Appendix C Risk Quotient (RQ) Method and Levels of Concern (LOCs)

A deterministic approach is used to evaluate the likelihood of adverse ecological effects to non-target species. In this approach, risk quotients (RQs) are calculated by dividing exposure estimates (EECs) by ecotoxicity values for non-target species, both acute and chronic.

RQ = EXPOSURE/TOXICITY

RQs are then compared to OPP's levels of concern (LOCs). These LOCs are criteria used by OPP to indicate potential risk to non-target organisms and the need to consider regulatory action. The criteria indicate that a pesticide used as directed has the potential to cause adverse effects on non-target organisms. LOCs currently address the following risk presumption categories: (1) acute endangered species - the potential for acute risk to endangered species is high, regulatory action may be warranted, and (4) chronic risk - the potential for chronic risk is high, regulatory action may be warranted. Currently, EFED does not perform assessments for chronic risk to plants, acute or chronic risks to non-target insects, or chronic risk from granular/bait formulations to mammalian or avian species.

The ecotoxicity test values (i.e., measurement endpoints) used in the acute and chronic risk quotients are derived from the results of required studies. Examples of ecotoxicity values derived from the results of short-term laboratory studies that assess Direct acute effects are: (1) LC_{50} (fish) representing the aquatic phase for the CRLF and (2) LD_{50} (birds and mammals) representing the terrestrial phase for the CRLF and indirect effects (3) EC_{50} (aquatic plants and aquatic invertebrates) and (4) EC_{25} (terrestrial plants). An example of a toxicity test effect level derived from the results of long-term laboratory study that assesses chronic effects is: NOAEC (birds, fish and aquatic invertebrates). Risk presumptions, along with the corresponding RQs and LOCs are tabulated below: All LOCs for this risk assessment are calculated using the endangered species LOC.

Table C.1 Risk presumptions for terrestrial animals based on risk quotients (RQ) and levels of concern (LOC).

Risk Presumption	RQ	LOC
	Birds	
Acute Endangered Species	EEC/LC_{50} or LD_{50}/ft^2 or LD_{50}/day	0.1
Chronic Risk	EEC/NOAEC	1
	Wild Mammals	
Acute Endangered Species	EEC/LC_{50} or LD_{50}/ft^2 or LD_{50}/day	0.1
Chronic Risk	EEC/NOAEC	1

[1] abbreviation for Estimated Environmental Concentration (ppm) on avian/mammalian food items
[2] mg/ft^2
[3] mg of toxicant consumed/day
LD_{50} * wt. of bird

LD_{50} * wt. of bird

Table C.2. Risk presumptions for aquatic animals based on risk quotients (RQ) and levels of concern (LOC).

Risk Presumption	RQ	LOC
Acute Endangered Species	**EEC/LC_{50} or EC_{50}**	**0.05**
Chronic Risk	**EEC/NOAEC**	**1**

[1] **EEC = (mg/L or** µg/L **) in water**

Table C.3. Risk presumptions for plants based on risk quotients (RQ) and levels of concern (LOC).

Risk Presumption	RQ	LOC
	Terrestrial and Semi-Aquatic Plants	
Acute Endangered Species	EEC/EC_{05} or NOAEC	1
	Aquatic Plants	
Acute Endangered Species	EEC/EC_{05} or NOAEC	1

[1] EEC = lbs ai/A
[2] EEC = (µg/L /mg/L) in water