

US EPA ARCHIVE DOCUMENT

Progress Report of the Ecological Committee on FIFRA Risk

The ECOFRAM Aquatic Exposure and Aquatic Effects Subgroups.

ABSTRACT:

The Ecological Committee on FIFRA Risk Assessment Methods (ECOFRAM) was formed in June 1997. The Committee's purpose is to develop tools and processes within the FIFRA framework for predicting the magnitude and probabilities of adverse effects to non-target aquatic and terrestrial species resulting from the introduction of pesticides into their environment. An Aquatic Work Group was formed to identify and discuss probabilistic methods for aquatic risk assessments and develop recommendations for future use by EPA. In addition, we are identifying information that must be developed in order to validate the proposed methods in order to ensure that the proposed assessment process, if adopted by EPA, supports environmental decisions that are scientifically defensible.

In accompanying posters, the ECOFRAM Aquatic Exposure and Effects Subgroups are displaying reports on what has been achieved so far. Both groups have progressed to identifying some of the tools which will be needed to perform probabilistic aquatic effects and exposure characterizations. In addition, both groups have started to consider a "tiered" framework within which the tools should be used along with the criteria that might determine when to move from one tier to the next.

Both teams recognize that one of the fundamental steps to success for ECOFRAM will be the way in which the Aquatic Exposure and Effects subgroups manage to combine their recommendations into an integral Aquatic Risk Assessment approach. The first joint meeting to integrate the two groups views on this will take place in December 1997. The resulting Aquatic Risk Assessment decision tree is expected to be the primary tool for making regulatory aquatic exposure assessments more predictable.

This poster shows the draft decision trees from both groups. The views of attendees will be sought on how the views could be combined. In addition, the poster displays lists of the issues raised so far as well as some key questions to prompt participation from SETAC attendees. The items being presented are "works in progress" and the teams are both requesting feedback from conference attendees especially via participation in the poster session.

INTRODUCTION:

There are three primary issues facing the ECOFRAM Aquatic team in producing integrated tools for Aquatic Risk Assessment. The primary one is

- **WHAT IS THE PROCESS THAT WILL BE FOLLOWED AS A RISK ASSESSMENT PROCEEDS FROM THE SIMPLEST LEVEL TO THE MOST COMPLEX??**

Traditionally, this has been conceived as a "tier system"; however, it is possible that the process will become a "decision matrix" since it may not be a matter of simple progression from one level of complexity to a higher one. Another idea is for the process to consist of guidance on the criteria for selecting "tools" from the "Aquatic Risk Assessment Toolbox".

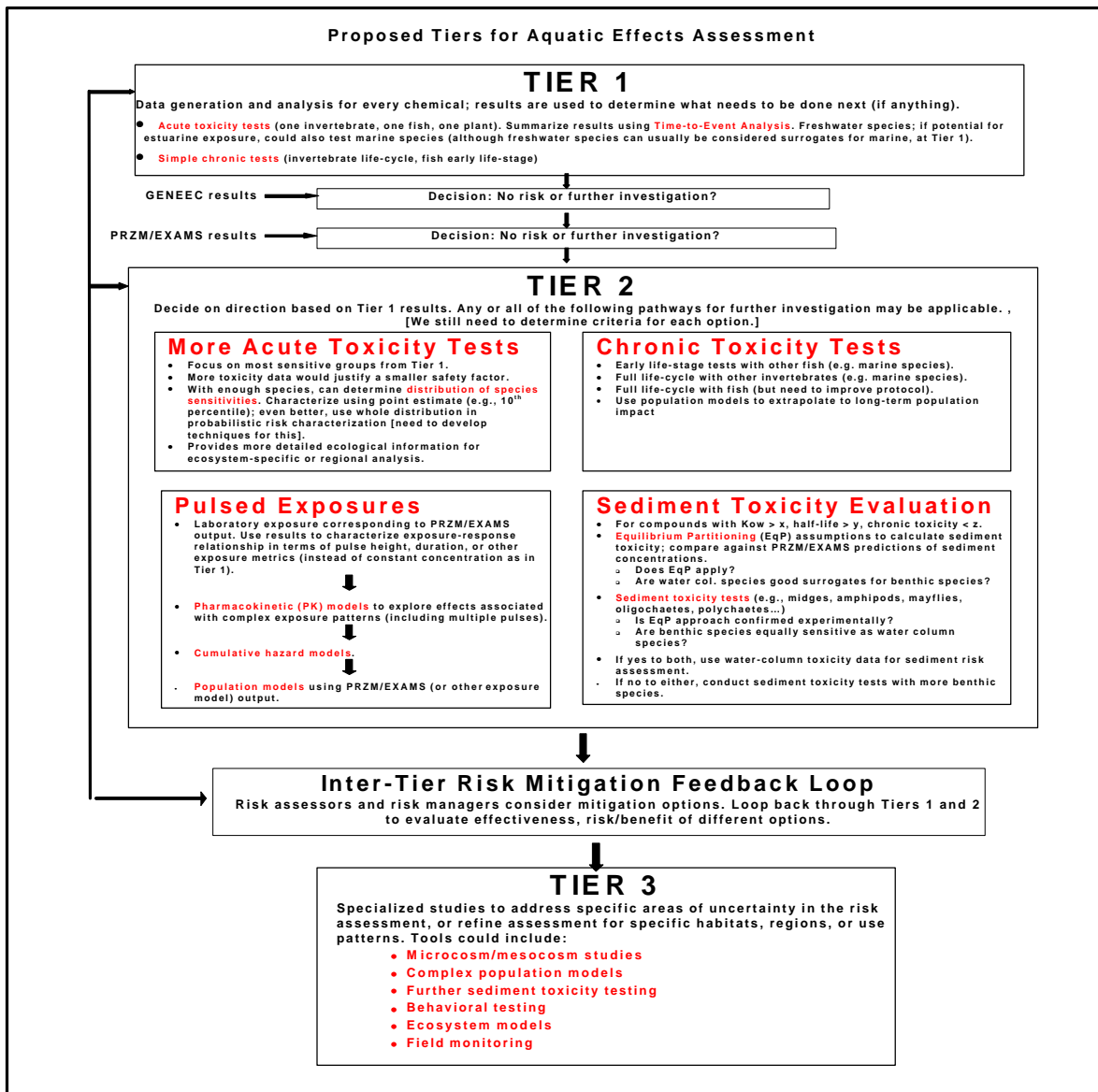
There is a need to avoid the use of "bright lines" in the process after the initial tier which decides whether there are any regulatory concerns. A mechanism is required to avoid sterile debates over differences in Risk Quotient (or its probabilistic equivalent) that are insignificant relative to the inherent uncertainty. One suggestion was to define broader "classes" of risk on a Red, Amber, Green basis.

During independent discussion in the workgroups, it is clear that the criteria for progression through the process are likely to be based on **interim assessments of risk** rather than independent estimates of effects or exposure - i.e. the process will require the efforts of the eco-toxicologist and the exposure scientist to be synchronized. This realization prompts two other key questions:

- **WHAT METRICS OF EXPOSURE ARE MOST APPROPRIATE FOR COMPARISON WITH EFFECTS??**
- **HOW CAN EXPOSURE PROBABILITY DISTRIBUTIONS AND EFFECTS PROBABILITY DISTRIBUTIONS BE COMBINED INTO A RISK PROBABILITY DISTRIBUTION??**

These points may require different answers depending upon where the current risk assessment falls within the overall process.

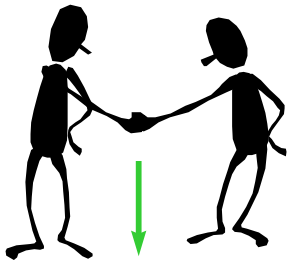
EFFECTS Workgroup Draft Process



Assessment Methods: IV Aquatic Risk Assessment.

Subgroup team members and their affiliations are listed in adjacent posters.

EXPOSURE EFFECTS



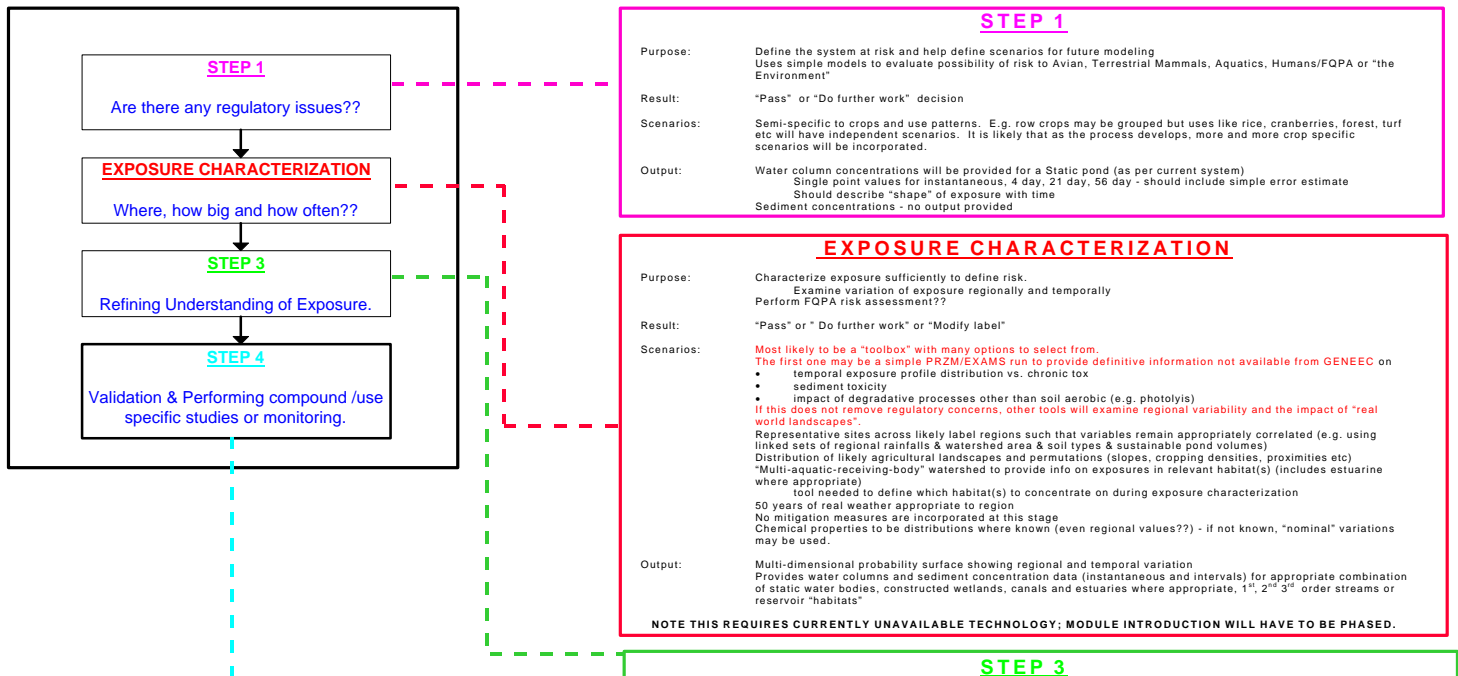
THESE ARE **DRAFTS FOR DISCUSSION - PLEASE GIVE US YOUR (CONSTRUCTIVE!!) COMMENTS**

The two schemes below reflect the initial thinking of the ECOFRAM Aquatic Effects and Exposure Subgroups. We will be trying to blend it into a common approach in December.

Please pass all comments to: **Paul Hendley (Paul.Hendley@agna.Zeneca.com) or Jeff Giddings (jgiddings@compuserve.com)**

AGREED AQUATIC RISK ASSESSMENT PROCESS

EXPOSURE Workgroup Draft Process



Monitoring may be thought of as another "model" with definable uncertainties - particularly for Surface Water where sampling timings can be critical to capturing an "event".

The most powerful approach would be a combination using thoroughly planned monitoring data across several years to calibrate validated models in which regulators have confidence. The modeling will provide probabilistic estimates of exposure

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Issues for Joint Discussion:

- 1) Pond Parameters
Need to define pond volume to watershed variation by region
- 2) Pond/runoff mixing issues and Refugia.
What is the biological significance of runoff entry areas experiencing higher residues while the remainder of the water body gets relatively low exposure??
PRZM/EXAMS predicts immediate mixing!!
- 3) What are we trying to protect?? Which habitats are of key interest
 - Flowing/static
 - Constructed wetlands
 - Drainage canals
 - Local "features"
- 4) Sediment Concentrations
Do we need step I sediment values and water column concns.?
- 5) Exposure Duration Step I
How to average data - arithmetic or geometric??
Study Duration vs. Intervals reported - 56 days or 60 days
- 6) Exposure Duration Step I
Meaning of 21 day concs if caused by a 1 day spike??
Impact on chronic study design by compound??
Short generation time organisms - what is value of reporting by "annual return frequencies??
Value of minimum modeling time step of 1 day??
- 7) Expression of Combined Probabilities
Use of risk categories
- 8) Linking Exposure Estimates to Existing Monitoring data
"Benchmarking"
- 9) Model Development, Validation and Research Needs

List of Issues and Questions from ECOFRAM Exposure Team

Needs:

- We should define storm rainfall in terms of intensities by month and by region
- Union between PRZM and EXAMS needs to be improved - SPEED!!
- Modeling of SW concentrations is not being evaluated in the FEMVTF model validation program - a program to increase confidence in Surface water predictions needs to be developed.

Issues

- How do we express the probability of a given exposure profile??
- How should we select values from a distribution of exposure??
 - How do we describe the shape of a distribution?
- Should the selected period of exceedance be tailored to species
 - *1 year in 10 is 0.25 sturgeon lifetimes but 600 daphnia life times (guesses!!)*
- What are the water bodies of concern -
 - **WHAT ARE WE TRYING TO PROTECT??**
- Do the species of concern vary with the water bodies of concern?
- How do we keep "correlated data" together within a landscape e.g. soil texture with slope with OM may well be correlated within a landscape?? Is this a scale issue??
- Does the relatively minor impact of some mitigation approaches truly matter relative to high uncertainties about exposure??
- Spatial scale of evaluations important
- How can we use existing data from monitoring to help "Benchmark" data sets
- Do changes in Ag Practices require changes in models
- How do we explain probabilistic approaches in a way that "works"
 - graphics
 - explanations
- Selection of matching species with exposure estimates
- When monitoring, is it better to measure concentrations more often at one place or less often at more places
- It is essential to standardize model input selection
- There is wide acceptance for including "weight of evidence" for toxicity issues
 - Why is there no analogous system for using monitoring data to support exposure arguments??
- How can we use real weather and relevant weather sequences to generate more than 36-50 year model runs??
- How can we deal with specific exposure scenarios - e.g. Florida Sugar cane
- Need to evaluate the suitability of the distribution functions we currently use - can geo-statistical approaches help us??
- We need to develop models that can examine the impact of buffers and mitigation measures
- Need to determine key sensitive variables and then focus on the distribution of THESE variables
- Physical models of environmental fate and effects (e.g. Microcosms and fate-o-cosms) are important to better define model parameters