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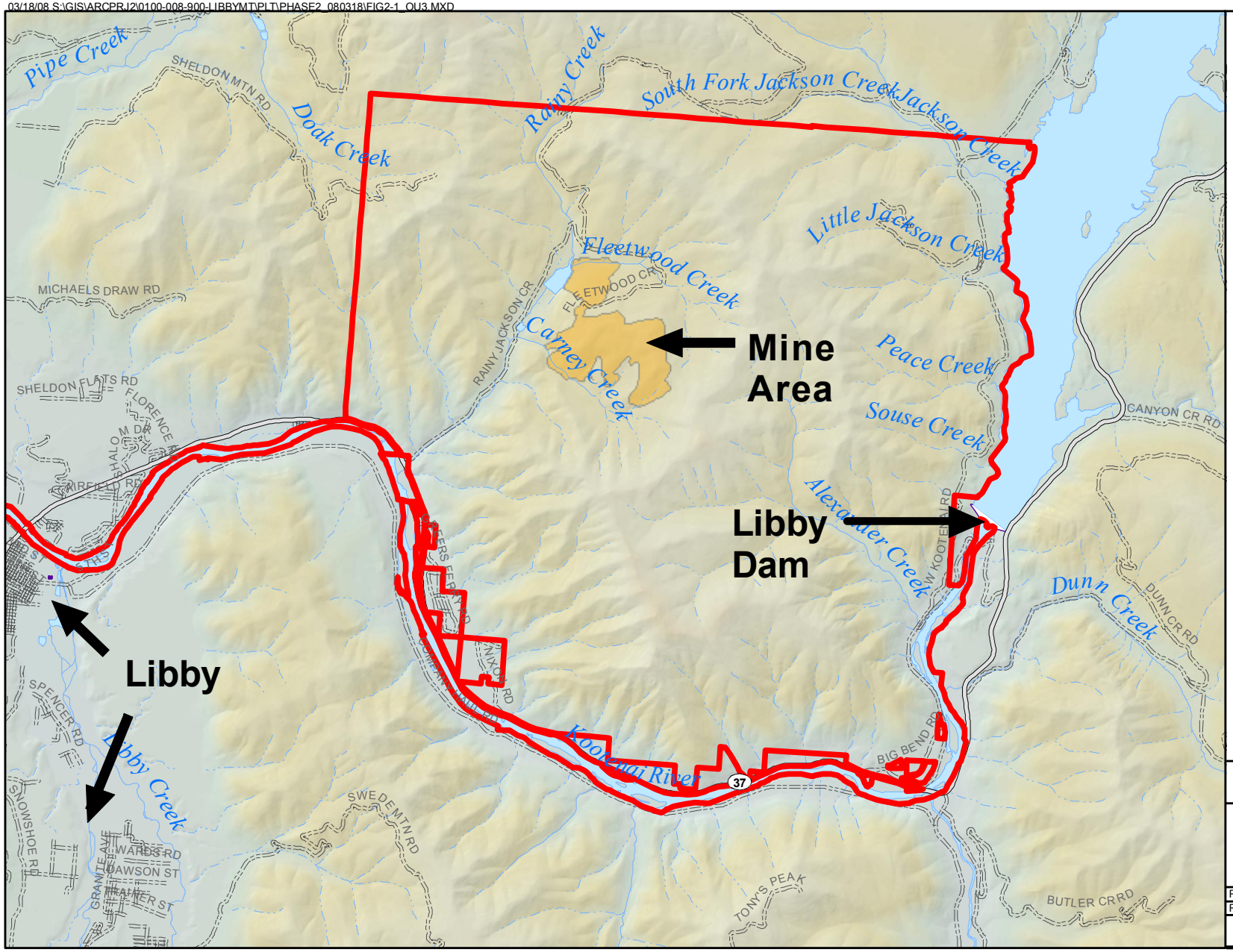
03/18/08 S:\GIS\ARCPRJ2\0100-008-900-LIBBYMT\PLT\PHASE2_080318\FIG2-1_OU3.MXD



Legend

- Operable Unit 3
- County Road
- Primary Road
- Open Water
- Perennial Stream
- Intermittent Stream
- Mined Area

N

0 1 2
Miles

Libby Montana Superfund Site
Operable Unit 3

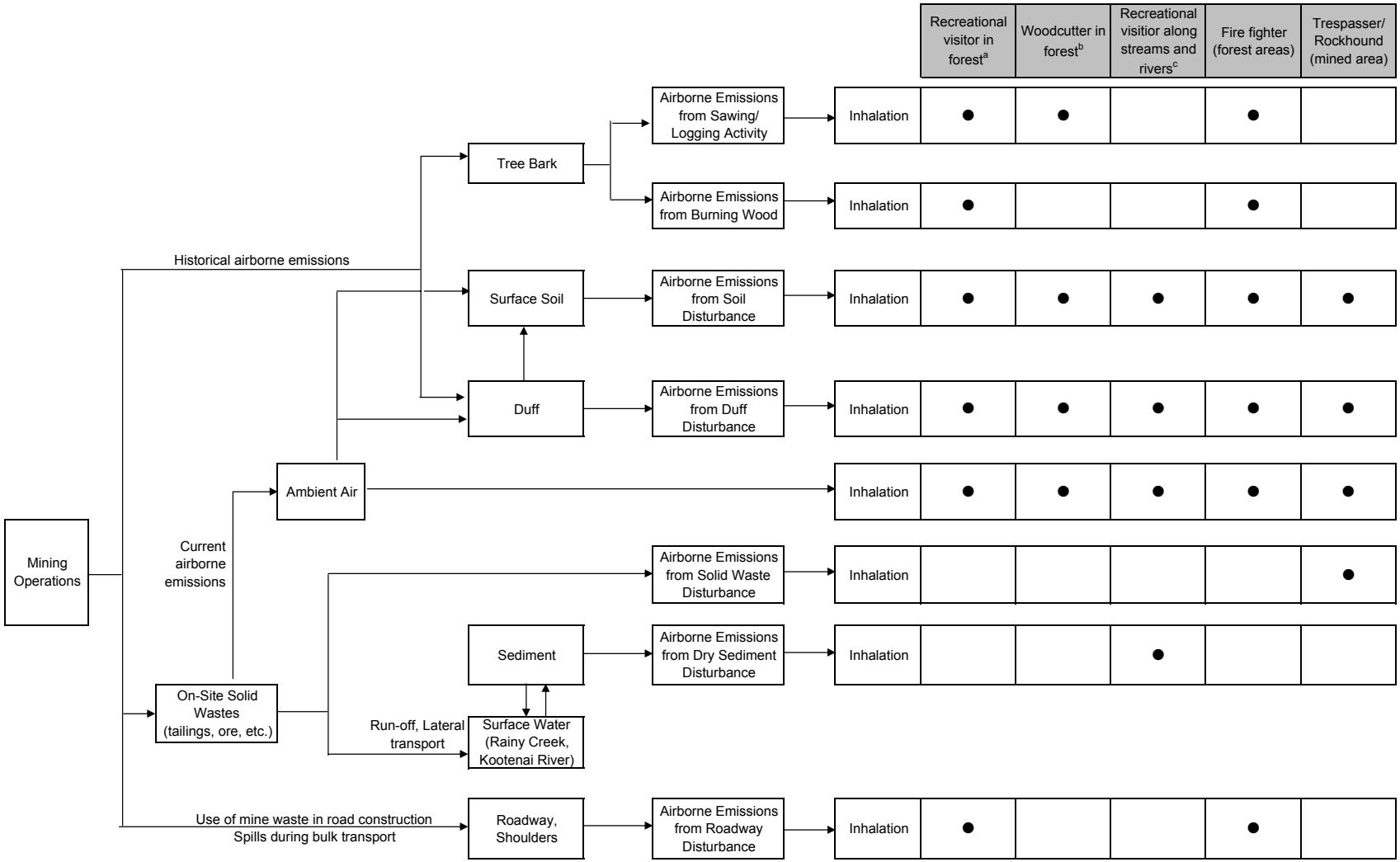
FIGURE 2-1

Operable Unit 3

PROJECT: 0100-008-900	MAR 18, 2008	
REV: 0	BY: VFS	CHECKED: ACK

Figure 3-1. Conceptual Site Model for Human Exposure to Asbestos

Operable Unit 3, Libby Superfund Site, Libby, Montana



LEGEND

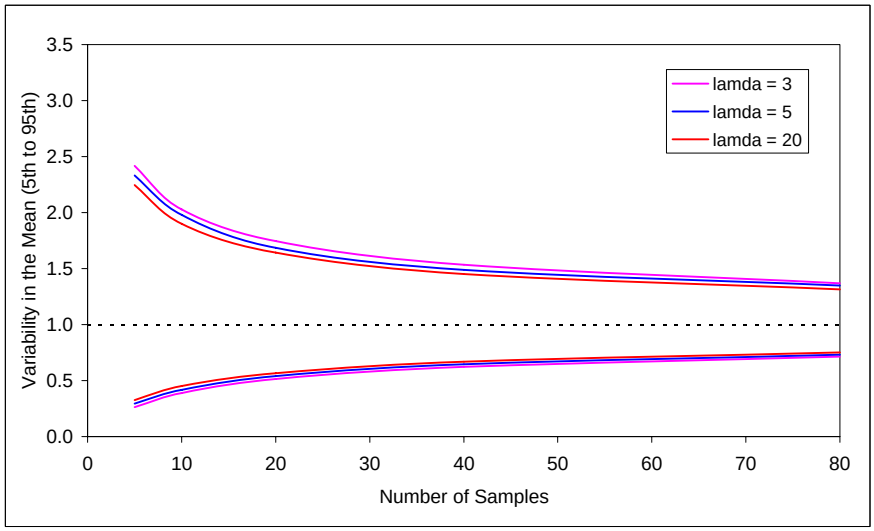
●	Pathway is complete and exposure may be significant
O	Pathway is complete but is believed to be minor in comparison to other pathways
	Pathway is incomplete or believed to be negligible

NOTES:

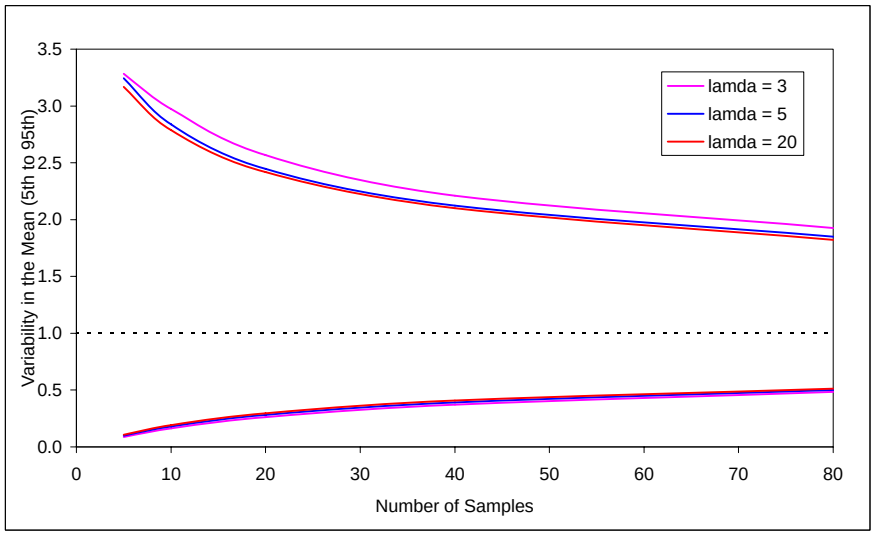
a. Recreational visitors in forest areas may include a range of activities, such as camping, hiking, dirt bike or ATV riding, hunting, etc.
b. Woodcutting may include exposures of area residents gathering wood for personal use as well as commercial logging activities
c. Recreational visitors along streams and rivers may include a range of activities such as hiking, fishing and wading/swimming

FIGURE 3-2. EFFECT OF SAMPLE SIZE ON UNCERTAINTY IN THE MEAN

GSD = 3



GSD = 6



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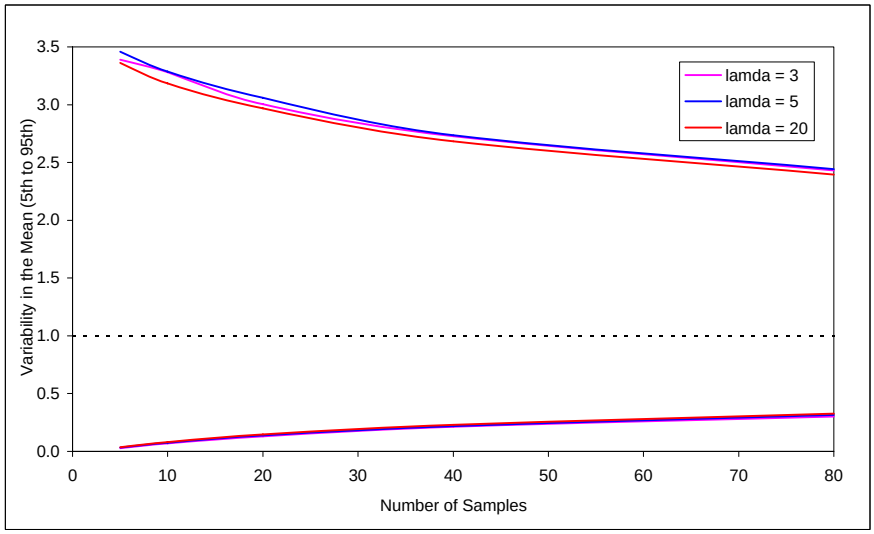
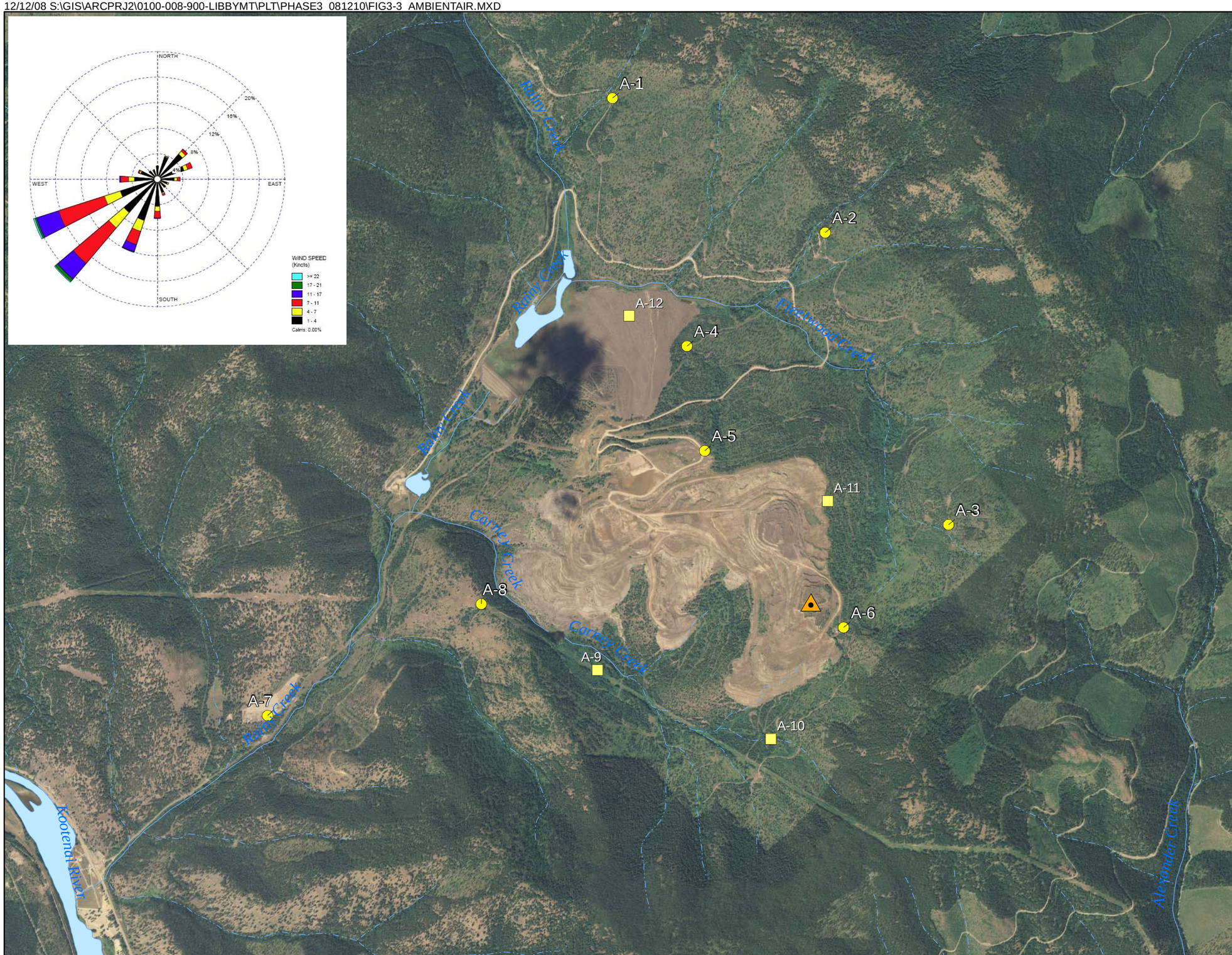


12/12/08 S:\GIS\ARCPRJ2\0100-008-900-LIBBYMT\PLT\PHASE3_081210\FIG3-3_AMBIENTAIR.MXD



Legend

- Phase I Air Monitoring Location
- Phase II Air Monitoring Location
- Meterological Station
- Open Water
- Perennial Stream
- Intermittent Stream

N

0 2,000 4,000

Feet

LIBBY MONTANA SUPERFUND SITE

OPERABLE UNIT 3

FIGURE 3-3

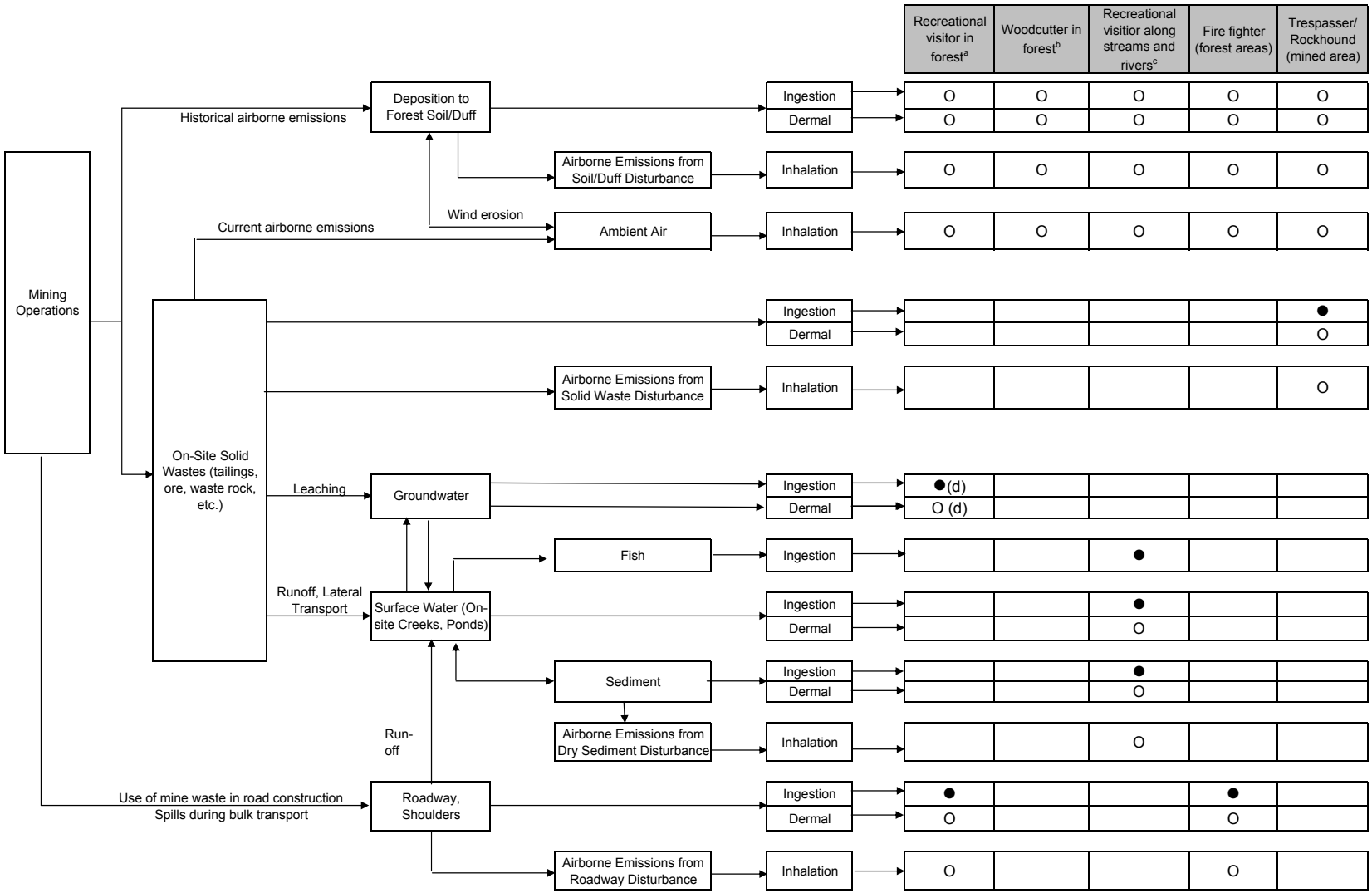
AIR MONITORING LOCATIONS

PROJECT: 0100-008-900	DEC 12, 2008	
REV: 1	BY: CRL	CHECKED: ACK

NEWFIELDS

Figure 3-5. Conceptual Site Model for Human Exposure to Non-Asbestos Contaminants

Operable Unit 3, Libby Superfund Site, Libby, Montana



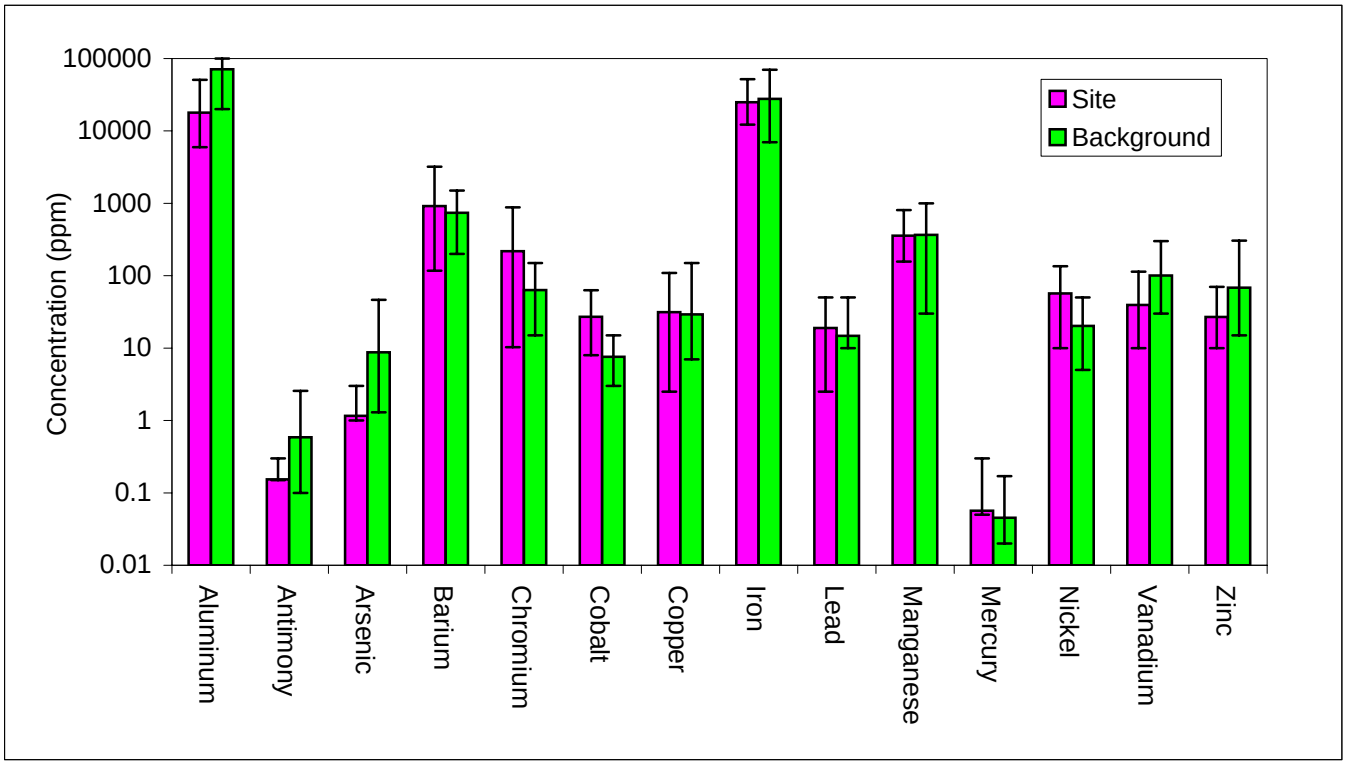
LEGEND

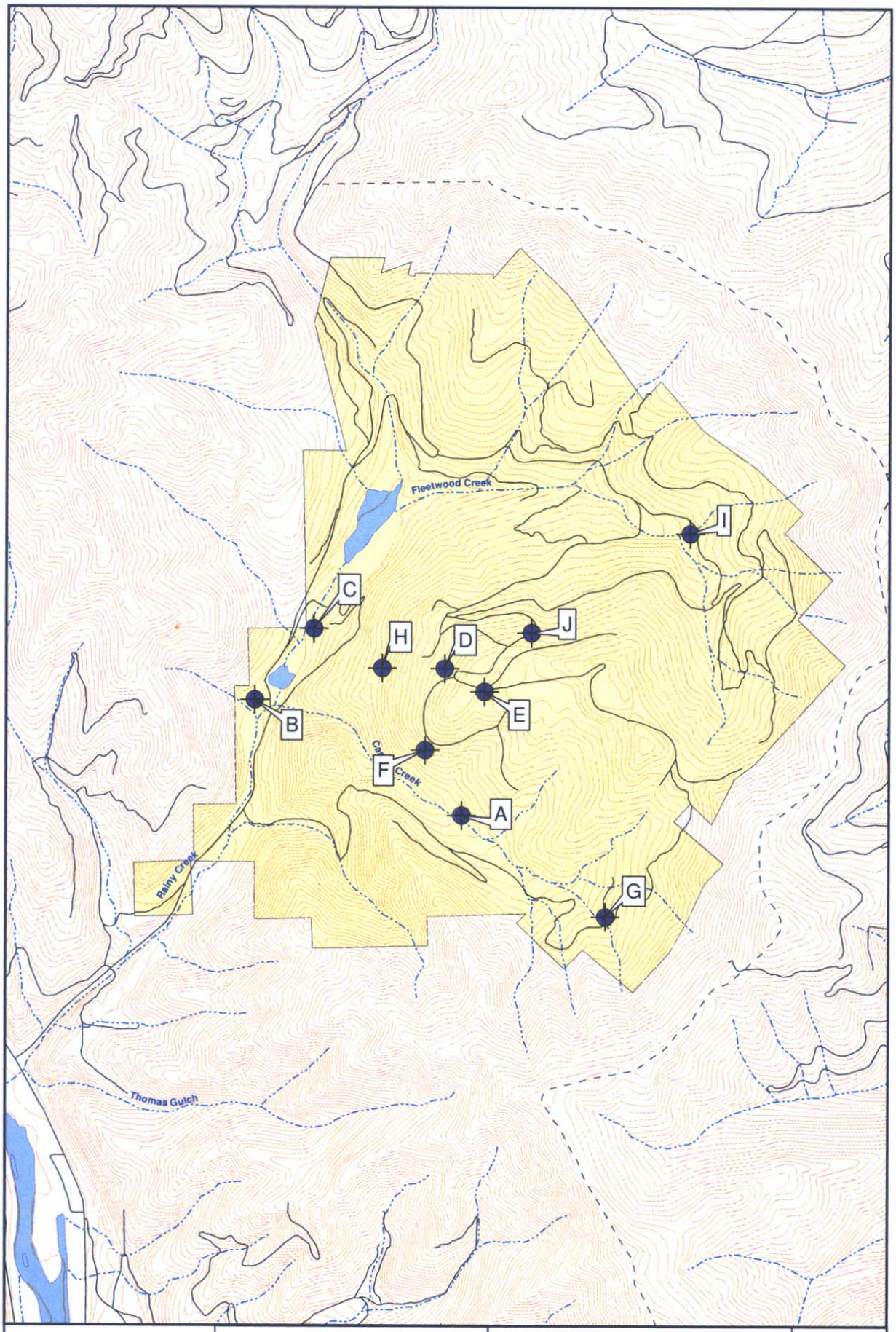
●	Pathway is complete and exposure may be significant
O	Pathway is complete but is believed to be minor in comparison to other pathways
	Pathway is incomplete or believed to be negligible

NOTES:

a. Recreational visitors in forest areas may include a range of activities, such as camping, hiking, dirt bike or ATV riding, hunting, etc.
b. Woodcutting may include exposures of area residents gathering wood for personal use as well as commercial logging activities
c. Recreational visitors along streams and rivers may include a range of activities such as hiking, fishing and wading/swimming
d. Hypothetical future exposure

Figure 3-6. Comparison of On-Site Soil Samples to Montana Background





N
W E
S
0 0.1 0.2 0.4 Miles

LEGEND

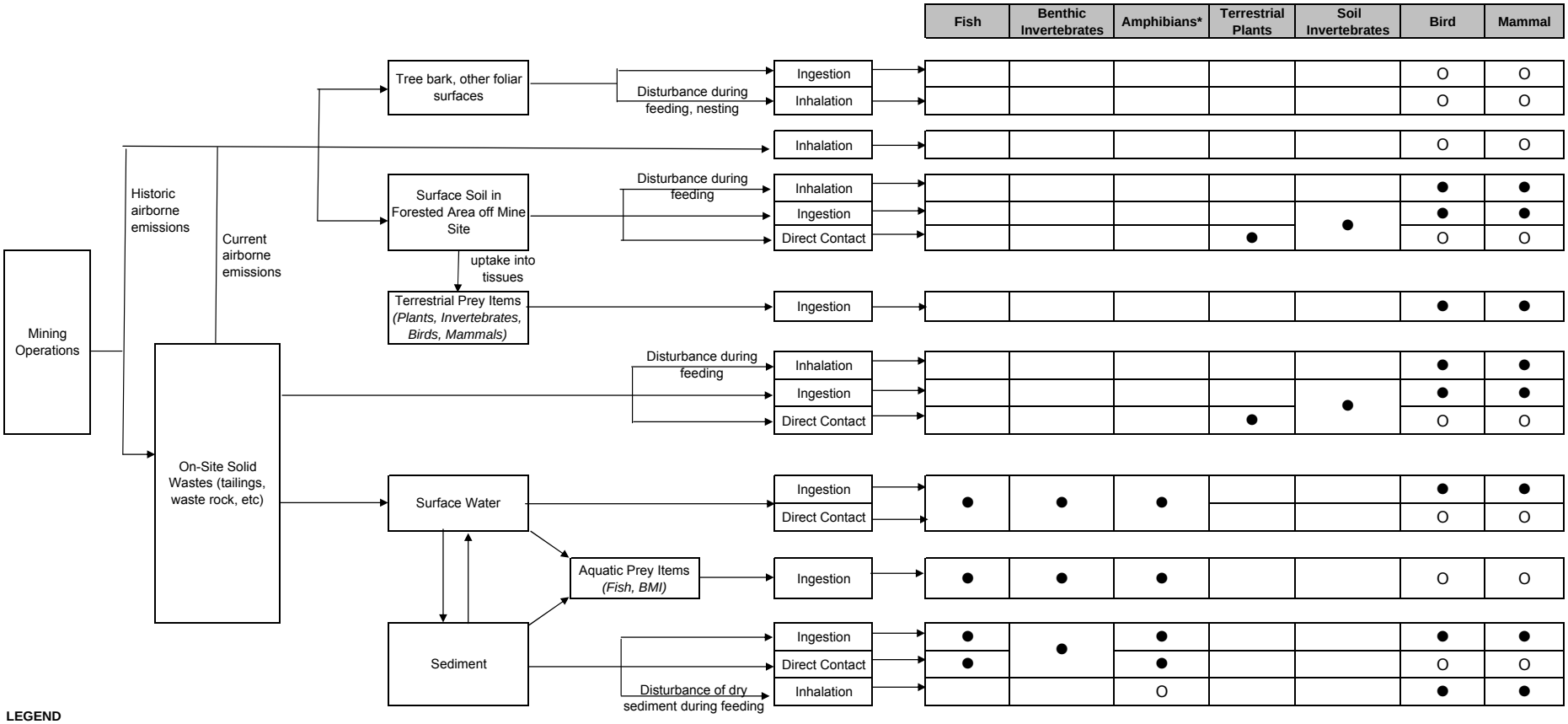
- Roads
- Trails
- Lakes
- Streams
- Well Locations
- Contours (40 foot)
- Former Mine Property

Figure 3-7
Well Locations

LIBBY ASBESTOS SUPERFUND SITE
OU3 PHASE III SAMPLING PLAN

MWH

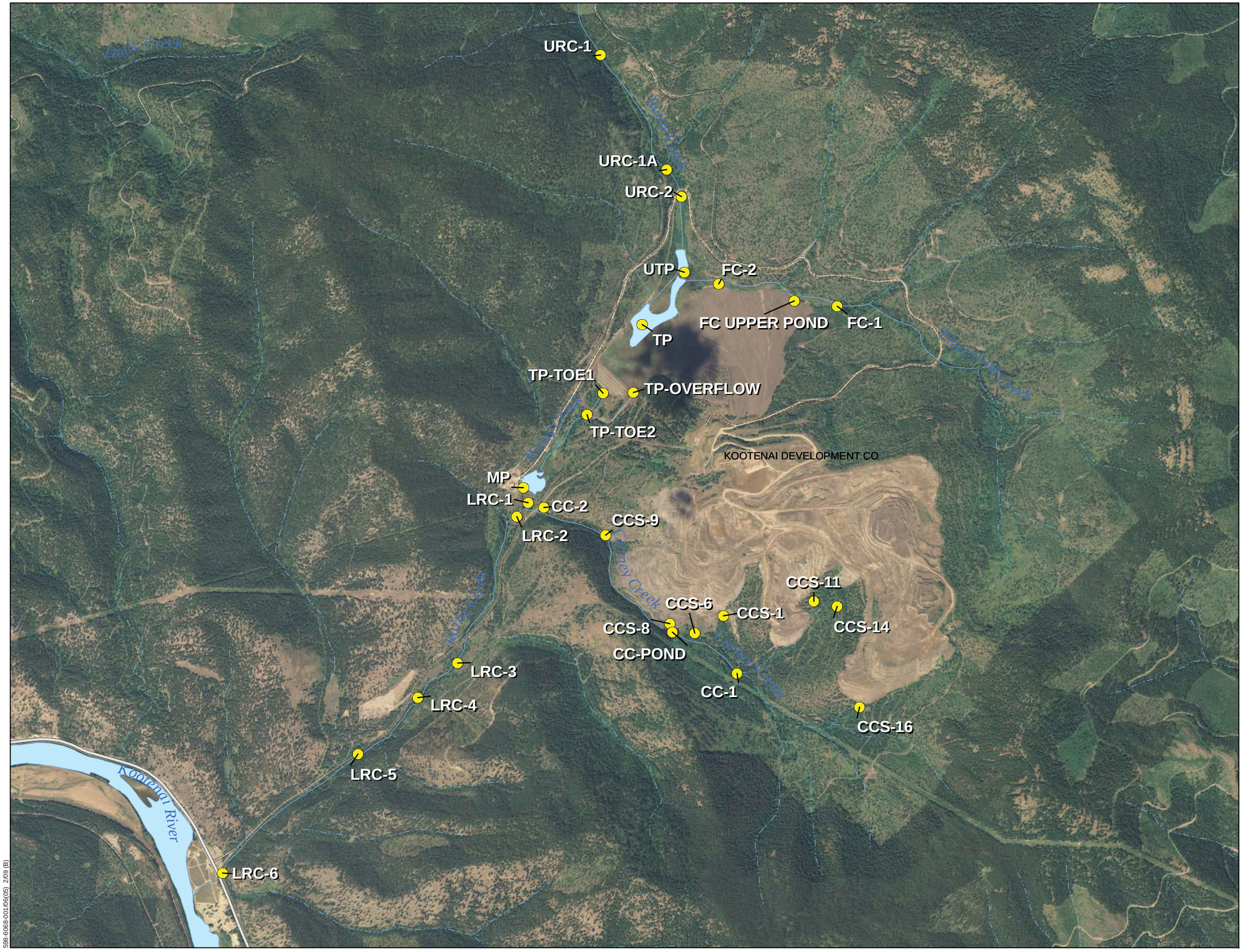
Figure 4-1. Conceptual Site Model for Exposure of Ecological Receptors to Asbestos at OU3



LEGEND

●	Pathway is believed to be complete.
O	Pathway is believed to be complete but is unlikely to be a major contributor to the total risk to the receptor (in comparison to one or more other pathways).
	Pathway is incomplete or believed to be negligible

* Aquatic life stages



Parametrix

N

0 4,000

Scale in Feet

Legend

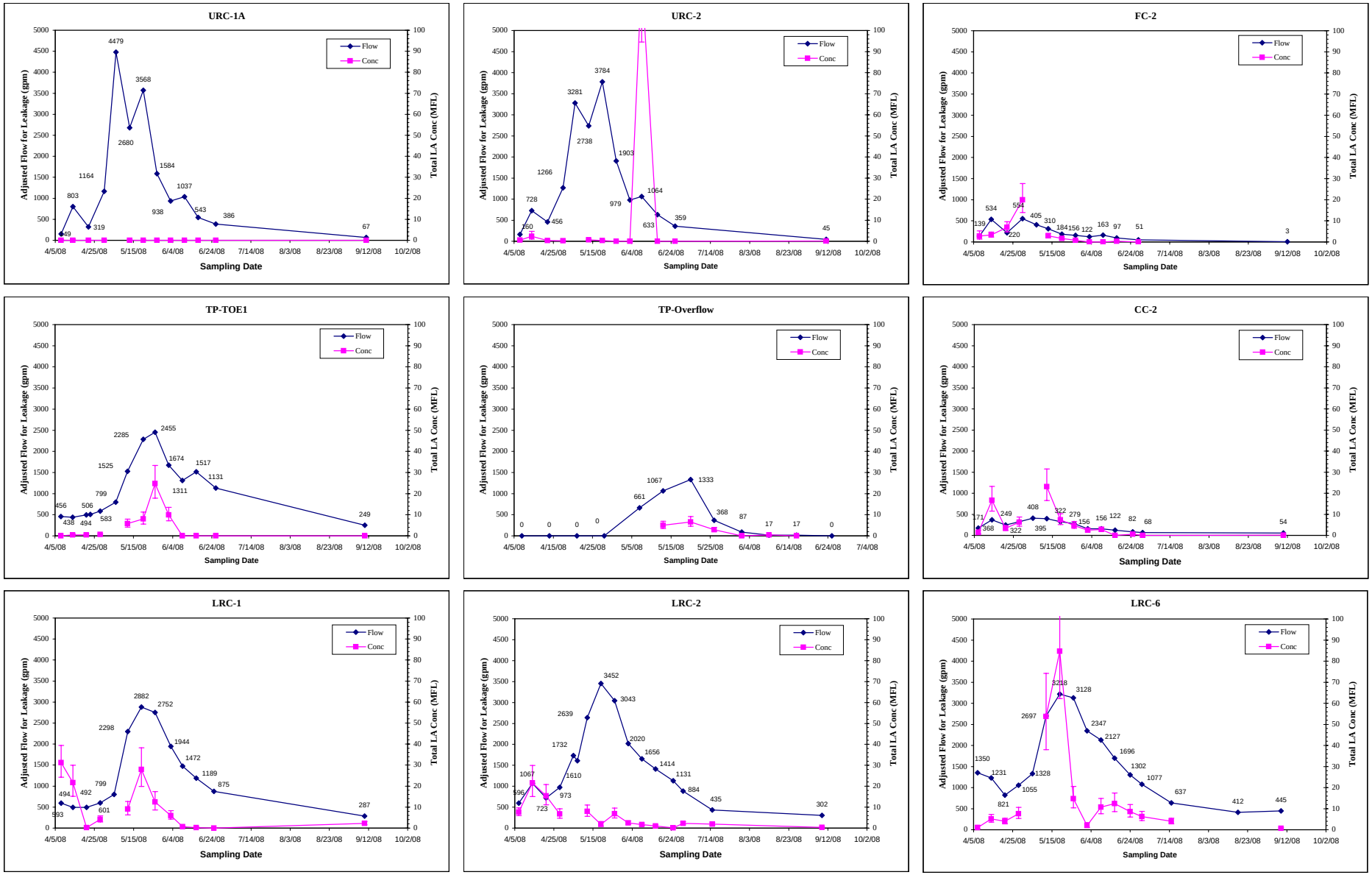
- Surface Water/Sediment Sampling Location
- County Road
- Primary Road
- Open Water
- Perennial Stream
- Intermittent Stream

Source: EPA, 2008

Figure 4-2
Libby Montana Superfund Site
Operable Unit 3,
Sampling Locations in
Rainy Creek Watershed

598-6068-001/06(05) 2/09 (B)

Figure 4-3. Surface Water Flow and Asbestos Concentrations, Libby OU3



Parametrix

N

0 2

Scale in Miles

Legend

Aquatic Reference Location

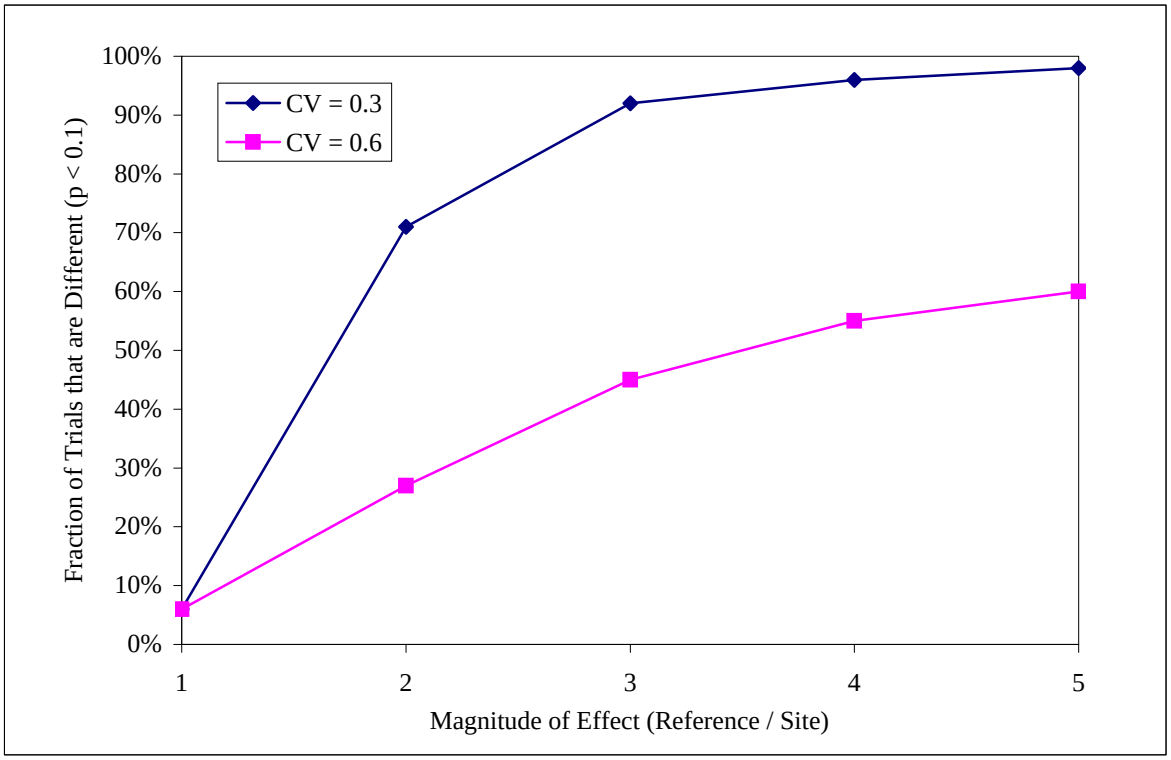
Note: Samples were collected from reference locations NSY-R1 and BTT-R1 only.

Source: EPA, 2008

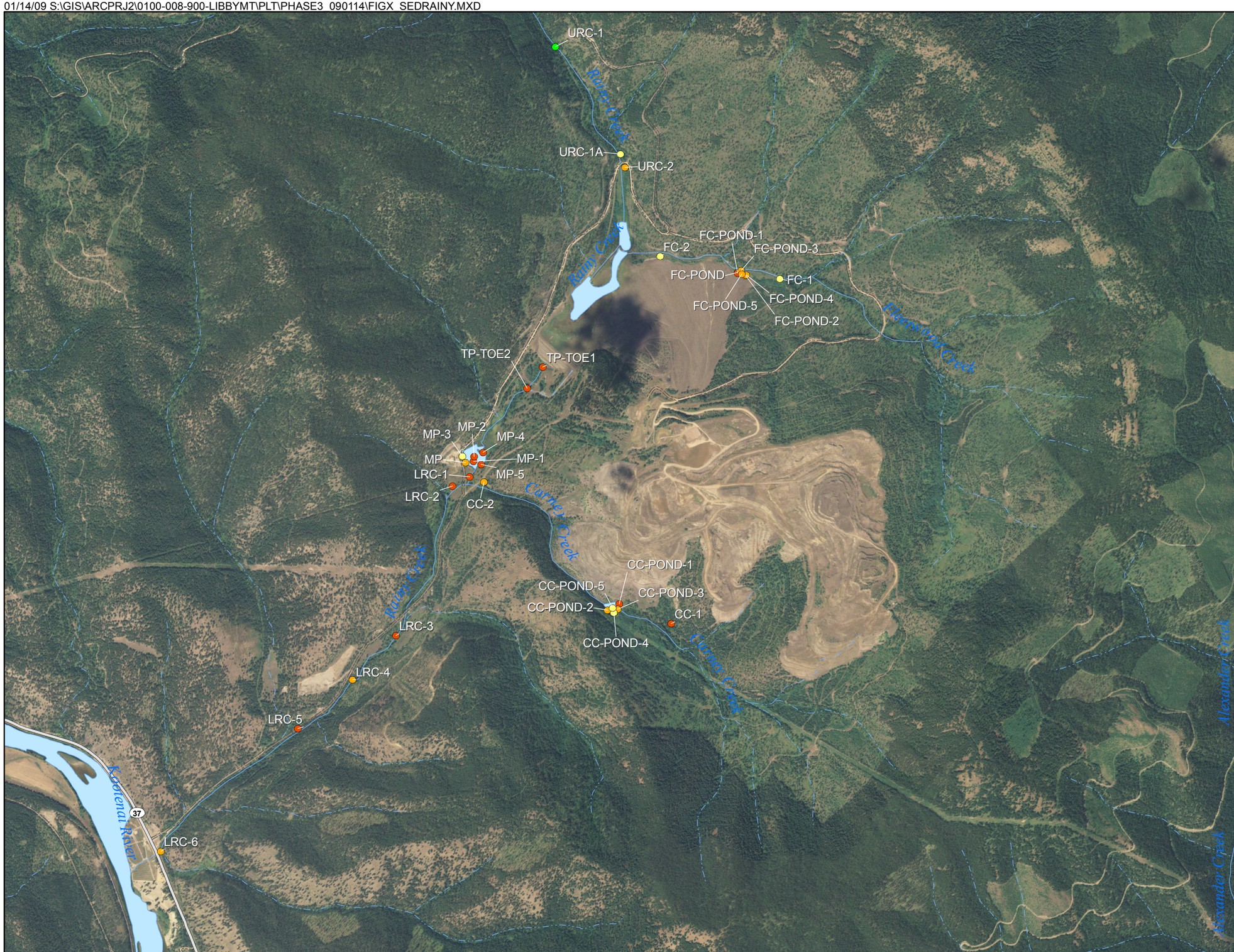
598-6068-001/06(05), 2/09 (B)

Figure 4-4
Libby Montana Superfund Site
Operable Unit 3,
Aquatic Reference Locations

Figure 4-5. Power of Signed Rank Test to Detect A Difference (N=5)



01/14/09 S:\GIS\ARCPRJ2\0100-008-900-LIBBYMT\PLT\PHASE3_090114\FIGX_SEDRAINY.MXD



Legend

- County Road
- Primary Road
- Open Water
- Perennial Stream
- Intermittent Stream

Sediment Asbestos (PLM-VE)

- Non-Detect
- Trace
- < 1%
- 1 - 5%

N

0 2,000 4,000

Feet

LIBBY MONTANA SUPERFUND SITE

OPERABLE UNIT 3

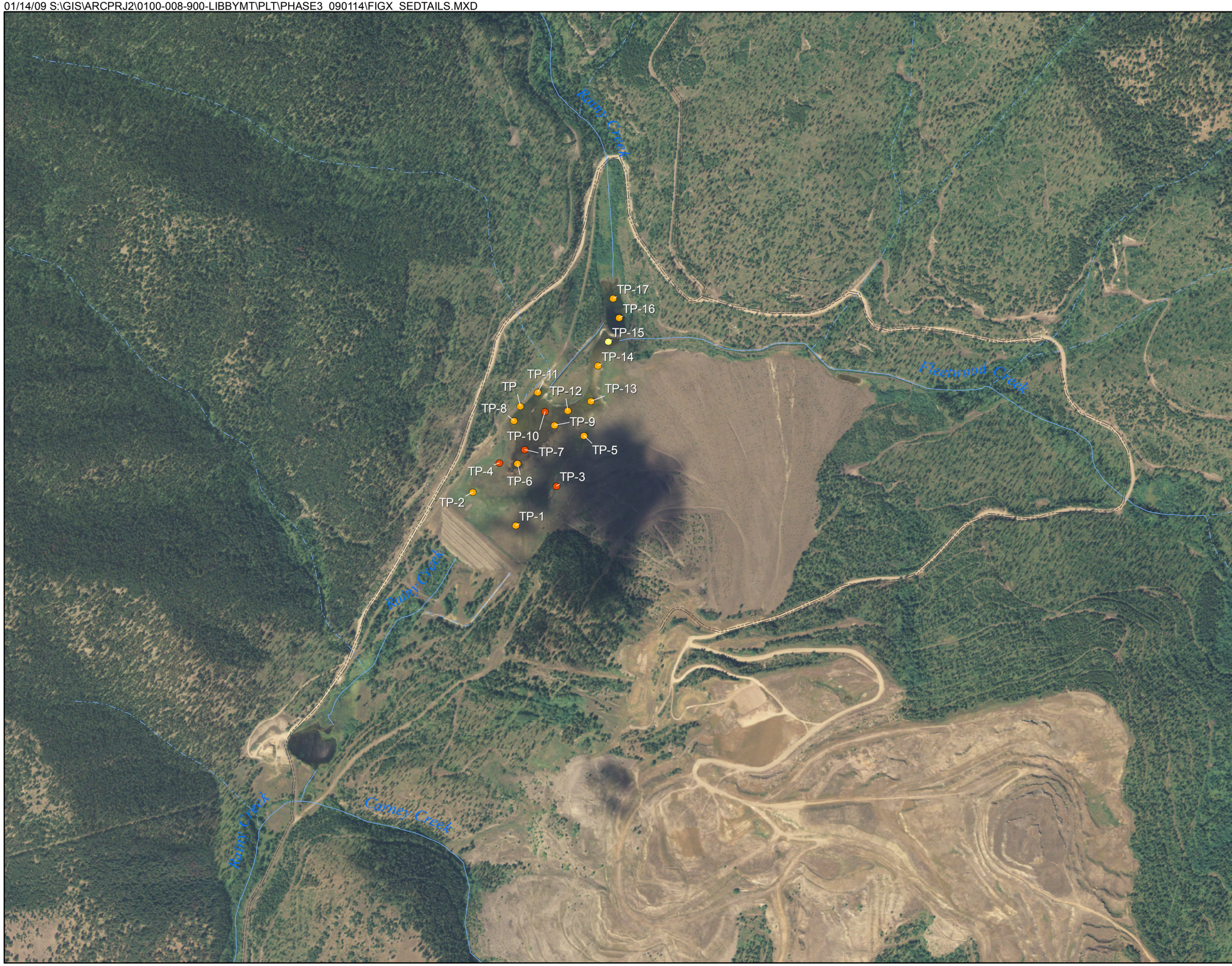
FIGURE 4-6

SEDIMENT ASBESTOS RESULTS (PLM-VE) RAINY CREEK

PROJECT: 0100-008-900	JAN 14, 2009	
REV: 0	BY: CRL	CHECKED: ACK

NEWFIELDS

01/14/09 S:\GIS\ARCPRJ2\0100-008-900-LIBBYMT\PLT\PHASE3_090114\FIGX_SEDTAILS.MXD



Legend

- County Road
- Primary Road
- Perennial Stream
- Intermittent Stream

Sediment Asbestos (PLM-VE)

- Non-Detect
- Trace
- < 1%
- 1 - 2%

N

Feet

0 1,000 2,000

LIBBY MONTANA SUPERFUND SITE

OPERABLE UNIT 3

FIGURE 4-7

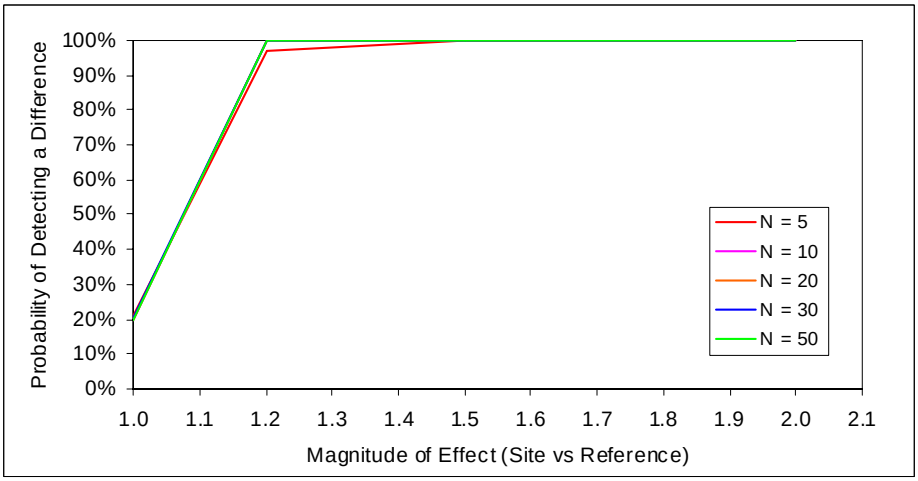
SEDIMENT ASBESTOS RESULTS (PLM-VE) TAILINGS IMPOUNDMENT

PROJECT: 0100-008-900	JAN 14, 2009	
REV: 0	BY: CRL	CHECKED: ACK

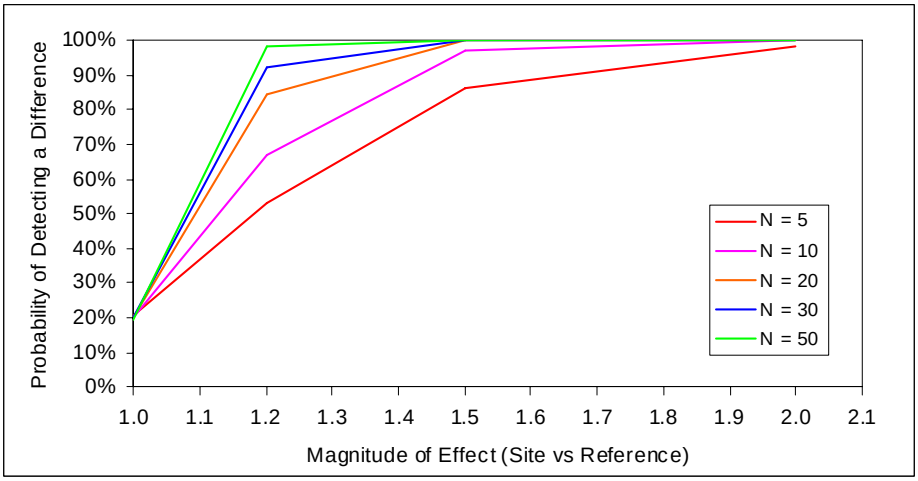
NEWFIELDS

FIGURE 4-8 EFFECT OF SAMPLE SIZE ON POWER OF THE WRS TEST
alpha = 0.20

Panel A: CV = 0.1



Panel B: CV = 0.3



Panel A: CV = 0.6

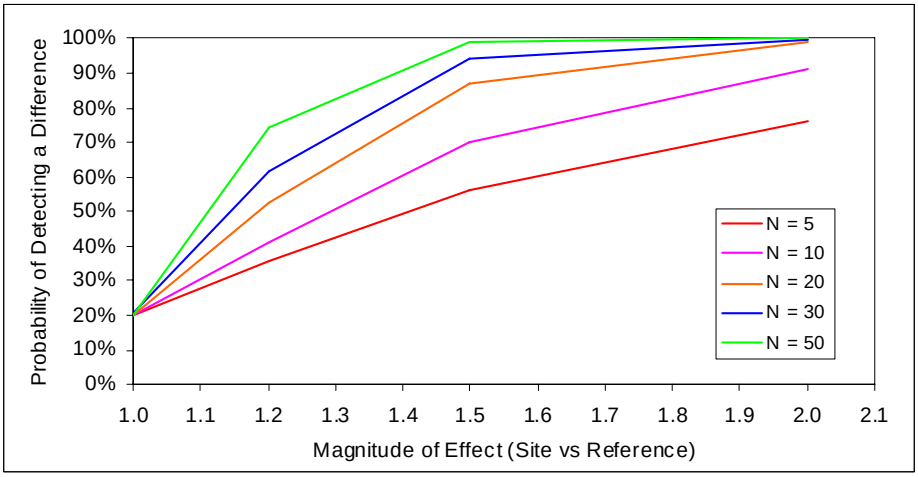
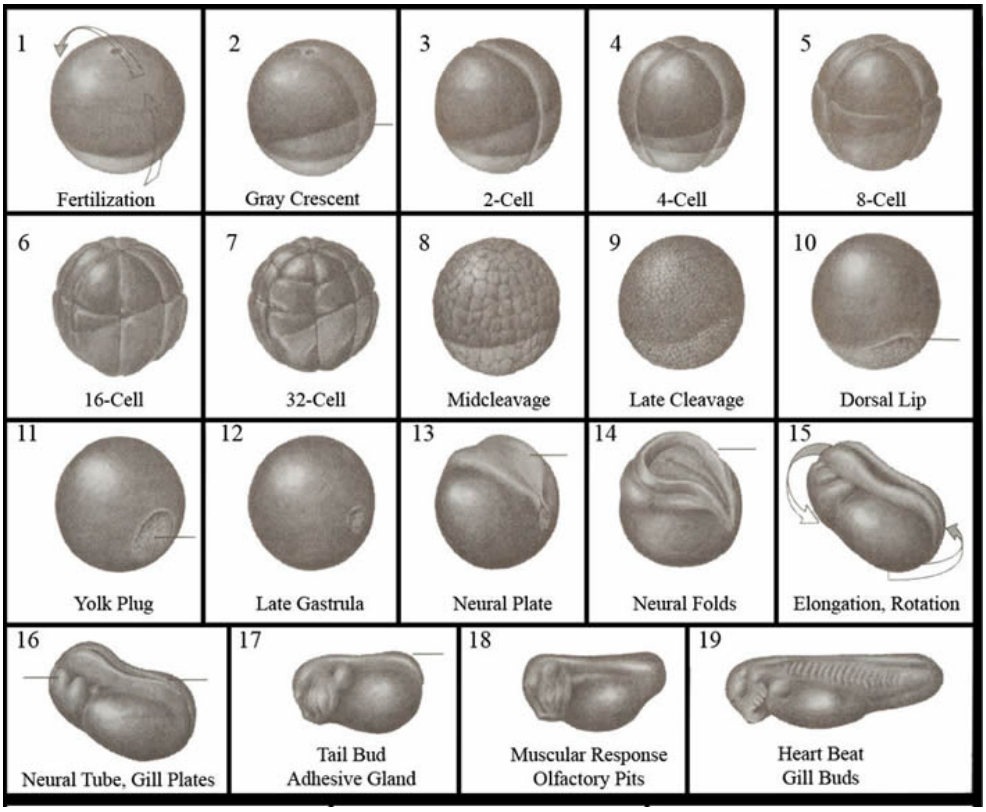


Figure 4-9. Gosner Stages of Development



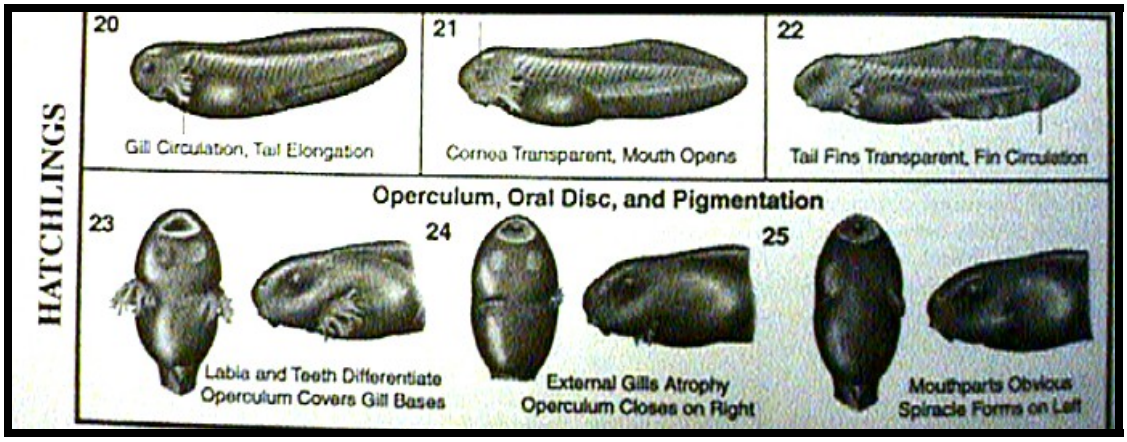
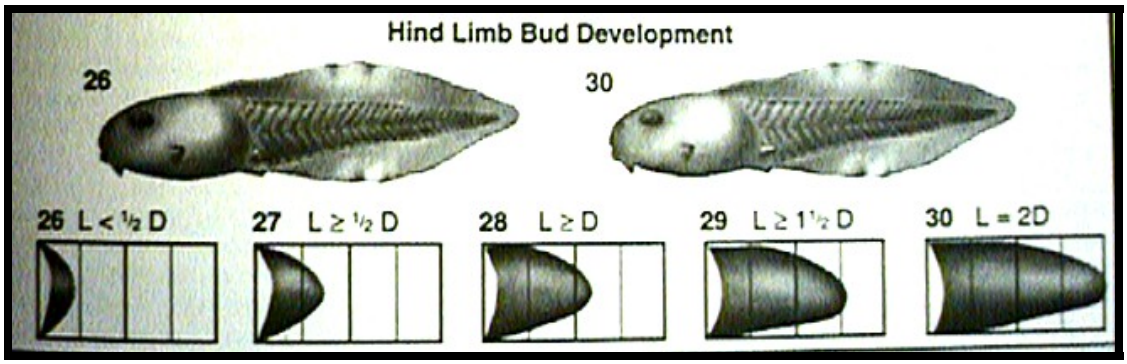
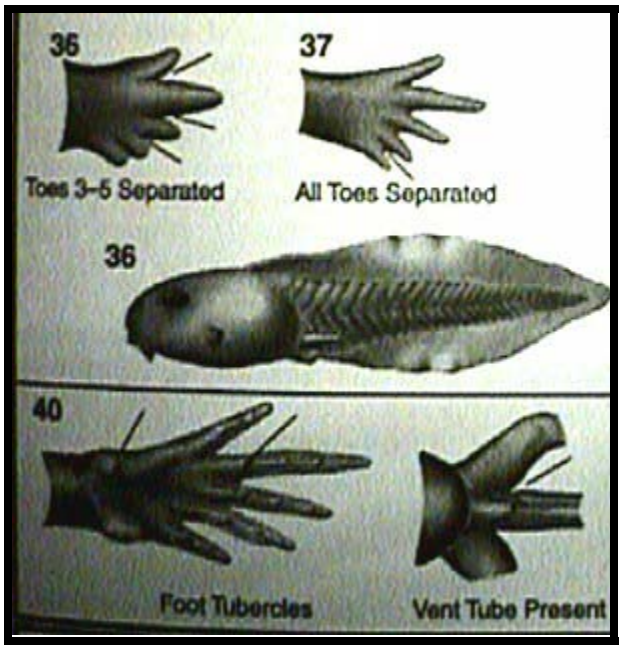


Figure 4-9. Gosner Stages of Development





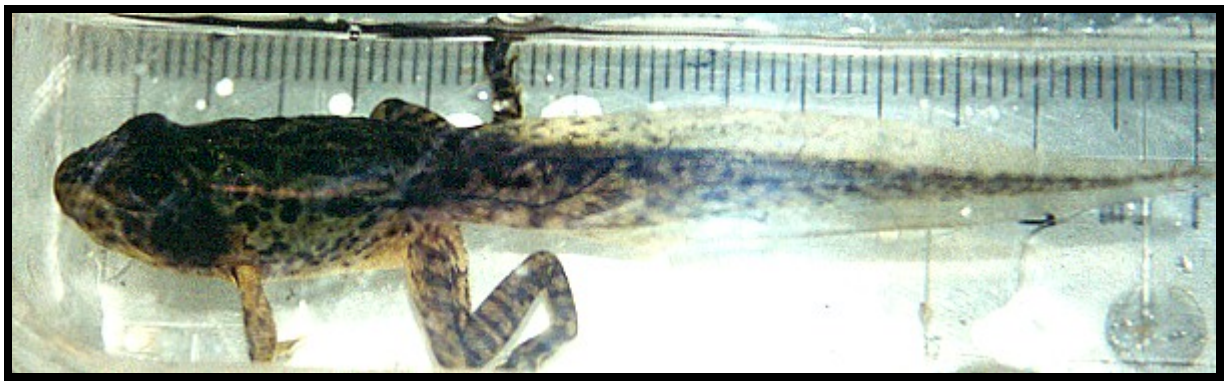
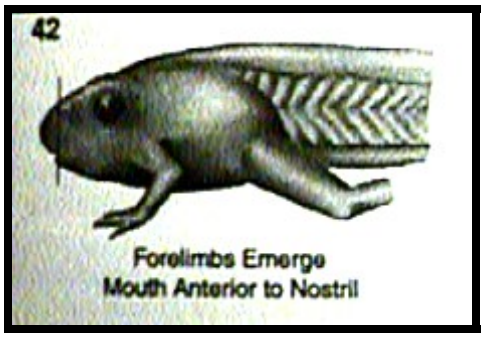
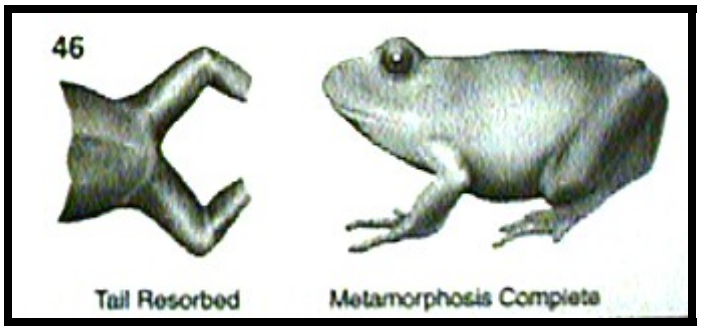


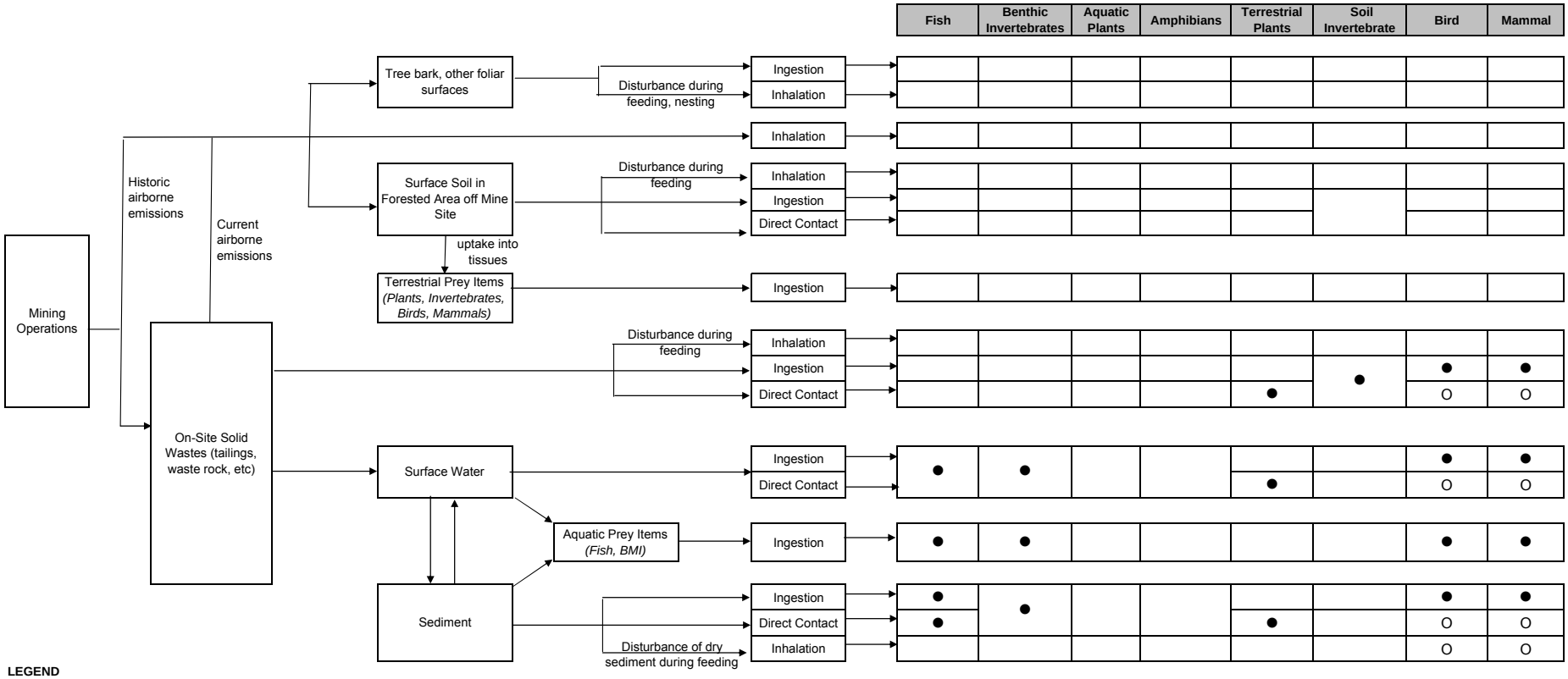
Figure 4-9. Gosner Stages of Development





Source:
Gosner, K.L. 1960. A simplified table for the staging of anuran embryos and larvae with notes on identification. *Herpetologica*. 16:183-190.

Figure 4-10. Conceptual Site Model for Exposure of Ecological Receptors to Non-Asbestos Contaminanats at OU3



LEGEND

●	Pathway is believed to be complete, and which may provide an important contribution to the total risk to the receptor.
O	Pathway is believed to be complete but is unlikely to be a major contributor to the total risk to the receptor (in comparison to one or more other pathways that are evaluated).
	Pathway is incomplete or believed to be negligible