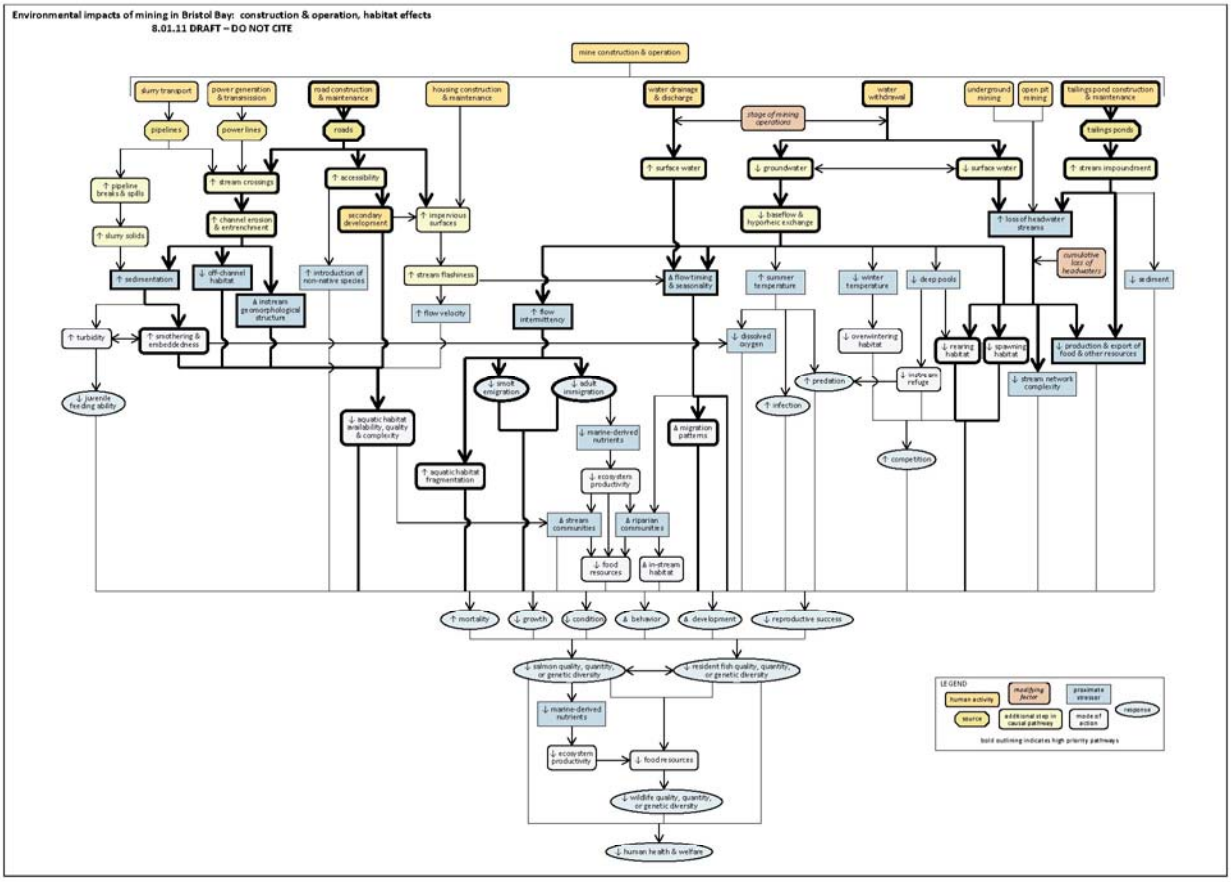
Environmental impacts of mining in Bristol Bay: construction & operation, habitat effects
8.01.11 DRAFT – DO NOT CITE
mine construction & operation
slurry transport
power generation & transmission
road construction & maintenance
housing construction & maintenance
water drainage & discharge
water withdrawal
underground mining
open pit mining
tailings pond construction & maintenance
stage of mining operations
pipelines
power lines
roads
tailings ponds
↑ surface water
↓ groundwater
↓ surface water
↑ streams impoundment
↑ pipeline breaks & spills
↑ streams crossings
↑ accessibility
↑ channel erosion & entrenchment
secondary development
↑ impervious surfaces
↓ baseflow & hyporheic exchange
↑ loss of headwater streams
↑ slurry solids
cumulative loss of headwaters
↑ sedimentation
↓ off-channel habitat
↑ introduction of non-native species
↑ stream flashiness
Δ flow timing & seasonality
↑ summer temperature
↓ winter temperature
↓ deep pools
↓ sediment
Δ instream geomorphological structure
↑ flow velocity
↑ flow intermittency
↑ turbidity
↑ smothering & embeddedness
↓ dissolved oxygen
↓ overwintering habitat
↓ rearing habitat
↓ spawning habitat
↓ production & export of food & other resources
↓ stream network complexity
↓ juvenile feeding ability
↓ smolt emigration
↓ adult immigration
↑ predation
↓ instream refuge
↑ infection
↓ aquatic habitat availability, quality & complexity
↓ marine-derived nutrients
Δ migration patterns
↑ competition
↑ aquatic habitat fragmentation
↓ ecosystem productivity
Δ stream communities
Δ riparian communities
↓ food resources
Δ in-stream habitat
↑ mortality
↓ growth
↓ condition
Δ behavior
Δ development
↓ reproductive success
↓ salmon quality, quantity, or genetic diversity
↓ resident fish quality, quantity, or genetic diversity
↓ marine-derived nutrients
↓ ecosystem productivity
↓ food resources
↓ wildlife quality, quantity, or genetic diversity
↓ human health & welfare
LEGEND
human activity
modifying factor
proximate stressor
response
source
additional step in causal pathway
mode of action
bold outlining indicates high priority pathways