affected natural gas fields in the region is low to moderate, there is potential for a locally  
7 significant impact on access to natural gas fields if they are permanently covered (inundated) such  
8 that the resource cannot be recovered. Implementation of Mitigation Measure MIN-6 would reduce  
9 this impact, but not to a less-than-significant level. Because implementation of Mitigation Measure  
10 MIN-6 cannot assure that all or a substantial portion of existing natural gas fields will remain  
11 accessible after implementation of this alternative, this impact is significant and unavoidable.

12 **Mitigation Measure MIN-6: Design Environmental Commitments 4 and 10 to Maintain**  
13 **Drilling Access to Natural Gas Fields to the Extent Feasible**

14 During final design of actions to offset the impacts of constructing and operating the water  
15 conveyance facilities, the project proponents will identify means to maintain access to natural  
16 gas fields that could be adversely affect by implementing Environmental Commitments 4 and 10  
17 where feasible. These could include preserving non-inundated lands either over or adjacent to  
18 natural gas fields adequate in size to allow drilling to occur. These measures will ensure that  
19 drilling access to natural gas fields is maintained to the greatest extent practicable.

20 **Impact MIN-7: Loss of Availability of Locally Important Aggregate Resource Sites (Mines and**  
21 **MRZs) as a Result of Constructing the Water Conveyance Facilities**

22 **NEPA Effects:** Because there are no permitted resource extraction mines (including aggregate  
23 mines) and no identified MRZs in the Alternative 4A footprint, including within the footprint for the  
24 east-west transmission line alignment option, there would be no effect on the availability of  
25 aggregate resources.

26 **CEQA Conclusion:** Because there are no permitted mines or MRZs in the construction footprint for  
27 Alternative 4A, including within the footprint for the east-west transmission line alignment option,  
28 there would be no impact. No mitigation is required.

29 **Impact MIN-8: Loss of Availability of Known Aggregate Resources as a Result of Constructing**  
30 **the Water Conveyance Facilities**

31 **NEPA Effects:** The demand for construction materials, including aggregates and borrow materials  
32 for Alternative 4A would be identical to Alternative 4. The principal demands for construction  
33 material would come from the three intakes and associated facilities, the nearly 40 miles of concrete  
34 pipeline tunnels, and forebays. This demand would not result in a substantial depletion of  
35 construction-grade aggregate within the six regional aggregate production study areas, would not  
36 cause remaining supplies to be inadequate for future development, and would not substantially  
37 contribute to the need for the development of new aggregate resources. Accordingly, it would not  
38 have an adverse effect on the availability of known aggregate resources or borrow materials over  
39 the water conveyance facilities construction period.

40 **CEQA Conclusion:** The use of large amounts of construction aggregate over the 9-year construction  
41 period would not result in a substantial depletion of construction-grade aggregate from the study  
42 area, would not cause remaining supplies to be inadequate for future development, and would not

1 contribute to the need for development of new aggregate sources. Consequently, although a  
2 substantial amount of available aggregate material may be used under Alternative 4A, the impact on  
3 aggregate resources would be less than significant. No mitigation is required.

4 Borrow is not a defined mineral resource and is usually developed on an as-needed basis.  
5 Consequently, the amount of borrow required for this alternative would not be a significant impact.  
6 No mitigation is required.

7 **Impact MIN-9: Loss of Availability of Locally Important Aggregate Resource Sites (Mines and**  
8 **MRZs) as a Result of Operation and Maintenance of the Water Conveyance Facilities**

9 **NEPA Effects:** The operation of the water conveyance facilities under Alternative 4A would include  
10 moving water, both within infrastructure that would be constructed and the natural channels.  
11 Adverse effects would only occur if operations prevented access to a locally important aggregate  
12 resource site; this is not expected to occur because there are no aggregate mines or MRZs in the area  
13 where the alternative would operate. Accordingly, operation of Alternative 4A would not block  
14 access to existing mines or identified MRZs and similar to Alternative 4, there would be no effect.  
15 Similarly, routine facilities maintenance activities such as painting, cleaning, and structure repair,  
16 landscape maintenance, road work, and periodic replacement of erosion protection on the levees  
17 and embankments would not cover or block access to existing mines or identified MRZs because  
18 there are no aggregate mines or MRZs in the area where the alternative would operate. Additionally,  
19 operations and maintenance would not increase the existing project footprint so they could not have  
20 any effect even if aggregate mines or MRZs did exist. Accordingly, the operation and maintenance of  
21 the water conveyance facilities under Alternative 4A would not have effects on the availability of  
22 aggregate resource sites.

23 **CEQA Conclusion:** The operation and maintenance associated with Alternative 4A would have no  
24 impact on the availability of aggregate resource sites because none exist within the areas affected by  
25 Alternative 4A operations and operations and maintenance would not increase the alternative's  
26 footprint. No mitigation is required.

27 **Impact MIN-10: Loss of Availability of Known Aggregate Resources as a Result of Operation**  
28 **and Maintenance of the Water Conveyance Facilities**

29 **NEPA Effects:** The operation of the water conveyance facilities under Alternative 4A would include  
30 moving water, both within infrastructure that would be constructed and natural channels. Similar to  
31 Alternative 4, no aggregate resources are required for operations so there would be no effect and  
32 only small amounts of aggregate and riprap would be required for maintenance of structure  
33 foundations, levees, stream banks, and access roads associated with major project features such as  
34 intakes, pumping plants, and the head of Old River barrier. As discussed under Alternative 4, the  
35 demand for these materials could be easily met locally. Accordingly, operation and the use of a small  
36 amount of aggregate material for the maintenance of the water conveyance facilities under  
37 Alternative 4A would not result in adverse effects.

38 **CEQA Conclusion:** Operation of the water conveyance facilities under Alternative 4A would not  
39 affect any aggregate resources because operation involves moving water through the conveyance  
40 infrastructure and no aggregate resources are required for operations. A small amount of aggregate  
41 material would be used for maintenance of Alternative 4A which would be available from local  
42 sources. Operation and maintenance would not cause substantial depletion or loss of availability,  
43 and would not cause remaining supplies to be inadequate to meet future demands and require

1 developing new sources. Therefore this impact would be less than significant. No mitigation is  
2 required.

3 **Impact MIN-11: Loss of Availability of Locally Important Aggregate Resource Sites (Mines and**  
4 **MRZs) as a Result of Implementing Environmental Commitments 3, 4, 6-12, 15, and 16**

5 **NEPA Effects:** The environmental commitments that would have the potential to affect important  
6 aggregate resource sites are those that would inundate large areas of land. The loss of important  
7 aggregate resource sites under Alternative 4A would be similar to that described under Alternative  
8 4. However, the potential for loss of important aggregate resource sites would be less than  
9 Alternative 4 because much less land would be restored within the Plan Area and over a much  
10 shorter period. Nevertheless, the potential for inundation and loss of this aggregate resource sites  
11 would remain under Alternative 4A and is considered an adverse effect. Mitigation Measure MIN-11  
12 is available to reduce this effect.

13 **CEQA Conclusion:** As described under Alternative 4, an active mine on Decker Island may fall within  
14 the inundation footprints associated with implementing restoration actions associated with tidal  
15 natural communities and nontidal marsh. Although less acreage would be restored under  
16 Alternative 4A, restoration actions could result in inundation of aggregate resources. Although the  
17 impact is expected to be less than under Alternative 4, the potential loss would remain a significant  
18 impact because it would eliminate the potential to recover aggregate resources. Mitigation Measure  
19 MIN-11 is designed to reduce the impact to less than significant.

20 **Mitigation Measure MIN-11: Purchase Affected Aggregate Materials for Use in Project**  
21 **Construction**

22 The project proponents will purchase the permitted aggregate volume of affected mines for  
23 construction use so that the available aggregate will not be lost. The resulting mined site(s)  
24 should be considered for integration into the restoration design of any environmental  
25 commitment that affects the site(s). For example, the mined site(s) could be reshaped to provide  
26 aquatic or intertidal habitat of varying depths and configurations.

27 **Impact MIN-12: Loss of Availability of Known Aggregate Resources as a Result of**  
28 **Implementing Environmental Commitments 3, 4, 6-12, 15, and 16**

29 **NEPA Effects:** Restoration actions occurring under Alternative 4A have the potential to reduce the  
30 availability of important aggregate resources. When compared to Alternative 4, loss of aggregate  
31 resources under Alternative 4A would be less because the total acreage of restoration occurring  
32 with the Plan Area would be substantially less. Similar to Alternative 4, aggregate and riprap would  
33 be used for levee, berm, access road, and rock revetment construction, and rock would be placed for  
34 erosion control and stability at levee breaches and toe drain earthworks. The amounts of aggregate  
35 and riprap necessary for these activities cannot be calculated at this time because of the  
36 programmatic nature and general design of the restoration actions. However, the amount needed  
37 would be used over a period of years and would be expected to be within the available resources of  
38 the study area and adjacent aggregate resource study areas discussed in Section 26.1.2.1, *Aggregate*  
39 *Resources* and identified in Table 26-1 of the Draft EIR/EIS. There would be no depletion (loss of  
40 availability) of regional aggregate supplies substantial enough to cause remaining supplies to be  
41 inadequate for future development or to require development of new aggregate sources to meet

1 future demand. Therefore, the use of aggregate material for the restoration actions under  
2 Alternative 4A would not cause an adverse effect on the availability of aggregate resources.

3 **CEQA Conclusion:** Restoration actions occurring under Alternative 4A would use small amounts of  
4 aggregate for levee, berm, and access road construction, and placement of rock revetments or riprap  
5 for erosion control and stability at level breaches and toe drain earthworks. The amounts of  
6 aggregate are unknown but would be within the available resources of the study area or adjacent  
7 aggregate resource study areas. Because implementing environmental commitments would not use  
8 an amount of aggregate that would cause remaining supplies to be inadequate to meet future  
9 demands and require developing new sources, this impact would be less than significant. No  
10 mitigation is required.