Introduction to EPA's Risk-Screening Environmental Indicators Model

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- RSEI Overview

- Highlights of RSEI Enhancements

- Appropriate and Inappropriate Uses

- Status

- Questions

- 1986 – EPCRA, SARA Title III

- 1989 – EPA's Relative Risk Screening Guidance for TRI

- 1992 – RSEI development initiated

- 1998 – SAB Review of 1997 Draft Methodology

- 1999 – Public Release of RSEI 1.0

- 2014 – Customer Service Survey

- 2015 – RSEI 2.3.4, public release of EasyRSEI and 3 years of Geographic Microdata

- 2016 – RSEI 2.3.5, public release of 27 years of microdata

Overview: So What is RSEI?

- A screening-level model for assessing the potential chronic human health impacts of certain TRI releases and transfers.

  – Air and water releases from TRI reporting facilities

  – Transfers to publicly-owned treatment works (POTWs) and off-site incineration.

- Primary Datasets

  – Toxics Release Inventory data

  – Chemical toxicity data

  – Locations of human populations and facilities.

- RSEI Results

  – RSEI produces different kinds of metrics (RSEI Score, RSEI Hazard, toxicity-weighted concentration)

  – Results can be examined at different levels of aggregation (e.g., facility, chemical, industry sector, zip code, county, state)

Overview: Types of Data

- Facility-level results (distributed in EasyRSEI, Envirofacts)
  - Impacts are aggregated and rolled back to the originating facility
  - Queries by geography pick up facilities within area, impacts may occur somewhere else.
  - Useful for screening and prioritizing facilities, industries, chemicals for further analysis

- Geographic Microdata
  - Not aggregated by facility or release- files are very large.
  - Calculated values for each release and each potentially affected grid cell.
  - Chemical concentration, toxicity-weighted concentration, RSEI Score and population.
  - Condensed version of Microdata sums all chemicals for each 810m x 810m grid cell.
  - Useful for looking at local geographic areas, environmental justice analyses.
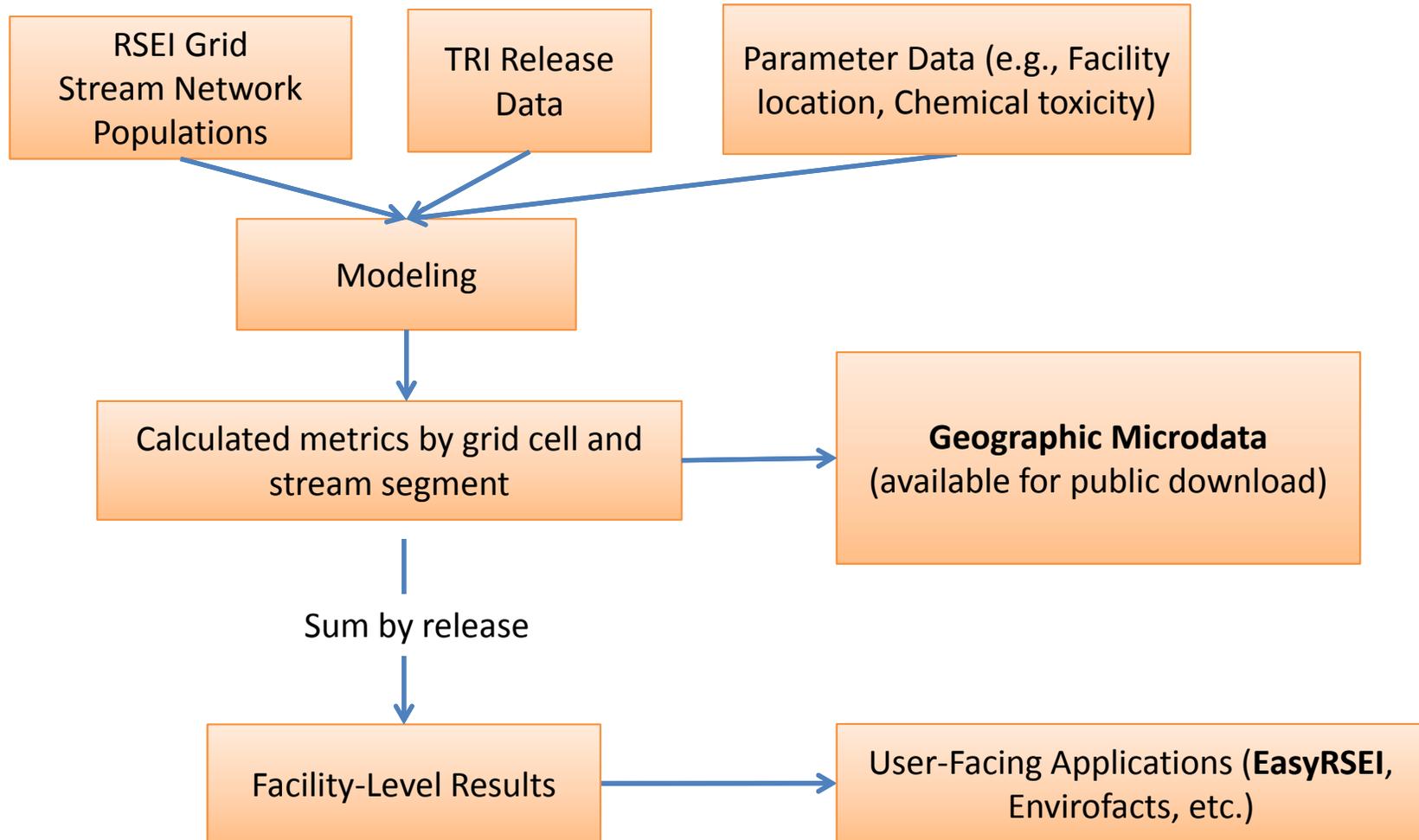
Overview: So What is a RSEI Score?

- RSEI Score is a unitless value accounting for:

  - The size of the chemical release

  - The fate and transport of the chemical through the environment

  - The size and location of the exposed population

  - The chemical's toxicity

- Score calculation

  - Toxicity weight * exposed population * estimated dose.

- Since it is unitless, a RSEI Score can only be compared with other RSEI Scores.

Overview: How is RSEI Unique?

- RSEI is a multi-year, multi-media, national-level model
  - Each refresh updates all data years (currently 27 years), for a fully consistent and comparable time series
  - Multi-media (RSEI models releases to both air and water)
  - RSEI models entire U.S. and territories. Results can be aggregated nationally or examined locally

- RSEI Geographic Microdata provide high-resolution data with a linked source-receptor relationship
  - In 2016, a 27-year Microdata time series was released to the public for the first time (TRI data years 1988-2014)

- RSEI's methodology is well-documented and based on standard EPA models and data sources

Overview: What Doesn't RSEI Do?

- RSEI does not model other TRI-reported management activities, such as land application or underground injection, or transfers other than those to POTWs and incineration

- RSEI is not a stand-alone source of information

- RSEI does not produce a risk assessment

- RSEI Scores do not describe a level of risk (such as the number of excess cancer cases), and should not be used to draw conclusions about risk

Better Input Data

- Vastly improved locations for facilities and drinking water intakes

- Better weather data

Better Modeling

- Upgraded air modeling to AERMOD, expanded modeling around each facility

- Currently upgrading water pathway hydrography to NHDPlus Version 2

Expanded Outputs

- Separate Cancer/Noncancer Score and Hazard

- Publicly downloadable Geographic Microdata

Appropriate Uses of RSEI

- RSEI can be used, in conjunction with other data and information, to help establish priorities for further investigation and to look at changes in potential human health impacts over time.

- Looking at trends in RSEI Score over time and across sectors, chemicals, facilities and locations.

- Ranking and prioritizing chemicals, industry sectors, and locations for strategic planning that will involve exploration of additional data sets and related information.

- Highlight situations with higher relative RSEI Scores that may warrant further investigation to better assess potential chronic human health risks.

- Screening for facilities that may benefit from pollution prevention programs.

Inappropriate Uses of RSEI

- Determining whether a facility is in compliance with federal or state regulations.

- Making conclusions or decisions about the risk posed by any particular facility or release.

- Making conclusions or decisions about individual risk or generating quantitative risk estimates.

- Making conclusions or decisions without consideration (or in isolation) of other data or related information.

- RSEI website has been revised with improved text and videos to enhance access, understanding and use. It is available at https://www.epa.gov/rsei

- Anticipating release of RSEI refresh including TRI data for 2015 this December.

- Results will be available in the TRI National Analysis and in EasyRSEI.

- Limited technical support is available to help users navigate and understand the RSEI results.

- Most recent three years of RSEI Geographic Microdata available at https://www.epa.gov/rsei/how-get-risk-screening-environmental-indicators-rsei-model#microdata.

- All years of Microdata (1988-2014), including state-level files are available on Amazon (https://aws.amazon.com/public-data-sets/epa-rsei/).

Questions?