SITE CONCEPTUAL MODELS & MRBCA

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What is a SCM?

- A description of a site and its environment based on existing knowledge
- A way to describe and evaluate how exposures have and might occur
- Defines ALL potential exposure pathways
- A tool to help formulate and test hypotheses to guide site investigations
- Facilitates replacement of assumption with fact

Qualitative

- A SCM should be considered a qualitative tool
- A SCM can include quantitative elements only after a risk assessment is conducted
- A SCM leads to a risk assessment
- The SCM shows whether an exposure pathway is or is not complete
- Where a pathway is complete, the Risk Assessment determines whether risk due to the complete pathway is or is not acceptable

Explains

- where contamination is known or believed to originate – defines/predicts the source
- how contaminants have or might move – defines/predicts transport mechanisms
- how receptors have or might be exposed – defines/predicts media, routes of exposure, and receptors

Depicts

At the least, the SCM depicts:

- Contaminant sources
- Release mechanisms
- Affected media
- Transport routes
- Exposure routes
- Receptors
  - Human
  - Ecological

Guides

- Guides
  - Illustrates what pathways are of concern
  - Informs as to what is known and what is assumed, what data is lacking
  - By these, focuses data collection efforts to characterize site and test hypotheses
  - Facilitates replacement of assumption with fact, justifies and explains decisions regarding exposure pathways

Why Develop an SCM?

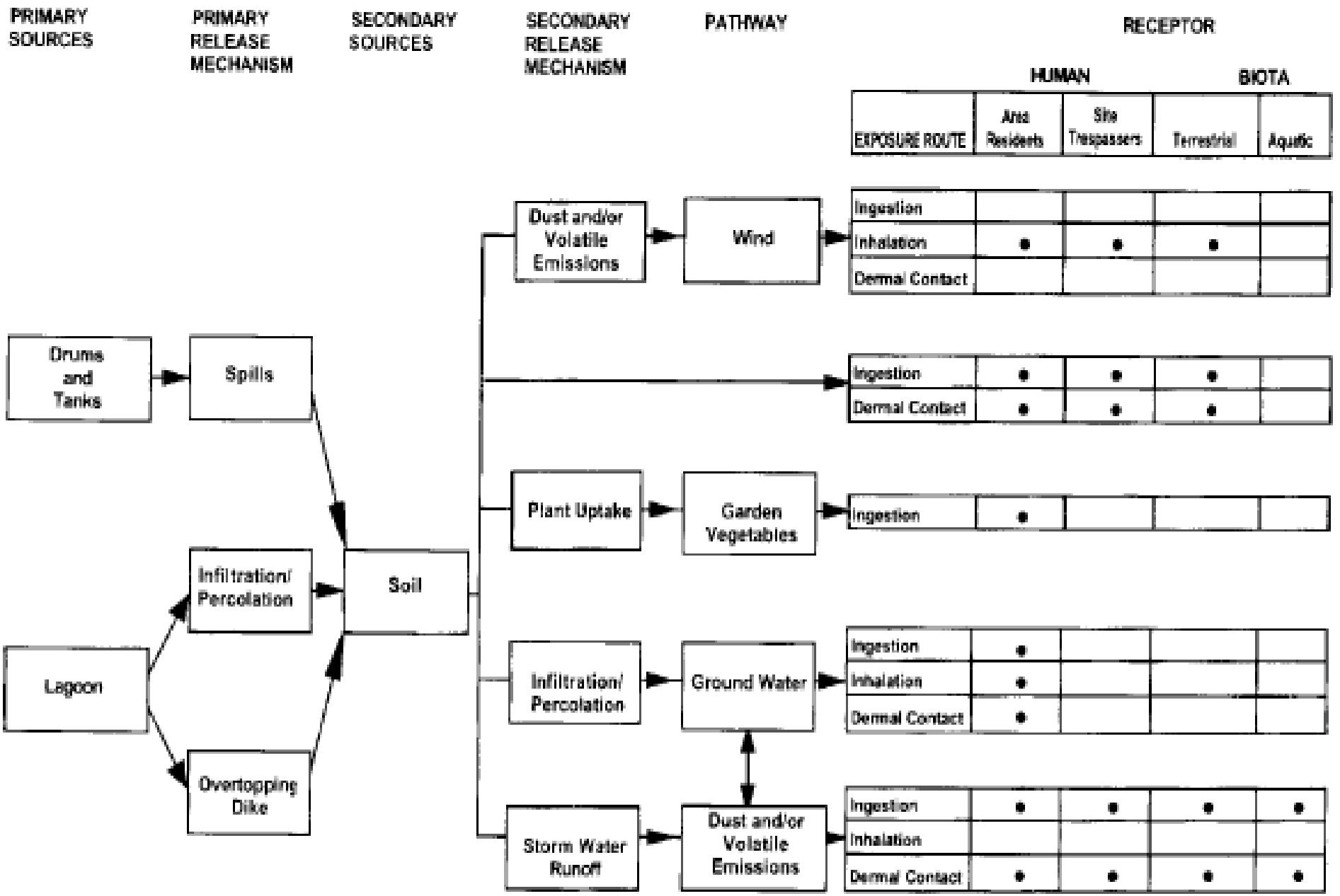
- Guides site characterization
- Reveals what is and is not known about the site (identifies data gaps)
- Helps focus data collection efforts
- Useful communication tool
- Track progress of project
- Assists with developing risk assessment

Progression

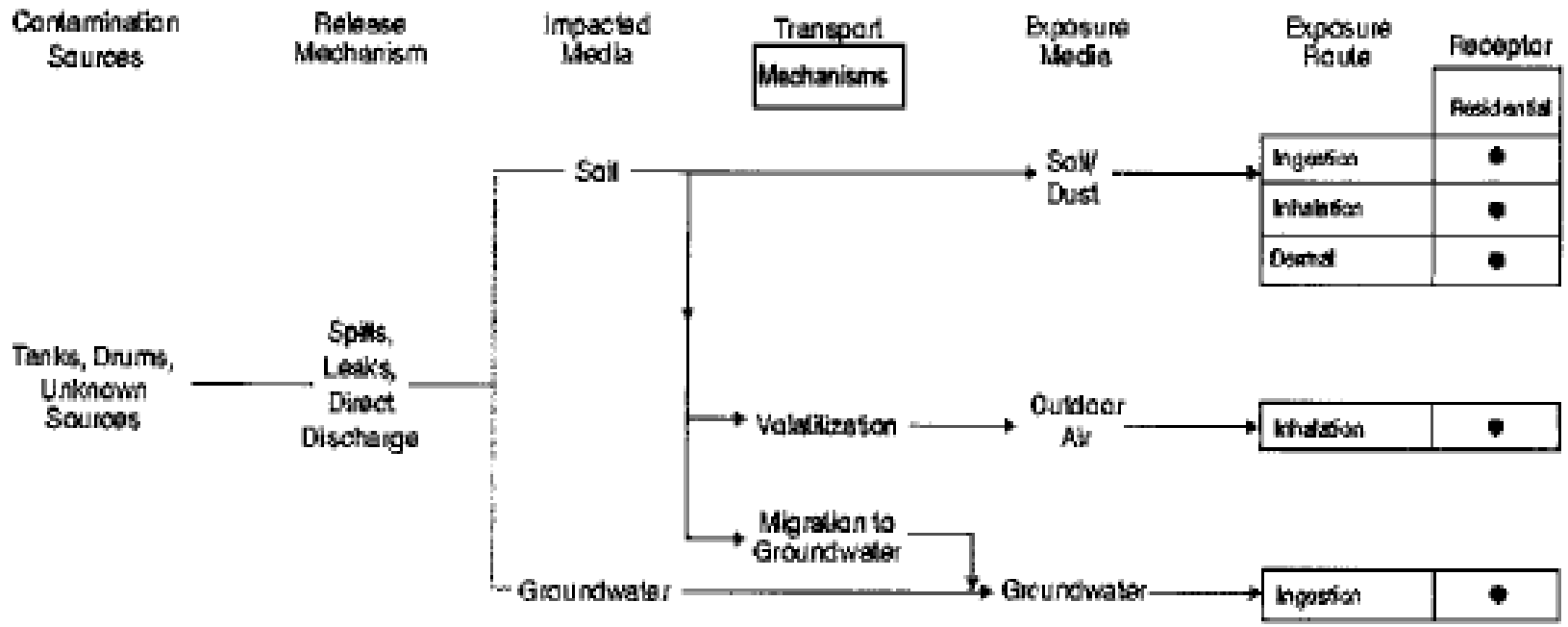
- Initial SCM can be developed with very little information
  - Must error on the side of assuming exposure pathways are complete (conservative hypotheses)
- More information = fewer assumptions
  - SCM is refined as more is known
  - Hone in on complete/potentially complete pathways, focus efforts

Format

- The SCM can be in one or more of several formats
  - Narrative: outline or report
  - Forms
  - Graphic
  - Combination
- The format is largely a personal preference – all should allow easy revision
- Graphical seems to be the most direct and simplest format; combined with narrative, both the basics and details can be presented


PRIMARY SOURCES
PRIMARY RELEASE MECHANISM
SECONDARY SOURCES
SECONDARY RELEASE MECHANISM
PATHWAY
RECEPTOR
HUMAN
BIOTA
EXPOSURE ROUTE
Area Residents
Site Trespassers
Terrestrial
Aquatic
Drums and Tanks
Spills
Lagoon
Infiltration/ Percolation
Overtopping Dike
Soil
Dust and/or Volatile Emissions
Wind
Ingestion
Inhalation
Dermal Contact
Ingestion
Dermal Contact
Plant Uptake
Garden Vegetables
Ingestion
Infiltration/ Percolation
Ground Water
Ingestion
Inhalation
Dermal Contact
Storm Water Runoff
Dust and/or Volatile Emissions
Ingestion
Inhalation
Dermal Contact

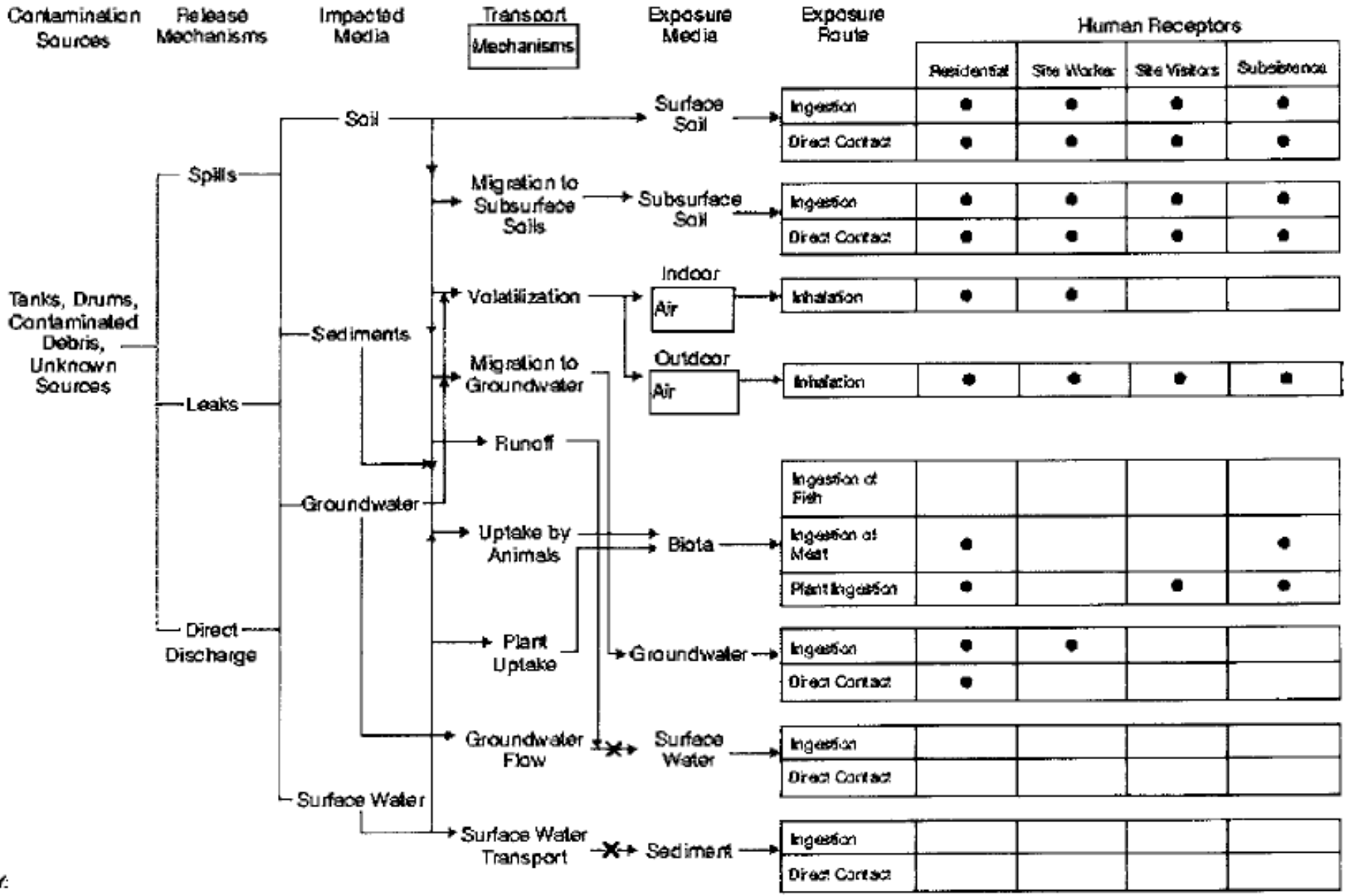
DEFAULT-HUMAN HEALTH CONCEPTUAL SITE MODEL FOR TABLED CLEANUP LEVELS



KEY:

● Complete Exposure Pathway

XAMPLE-HUMAN HEALTH CONCEPTUAL SITE MODEL (GRAPHICAL)



Information

- The SCM must show which pathways are complete, currently and in the future
- Complete does not necessarily equal excess risk; the RA quantifies the risk
  - When in doubt, assume complete; revise as more information is gathered
- Identify which pathways evaluated qualitatively and which quantitatively
- Can be used for both human and ecological receptors

Summary

- The SCM provides for a clear understanding of how a contaminant might reach a receptor
- Facilitates formulation and testing of hypotheses
- Guides data collection for site characterization and risk assessment
- A means of clear communication

MRBCA Guidance Revision

- Draft guidance revisions complete
- Discussions with stakeholders ongoing
- Rule in development, due February 2009
- Revisions at
  - http://www.dnr.mo.gov/env/hwp/tanksrbca.htm
- Input welcome, opportunity for formal comments during rulemaking process

Contact Information

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