To: Kuray, Marilyn[kuray.marilyn@epa.gov]
From: Frithsen, Jeff
Sent: Wed 12/17/2014 12:19:55 AM
Subject: FW: IGTT materials -- Email 2
BB_Conceptual_Diagram_0_Introduction_DRAFT.pdf
BB_Conceptual_Diagram_1_Construction and Operation_Habitat_Effects_DRAFT.pdf
BB_Conceptual_Diagram_2_Construction and Operation_Water_QualityHabitat_Effects_DRAFT.pdf
BB_Conceptual_Diagram_3_Post_Closure_WQ_and_Habitat_Effects_DRAFT.pdf
BB_Conceptual_Diagram_4_Accidents_DRAFT.pdf

The second email

Jeff Frithsen

USEPA-ORD-NCEA

703-347-8623 (office phone)

From: Frithsen, Jeff
Sent: Tuesday, December 16, 2014 5:03 PM
To: Hough, Palmer; Young, Margo; Fordham, Tami; Parkin, Richard; Brown, Leah; Palomaki, Ashley; Nalven, Heidi; Srinivasan, Gautam; McKenna, Elizabeth; Smith, Judy; Steiner-Riley, Cara
Subject: BBA: IGTT materials -- Email 2

Email 2

Jeff Frithsen

USEPA-ORD-NCEA

703-347-8623 (office phone)

From: Frithsen, Jeff
Sent: Thursday, October 16, 2014 10:06 PM
To: Barnes-Weaver, Erin
Cc: Gilbride, Patrick; Holthaus, Randy; Stolz, Luke; Curley, Ganesa; Kohler, James; Suter, Glenn; Parkin, Richard; Hough, Palmer

Subject: RE: Responses to Request from September 25, 2014 - Part B - Conceptual Model Before IGTT Meeting

Erin:

In response to your email of September 25, 2014, I need to send along multiple attachments. I suspect that I might be challenging Outlook, so I will be sending along responses in multiple emails.

In this email, please find multiple attachments in response to request B: Conceptual models developed for the BBA before the IGTT meeting – again part of problem formulation.

Jeff

Jeff Frithsen

USEPA-ORD-NCEA

703-347-8623 (office phone)

From: Barnes-Weaver, Erin
Sent: Thursday, September 25, 2014 9:56 AM
To: Frithsen, Jeff; Suter, Glenn
Cc: Gilbride, Patrick; Holthaus, Randy; Stolz, Luke; Curley, Ganesa; Kohler, James
Subject: follow-up from yesterday's discussion

Jeff and Glenn –

Thanks again for taking the time to meet with our team yesterday afternoon. We found the discussion quite helpful and appreciate you meeting with us, particularly so late in the work day.

As we discussed, **please provide us with the following by October 17**, if possible:

(b)(5) Deliberative Process Privilege

(b)(5) Deliberative Process Privilege

(b)(5) Deliberative Process Privilege

(b)(5) Deliberative Process Privilege

Please let us know if you'll need additional time to address this request. Otherwise, we sincerely appreciate your continued assistance and information.

Glenn, all the best on your vacation!

-Erin

Erin Barnes-Weaver | Project Manager | US EPA Office of Inspector General | 1595 Wynkoop St., 4th Floor (8-OIG) | Denver CO 80202 | 303-312-6871

Using conceptual diagrams as tools for the Bristol Bay Assessment

A conceptual diagram is a visual representation of hypothesized relationships among human activities and the resulting sources, stressors, and responses—basically, it explicitly lays out how you think a system of interest is (or will be) working. These diagrams can be useful tools throughout an assessment, from structuring and clarifying initial brainstorming, to providing a framework for data collection and analysis, to organizing and presenting results.

Development of conceptual diagrams at the beginning of an assessment facilitates explicit, critical thinking about linkages among system components. Because these diagrams are always works-in-progress, to be revised and updated as the assessment progresses and information accumulates, they encourage transparency by providing a window into the assessment process.

Figure 1 provides a diagrammatic overview of the Bristol Bay Assessment. The assessment focuses on how environmental impacts associated with mine construction, operation, and long-term management (i.e., post-closure activities and maintenance) may affect salmon and resident fishes; effects on wildlife and human populations will be assessed in terms of fish-mediated impacts, although direct effects are recognized (dashed lines). We currently are developing four conceptual diagrams for mine life stage (mine construction & operation; post-closure management) and impact type (water quantity, sediment, and physical habitat; water quality) combinations, as well as a diagram illustrating potential effects of low probability but high impact accidents.

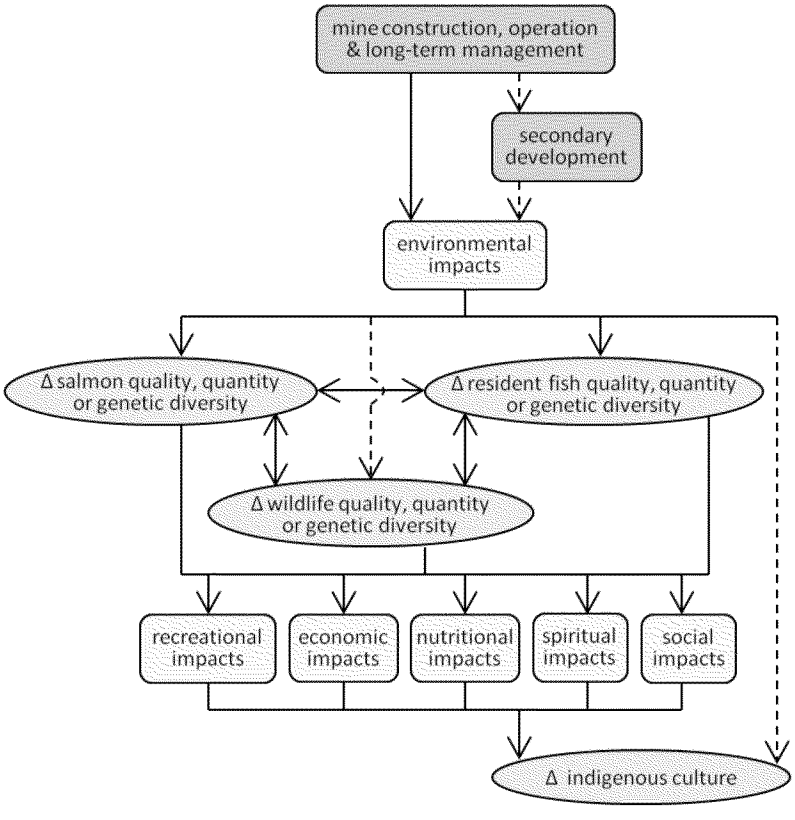
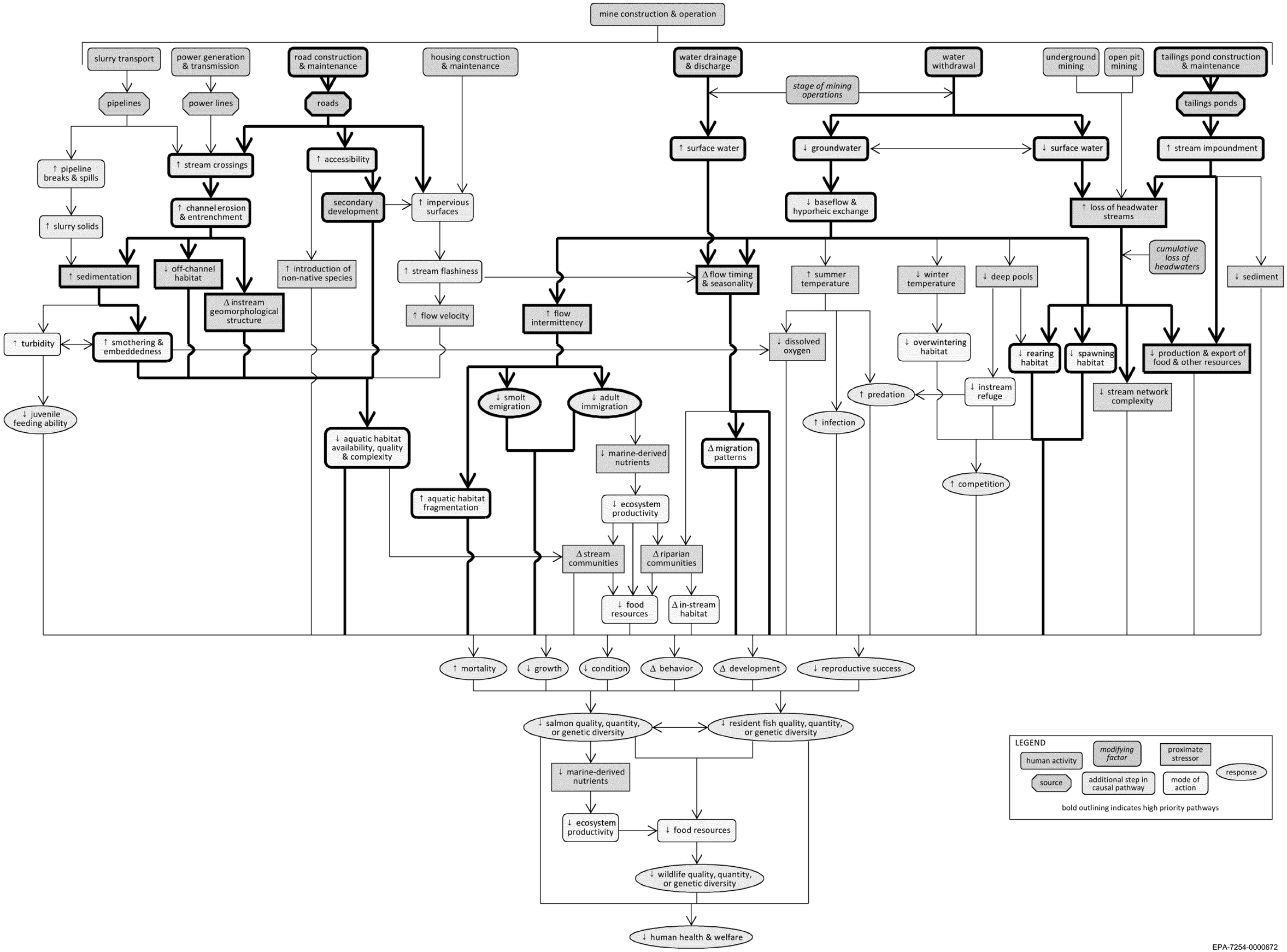
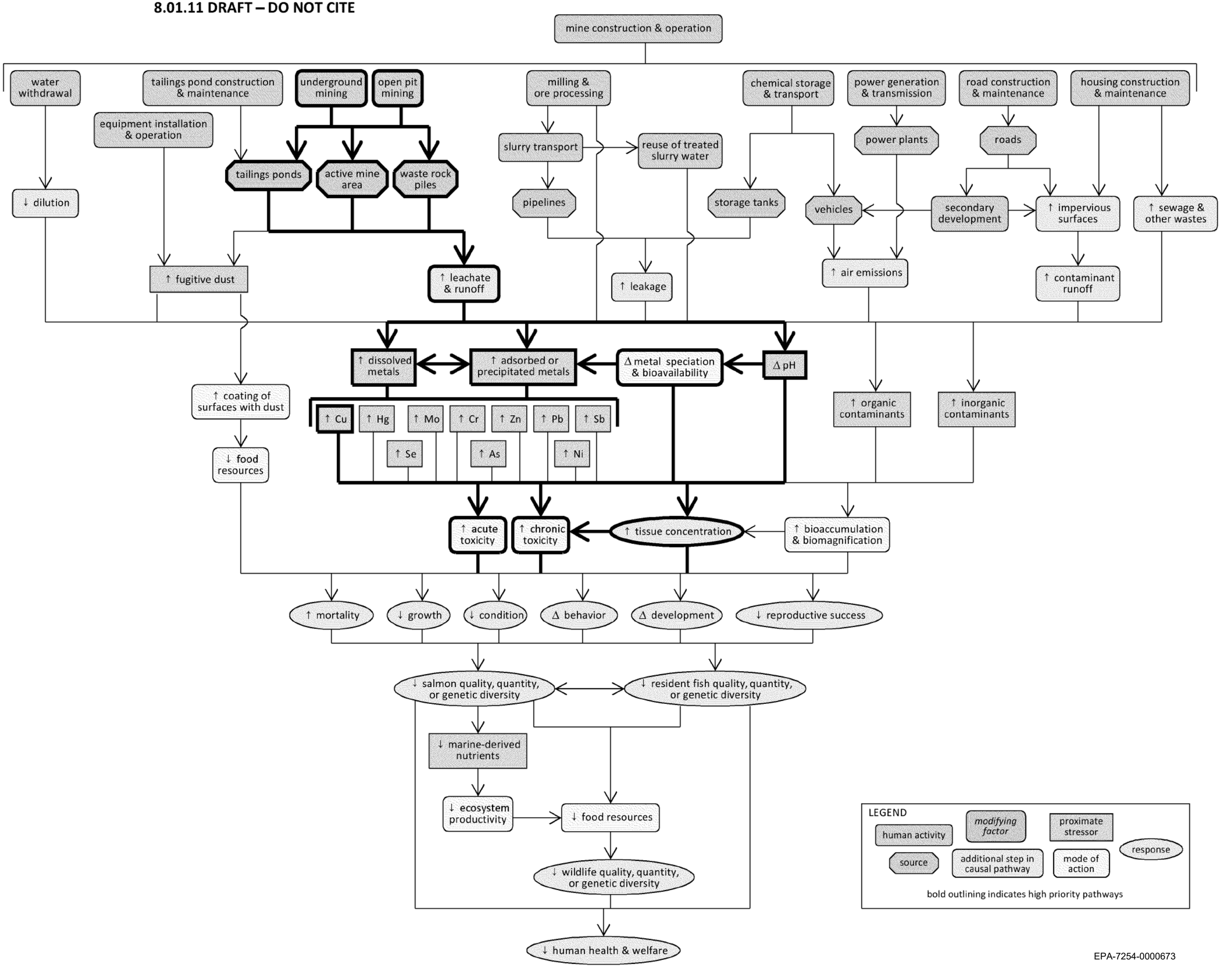


Figure 1. An overview of key components of the Bristol Bay Assessment (solid lines indicate focal pathways for the assessment).


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
↑ stream impoundment
↑ pipeline breaks & spills
↑ stream crossings
↑ accessibility
secondary development
↑ impervious surfaces
↓ baseflow & hyporheic exchange
↑ loss of headwater streams
↑ channel erosion & entrenchment
↑ 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
↓ smolt emigration
↓ adult immigration
↑ predation
↓ instream refuge
↓ stream network complexity
↓ juvenile feeding ability
↑ 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


mine construction & operation
water withdrawal
tailings pond construction & maintenance
underground mining
open pit mining
milling & ore processing
chemical storage & transport
power generation & transmission
road construction & maintenance
housing construction & maintenance
equipment installation & operation
slurry transport
reuse of treated slurry water
power plants
roads
tailings ponds
active mine area
waste rock piles
↓ dilution
pipelines
storage tanks
vehicles
secondary development
↑ impervious surfaces
↑ sewage & other wastes
↑ fugitive dust
↑ leachate & runoff
↑ leakage
↑ air emissions
↑ contaminant runoff
↑ dissolved metals
↑ adsorbed or precipitated metals
Δ metal speciation & bioavailability
Δ pH
↑ coating of surfaces with dust
↑ organic contaminants
↑ inorganic contaminants
↑ Cu
↑ Hg
↑ Mo
↑ Cr
↑ Zn
↑ Pb
↑ Sb
↑ Se
↑ As
↑ Ni
↓ food resources
↑ acute toxicity
↑ chronic toxicity
↑ tissue concentration
↑ bioaccumulation & biomagnification
↑ 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
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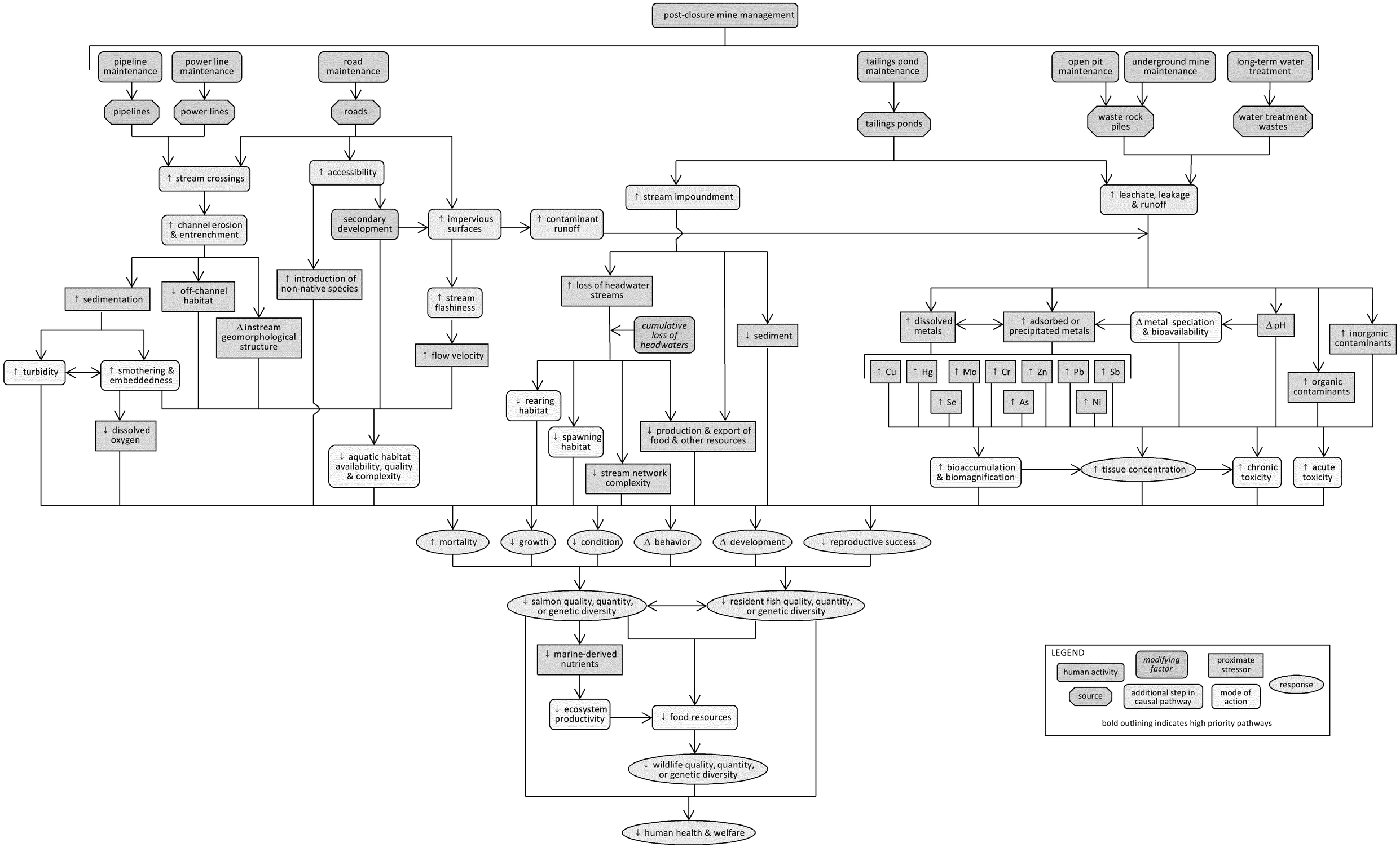
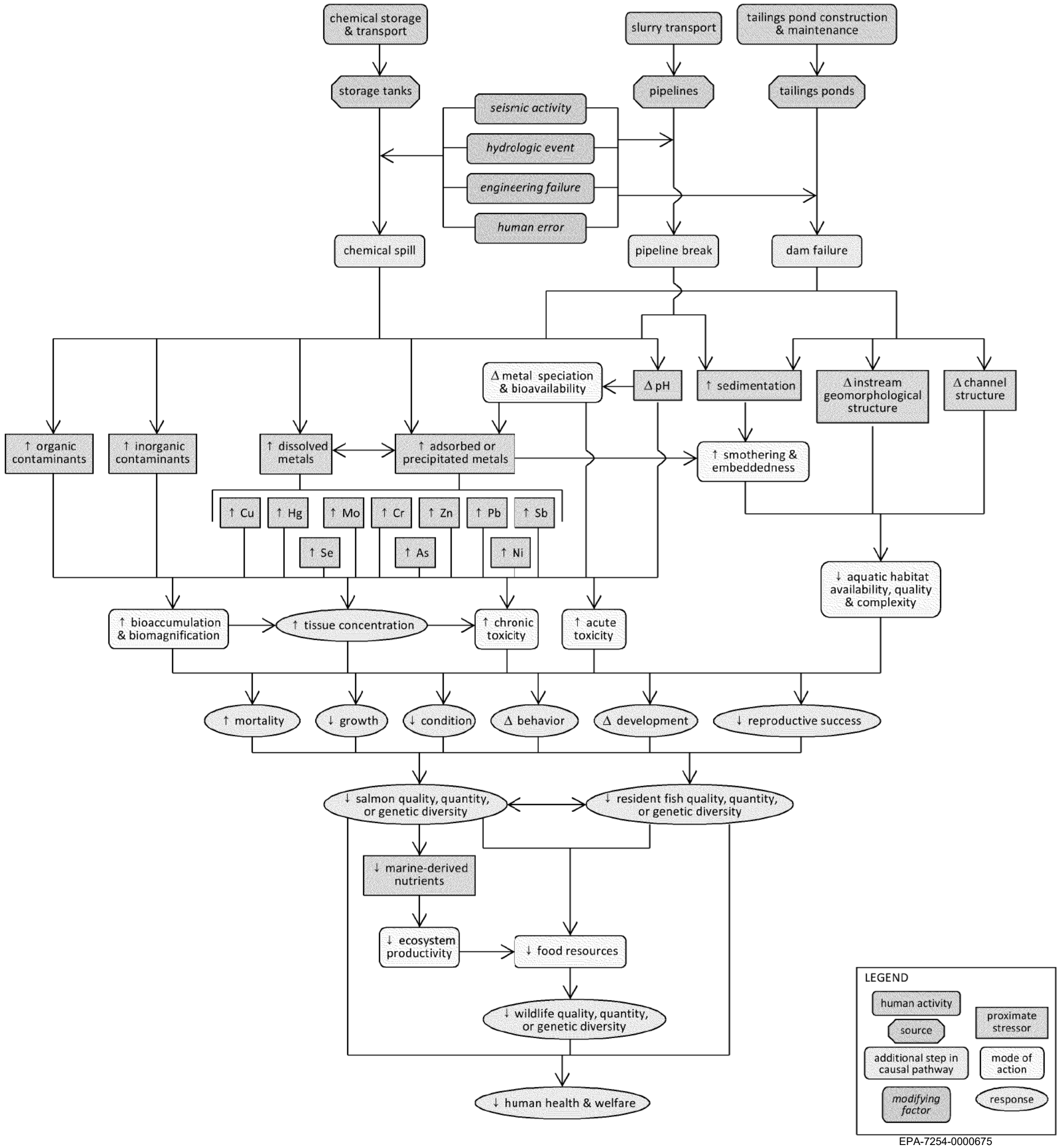
additional step in causal pathway
mode of action
bold outlining indicates high priority pathways

Environmental impacts of mining in Bristol Bay: post-closure, water quantity/habitat & water quality effects
8.01.11 DRAFT – DO NOT CITE




chemical storage & transport
slurry transport
tailings pond construction & maintenance
storage tanks
pipelines
tailings ponds
seismic activity
hydrologic event
engineering failure
human error
chemical spill
pipeline break
dam failure
Δ metal speciation & bioavailability
Δ pH
↑ sedimentation
Δ instream geomorphological structure
Δ channel structure
↑ organic contaminants
↑ inorganic contaminants
↑ dissolved metals
↑ adsorbed or precipitated metals
↑ smothering & embeddedness
↑ Cu
↑ Hg
↑ Mo
↑ Cr
↑ Zn
↑ Pb
↑ Sb
↑ Se
↑ As
↑ Ni
↓ aquatic habitat availability, quality & complexity
↑ bioaccumulation & biomagnification
↑ tissue concentration
↑ chronic toxicity
↑ acute toxicity
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↓ growth
↓ condition
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