construction of the PA, as well as operational activities. Based on these assessments, NMFS could determine that the PA is reasonably certain to result in incidental take of listed species as described in Section 2.9.1 Amount or Extent of Anticipated Take. Incidental take for those activities that approve a framework for development of future actions that are authorized, funded, or carried out at a later time and any take of a listed species would not occur unless and until those future actions are carried out at a later time and subject to further section 7 consultation, and which lack sufficient detail to analyze to level of take, is not included in this ITS (see 2.5.1.4 Programmatic Activities).

NMFS is also using the interim guidance on the ESA term of "harass" (Wieting 2016) in this consultation. Based on that interim guidance, "harass" means to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering."

2.9.1 Amount or Extent of Anticipated Take

In the biological opinion, NMFS determined that incidental take is reasonably certain to occur as follows:

NMFS anticipates that the PA will result in the incidental take of individual Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, CCV steelhead, and sDPS of North American green sturgeon. For the reasons described in Section 2.9.1.2.9, the amount or extent of incidental take anticipated for Southern Resident killer whales is not included in this ITS at this time.

Incidental take associated with this action is expected in one or more of the following forms: mortality, harm, harassment, capture, and collection of adult and juvenile Sacramento River winter-run Chinook salmon, adult and juvenile CV spring-run Chinook salmon, adult and juvenile CCV steelhead and adult and juvenile sDPS of North American green sturgeon. Incidental take is expected to result from construction activities due to:

(1) Noise associated with vibratory and impact pile driving of sheet piles and foundation piles at construction sites throughout the Delta, including the NDD intakes, CCF modifications, HOR gate installation, and barge landings.

(2) Avoidance and behavioral modifications related to underwater noise generated by barge traffic associated with the PA construction.

(3) Avoidance and behavioral modifications related to increased turbidity and resuspended sediment concentrations in the water column due to construction, dredging, geotechnical surveys, and barge traffic actions within the Delta.

(4) Physiological and behavioral effects related to exposure to contaminants contained in resuspended bottom sediments during construction, dredging, geo-technical surveys, and barge traffic within the Delta related to PA activities.

(5) Increased predation due to displacement of fish from preferred habitat caused by temporary in-water structures and increased barge traffic.

(6) Physical impacts related to construction dredging activities of the PA within the Delta.

(7) Injuries and behavioral modifications due to propeller entrainment related to increased barge traffic associated with the PA.

(8) The entrapment, handling, and release of listed fish captured within the confined waters created by the installation of cofferdams at the NDD intake locations, the HOR gate location, and the CCF modifications due to dewatering and fish rescue and salvage actions.

Incidental take is expected to result from operations post-construction due to:

(1) Increased predation related to permanent structures built within the Delta due to PA activities (NDDs and HOR gate).

(2) Avoidance and behavioral modifications related to increased turbidity and resuspended sediment concentrations in the water column due to maintenance actions within the Delta.

(3) Physiological and behavioral effects related to exposure to contaminants contained in resuspended bottom sediments due to maintenance actions within the Delta.

(4) Physical impacts related to maintenance dredging activities of the PA within the Delta.

(5) Impacts related to the operations of the NDDs related to mortality and injury of listed fish exposed to the intakes' fish screens.

(6) Operations of the CVP and SWP export facilities in the South Delta and their effect on salvage and loss of listed fish, hydrodynamics, and behavioral effects.

(7) Operations of the NDD and their effects on Delta hydrodynamics, behavioral effects and survival of listed fish in the Delta.

(8) Operations of the DCC radial gates and their effects on the entrainment of listed fish into the open DCC junction.

This ITS will use surrogates to establish the expected level of take due to project actions when direct quantification of take of individuals is not possible. Surrogates are used for this ITS since it is nearly impossible to quantify the number of individuals of listed species exposed to the PA's activities, but it is reasonably certain that those individuals that are exposed will incur some level of adverse response to the exposure resulting in take as defined under the ESA. This ITS explains the causal link between the surrogate and take of the listed species; explains the reason it is impractical to express the amount or extent of anticipated take or to monitor take-related impacts in terms of the amount of individuals of the listed species; and finally, establishes a clear standard for determining when the level of anticipated take is exceeded (the surrogate parameter). Generally, unless the amount or number of individuals is listed in the ITS below, it is impossible to quantify and track the amount or number of individuals that are expected to be incidentally taken per species as a result of the PA due to the variability and uncertainty associated with the response of listed species to the effects of the PA, the varying population size of each species, annual variations in the timing of spawning and migration, and individual habitat use within the action area.

2.9.1.1 Construction-related Effects

2.9.1.1.1 Acoustic Stressors

Because the level of acoustic noise generated by pile driving and tugboat and barge operations can be accurately and consistently measured, it provides a quantifiable metric for determining incidental take of listed fish. The number of fish exposed to the noise associated with pile driving