

Use of Prediction Information in Mine Permitting and Case Studies

Characterizing, Predicting, and Modeling Water from Mine Sites



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Primary Reference:

Kuipers, J.R., Maest, A.S., MacHardy, K.A., and Lawson, G. 2006. *Comparison of Predicted and Actual Water Quality at Hardrock Mines: The reliability of predictions in Environmental Impact Statements.*

- Available at <http://www.earthworksaction.org/home.cfm>

Comparison Study Tasks

- Define and identify “major” hardrock mines in the U.S.
- Identify NEPA eligibility of major hardrock mines
- Identify and gather NEPA documentation for major mines
- Identify and compile water quality predictions information from NEPA documents
- Identify other water quality predictions information
- Conduct case studies analysis of NEPA process, predictions results, and actual water quality history
- Analyze NEPA predictions and water quality information on a comparative basis and in subgroups

Comparison Study Project Database

- Location
- Ownership
- Commodity
- Operation Type
- Operation Status
- Disturbance and Financial Assurance
- NEPA Documentation
- Record of NEPA document requests and retention
- NPDES Information

Data provided in Excel database form and statistically evaluated in appendices to report

Comparison Study Methods – Major Mines Identification

- Major Mines Criteria
 - disturbance area of over 100 acres, and
 - financial assurance amount of over \$250,000, or
 - having a production history (1975 to current) of greater than 100,000 oz's Au, 100,000,000 #'s copper, or equivalent in other metal
 - In operation 1975 to present
- Sources
 - Kuipers, Randol, USGS, Infomine
- 182 major mines identified in U.S.
- 132 of those mines NEPA eligible

Major Mine – NEPA Eligibility (132 Mines)

- 93 (68%) are located on BLM administered lands
- 34 (25%) are located on Forest Service administered lands
- nine (7%) are located on both BLM and Forest Service administered lands
- five (4%) required 404 wetlands permits from the COE invoking NEPA
- three (2%) required NPDES permits from EPA invoking NEPA
- two (1%) are located on Indian Lands invoking NEPA
- 23 (19%) are located in states (California, Montana, Wisconsin) that have NEPA requirements
 - 17 (14%) require both NEPA for federal purposes and are located in states that have NEPA requirements
 - Six (5%) require NEPA to meet state requirements only

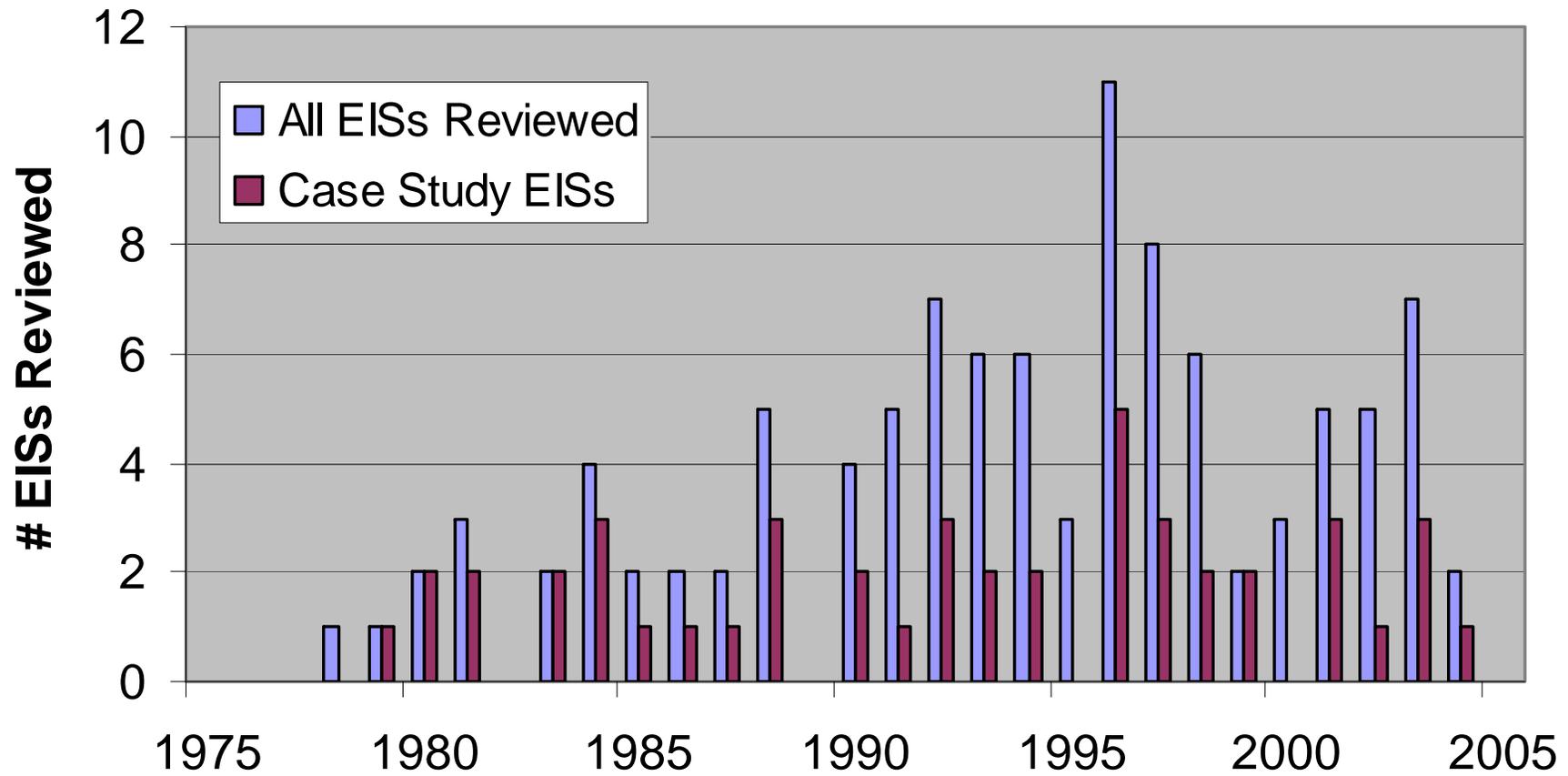
Comparison Study Methods – EIS Water quality Info

- Identified 182 major hardrock mines and 136 major mines eligible for National Environmental Policy Act (NEPA)
- Gathered information on:
 - geology/mineralization
 - climate
 - hydrology
 - field and lab tests performed
 - constituents of concern identified
 - predictive models used
 - water quality impact potential (pre-mitigations)
 - mitigations
 - predicted water quality impacts (after mitigations)
 - discharge information
- Information was scored numerically and entered into an Excel database

Comparison Study Methods – Case Studies

- Obtained data/information on operational water quality for case study mines from NEPA documents, State agencies, and/or consultant or agency reports
- Compared potential (pre-mitigation) and predicted (after considering effects of mitigations) water quality from the EISs with actual water quality at the case study mines.
- Evaluated effects of geochemical and hydrologic characteristics on operational water quality.

Distribution of EIS's Reviewed, by Year



NEPA/CEQA and Water Quality Predictions

- National Environmental Policy Act, 1969
 - NEPA requires federal agencies to take a “hard look” at the environmental impacts of certain proposed projects to ensure the necessary mitigation or other measures are employed to meet federal regulations and other applicable (such as state) requirements.
 - NEPA and its implementing regulations require all federal agencies to: [I]nsure the professional integrity, including scientific integrity of the discussions and analysis in environmental impact statements. [Agencies] shall identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement (40 CFR 1502.24).

NEPA/CEQA and Water Quality Predictions

- The regulations mandate that all NEPA documents be “supported by evidence that the agency has made the necessary environmental analysis” (40 CFR § 1502.1).
 - Federal agencies have a duty to disclose the underlying scientific data and rationale supporting the conclusions and assumptions in an EIS.
 - Unsupported conclusions and assumptions violate NEPA.
 - The federal courts pay particular attention to this requirement and have found that federal agencies are required to provide the underlying environmental data that are relied upon in the NEPA process.
 - The scientific data and rationale are typically contained in appendices to an EIS.

NEPA/CEQA and Water Quality Predictions

- 40 CFR § 1502.22 imposes three mandatory obligations in the face of scientific uncertainty:
 - (1) a duty to disclose the scientific uncertainty;
 - (2) a duty to complete independent research and gather information if no adequate information exists (unless the costs are exorbitant or the means of obtaining the information are not known); and
 - (3) a duty to evaluate the potential, reasonably foreseeable impacts in the absence of relevant information, using a four-step process.

NEPA/CEQA and Water Quality Predictions

The four step process involves:

- a statement that such information is incomplete or unavailable;
- a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment;
- a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment, and;
- the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community

EIS Approach to Impacts

