



***Scientific Assessments Informing
Decisions: The Bristol Bay
Assessment Example***

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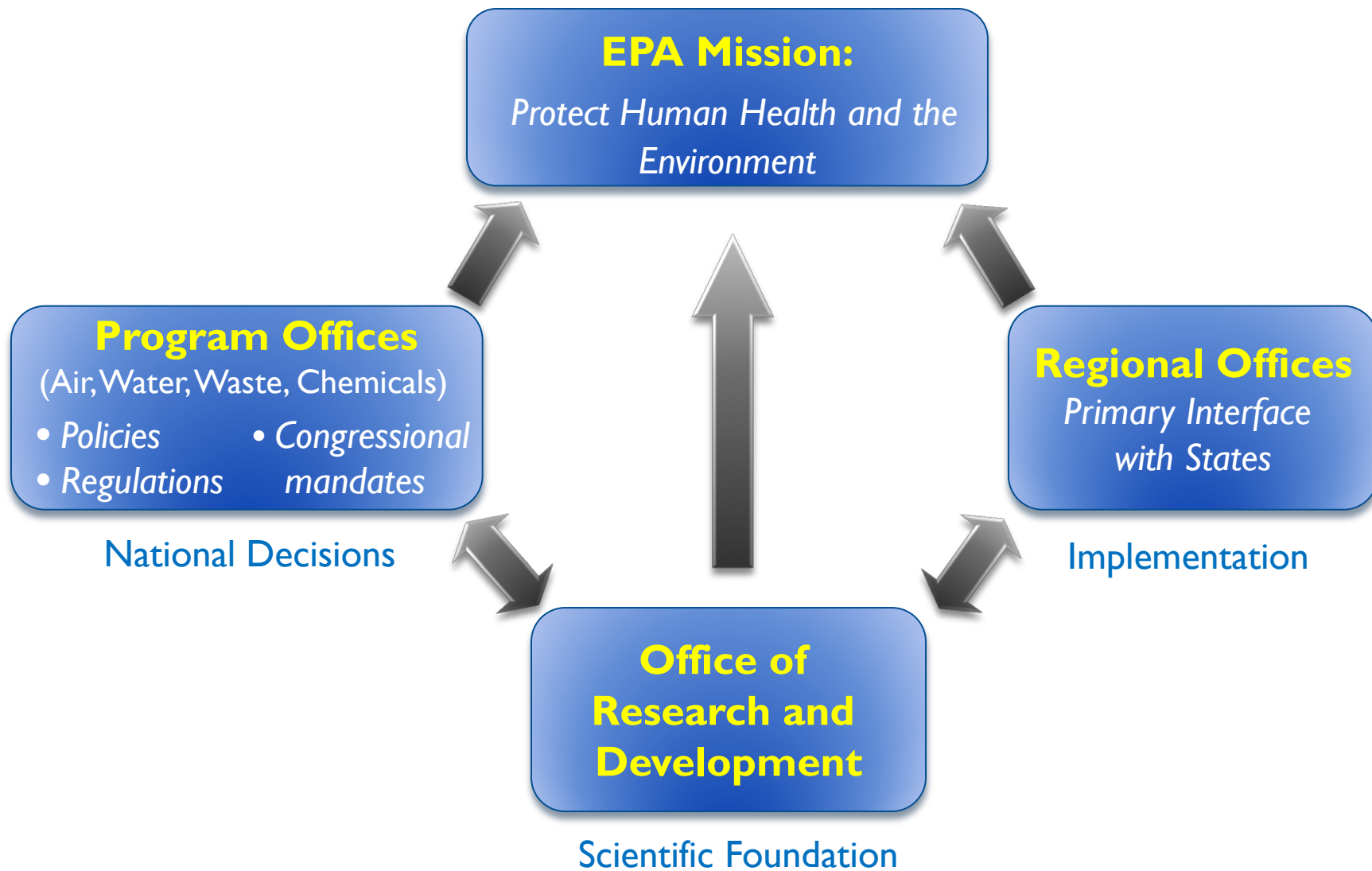
**National Conference on Mining-Influenced Waters
Albuquerque, New Mexico
August 12, 2014**

Science Informs Decisions



- **Risk Assessments**
 - **Prospective**
 - **If “X” then “Y”**
- **Causal Assessments**
 - **Retrospective**
 - **Observed “Y”, what “X”**
- **Research activities provide the foundation for both**

Science Supporting EPA's Mission



ORD Research Programs



Air, Climate & Energy



Sustainable & Healthy Communities



Homeland Security



Chemical Safety for Sustainability



Human Health Risk Assessment



Safe & Sustainable Water Resources

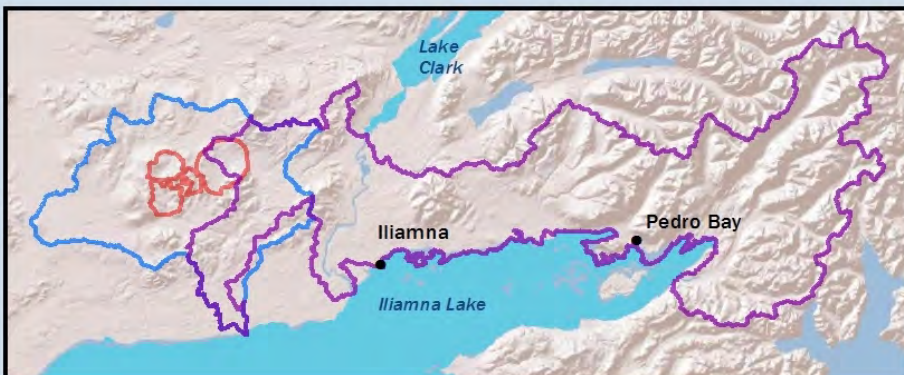
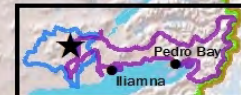
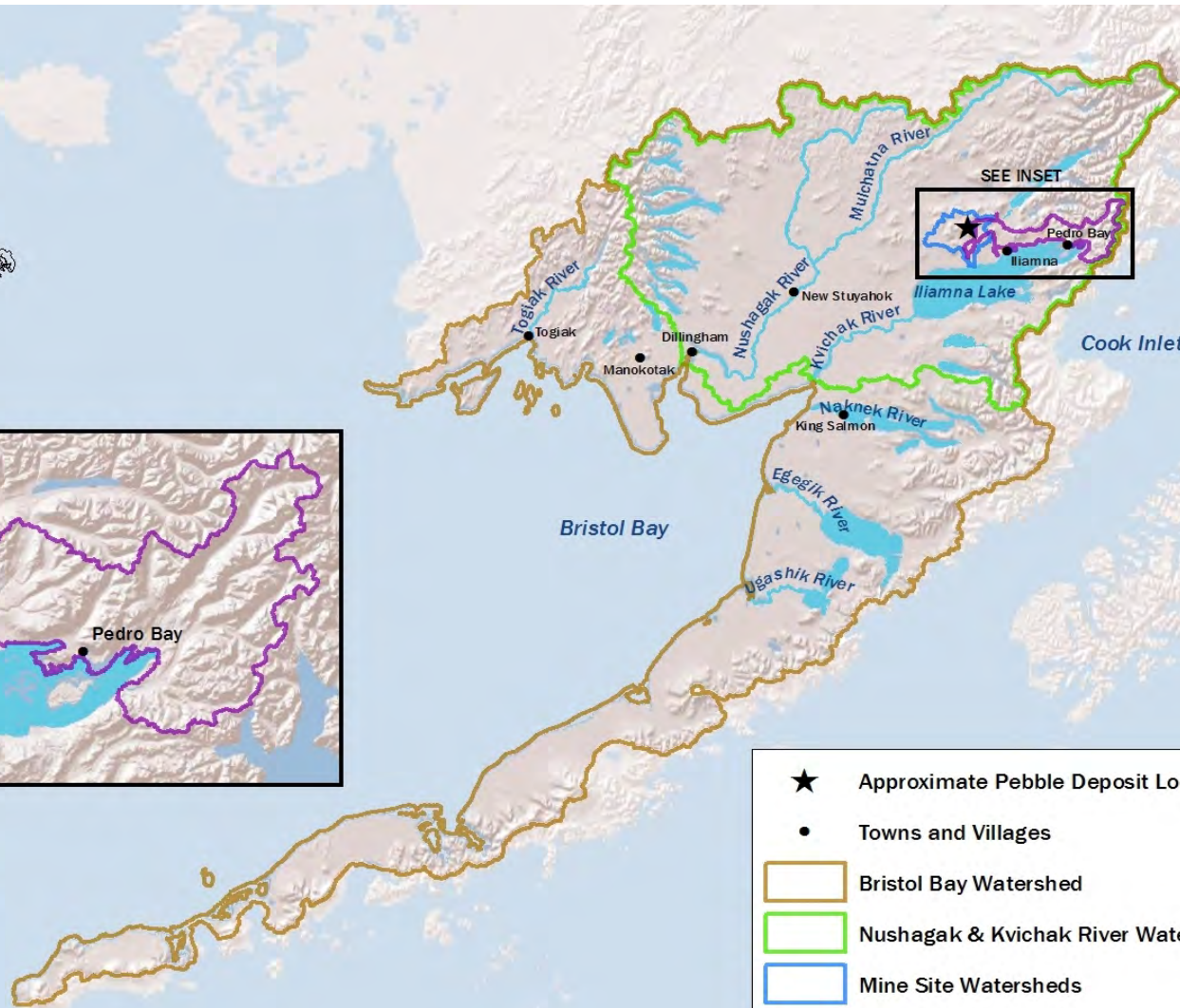




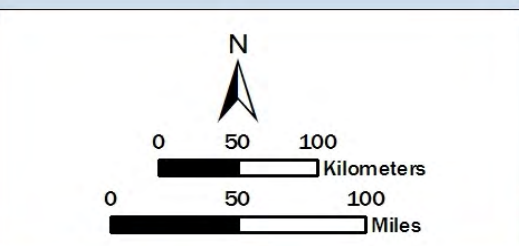
EPA's Bristol Bay Assessment

**A Joint Assessment Conducted by
USEPA Region 10, Office of Water, and
Office of Research and Development
with assistance from USFWS, NOAA, and USGS**

Bristol Bay and Areas of Study



- ★ Approximate Pebble Deposit Location
- Towns and Villages
- ▭ Bristol Bay Watershed
- ▭ Nushagak & Kvichak River Watersheds
- ▭ Mine Site Watersheds
- ▭ Mine Footprints
- ▭ Transportation Corridor Area



Drivers for the Assessment



Watershed Characteristics

- Unique and pristine ecosystem.
- Large commercial and recreational fishery.
- Important subsistence fishery.
- Strong indigenous cultures.

Proposed Mining – Pebble

- Potential to be one of the largest mines of its kind in world.
- Large deposit, low grade ore.
- Will generate vast amounts of waste rock and tailings.
- Additional claims and exploration sites in watershed.



Drivers for the Assessment



Multiple requests to the agency (2010)

- Agency received requests to use CWA 404(c) from nine Bristol Bay federally recognized tribal governments, the Bristol Bay Native Corporation, and other tribal organizations.
- Others (including Pebble Limited Partnership, State of Alaska, and other Tribes) asked EPA to let the standard NEPA/404 review process proceed.



- EPA decided to conduct this Assessment to respond to these competing requests, characterize the resources within the watershed, and provide a scientific foundation for public understanding and future decisions.

An aerial photograph of a river valley. The river flows from the top center towards the bottom right. A large, irregularly shaped area in the center of the valley is highlighted in a vibrant green color, indicating a pebble deposit. The surrounding landscape is a mix of brown, tan, and greyish tones, with some smaller water bodies and channels. The text 'The Assessment' is overlaid in white, serif font in the upper middle part of the image.

The Assessment

South Fork Koktuli River
Looking South from Pebble Deposit

Purpose of Assessment



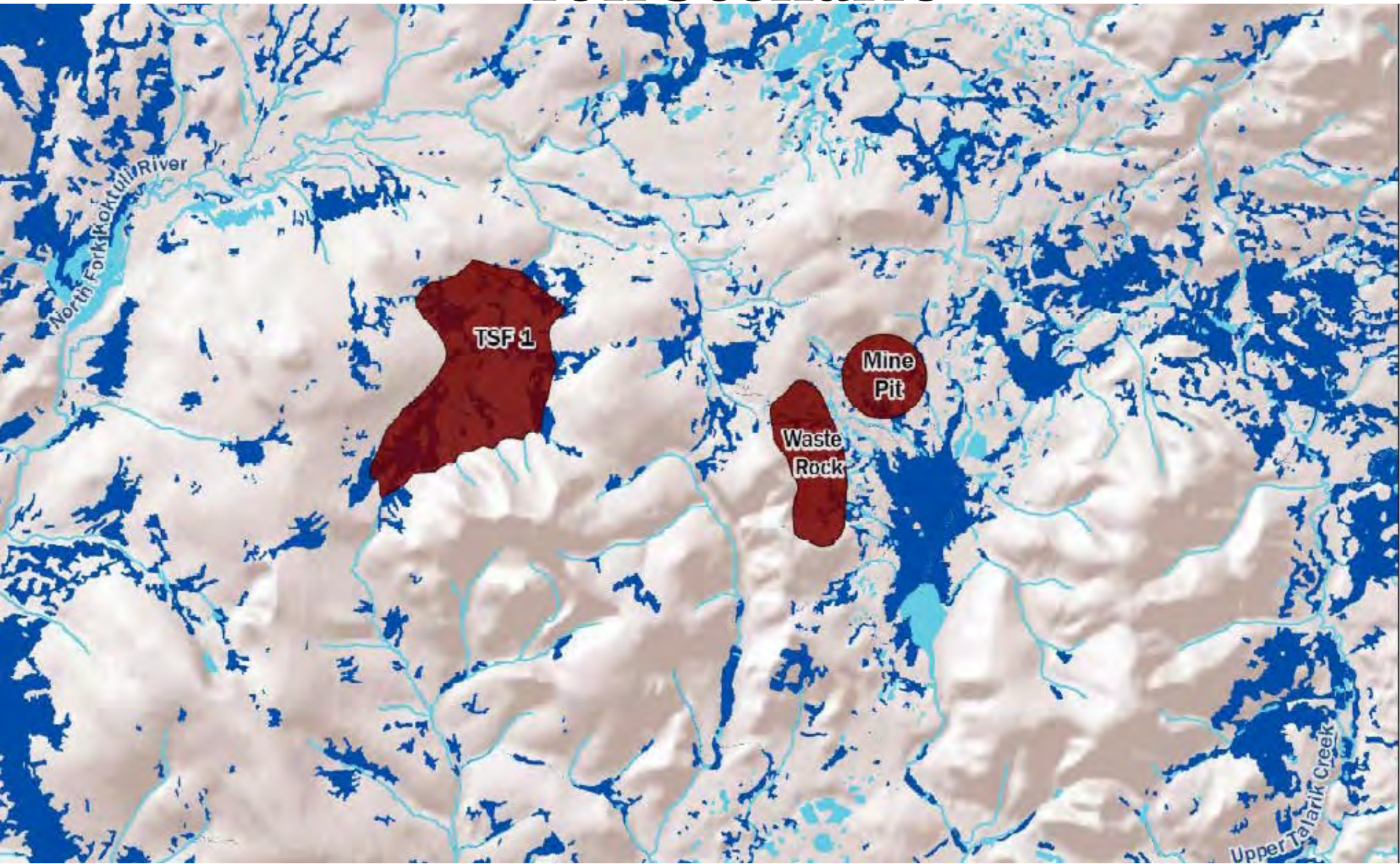
- Characterize the biological and mineral resources of the Bristol Bay watershed.
- Increase understanding of the potential impacts of large-scale mining on the region's fish resources.

The Assessment



- Conducted as an ecological risk assessment.
- Primary endpoint is fish habitat and the fishery.
- Impacts on wildlife and indigenous people also of interest, but only as mediated through impacts on fish.
- Mine scenarios based upon modern industry practice and information filed by the Pebble Limited Partnership with the SEC and published in 2011.
- Mine scenarios include three mine sizes (0.25, 2.0, and 6.5 billion tons) and a transportation corridor to Cook Inlet.
- Deep water port in Cook Inlet, power plants and secondary development not evaluated.

Mine Site Example -- 2.0 Billion Ton Scenario



Parameter	Mine Scenario		
	Pebble 0.25	Pebble 2.0	Pebble 6.5
Amount of ore mined (billion metric tons)	0.23	1.8	5.9
Approximate duration of mining (years)	20	25	78
Ore processing rate (metric tons/day)	31,100	198,000	208,000
Mine Pit			
Surface area (km ²)	1.5	5.5	17.8
Depth (km)	0.30	0.76	1.24
Waste Rock Pile			
Surface area (km ²)	2.3	13.0	22.6
PAG waste rock (million metric tons)	86	580	4,700
NAG waste rock (million metric tons)	320	2,200	11,000
TSF 1*			
Capacity, dry weight (billion metric tons)	0.25	1.97	1.97
Surface area, exterior (km ²)	6.8	16.1	16.1
Maximum dam height (m)	92	209	209
TSF 2*			
Capacity, dry weight (billion metric tons)	NA	NA	3.69
Surface area, exterior (km ²)	NA	NA	22.7
TSF 3*			
Capacity, dry weight (billion metric tons)	NA	NA	0.96
Surface area, exterior (km ²)	NA	NA	9.82
Total TSF surface area, exterior (km²)	6.8	16.1	48.6

Tailings Storage Facility Dams

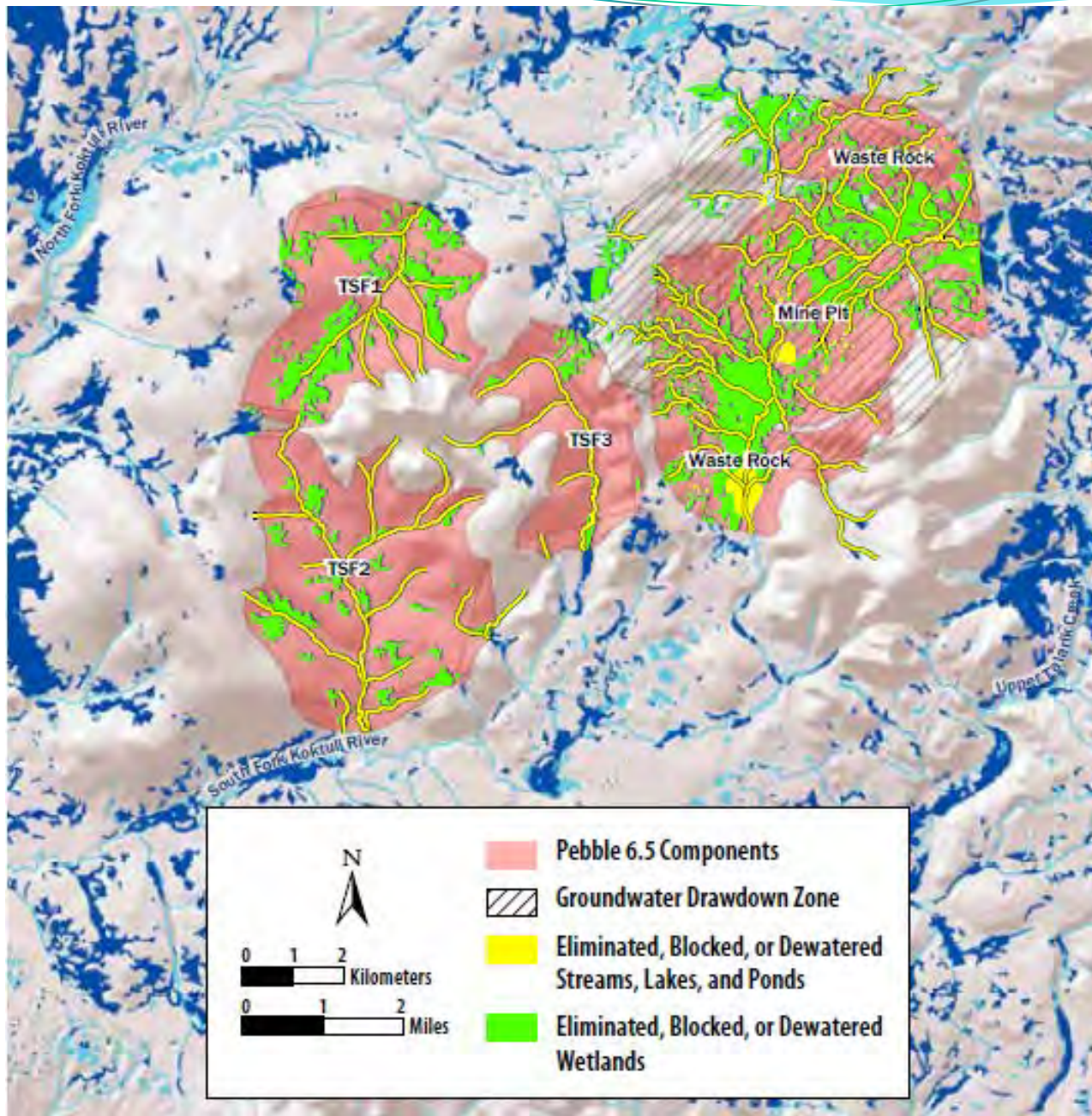


Height of the Dam at TSF 1 In the Pebble 2.0 and Pebble 6.5 Scenarios, Relative to U.S. Landmarks



Major Findings

Impacts from Mining – Mine Site



Impacts from Routine Operations



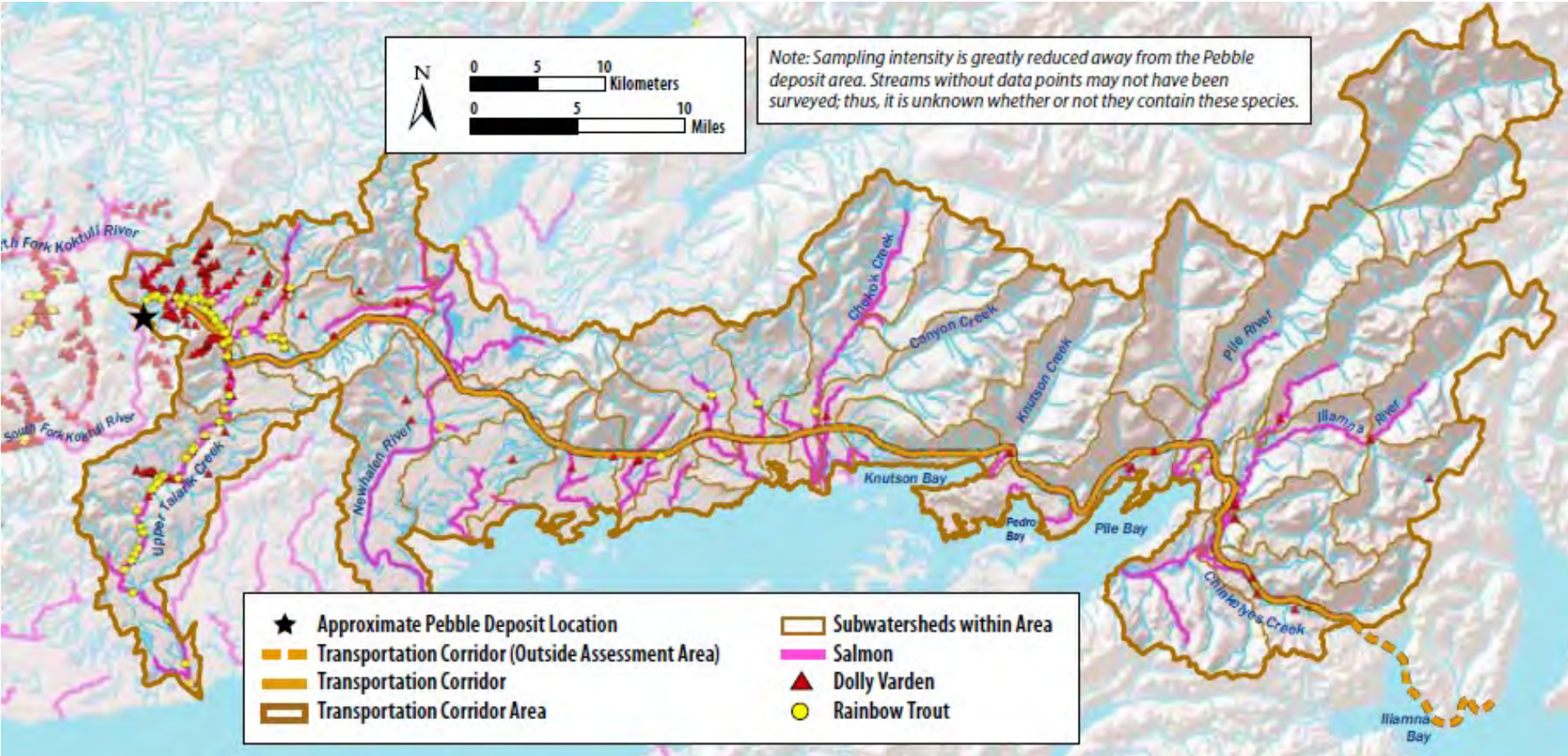
- **Mine footprint** would eliminate, block, or dewater 38 to 151 km (24 to 94 miles) of streams.
- **Mine footprint** would cause loss of 4.5 to 18 square km (1,200 to 4,900 acres) of wetlands and 0.4 to 1.8 square km (100 to 450 acres) of ponds and lakes.
- **Streamflow alterations** exceeding 20% would adversely affect habitat in an additional 15 to 53 km of streams.
- **Leakage** of tailings and waste rock leachates during routine operations would result in instream copper levels sufficient to cause direct effects on fish and invertebrates in 21 to 82 km of streams.

Impacts from Accidents



- **Failures of leachate collection and treatment** would be likely over time and would introduce contaminants toxic to fish and invertebrates downstream.
- In one scenario, complete loss of water treatment and release of wastewater would cause direct impacts to salmonids in 27 to 97 km of streams. Invertebrates mortality or reduced reproduction expected in 78 to 100 km of streams.
- **A tailings dam failure** would be less likely but result in significant habitat destruction and reduction of salmon population.

Transportation Corridor



Impacts Along Transportation Corridor



- **Transportation corridor** would cross approximately 64 streams, many supporting anadromous fish, and multiple wetlands.
- **Risks to salmon from blocked culverts** is very likely, especially after mine closure.
- **Chemical spills** from truck accidents could be very likely during mine operation.
- **Pipeline failures** are very likely and would release product concentrate, diesel fuel, or return water into streams or wetlands.



Upper Talarik Creek, which flows into Iliamna Lake.



What follows the
Assessment?

Clean Water Act Section 404(c)

- Authorizes EPA to **prohibit or restrict** the placement of dredged or fill material in waters of the U.S.
- Unacceptable adverse effect(s):
 - Municipal water supply (o);
 - Shellfish beds and fishery areas (6);
 - Wildlife (11), or;
 - Recreation areas (5).



“404(c) Process” – 40 CFR 231



1. Initiated – “15-day letter” – February 28, 2014.
2. Proposed Determination (PD)
 - Published in Federal Register for comment
 - Public hearing
3. Recommended Determination (RD)
4. Final Determination (FD)

Where's the report?
www.epa.gov/bristolbay

