INTRODUCTION TO THE ANSTF RAM COMMITTEE'S

GENERIC NONINDIGENOUS AQUATIC ORGANISMS RISK ANALYSIS REVIEW PROCESS

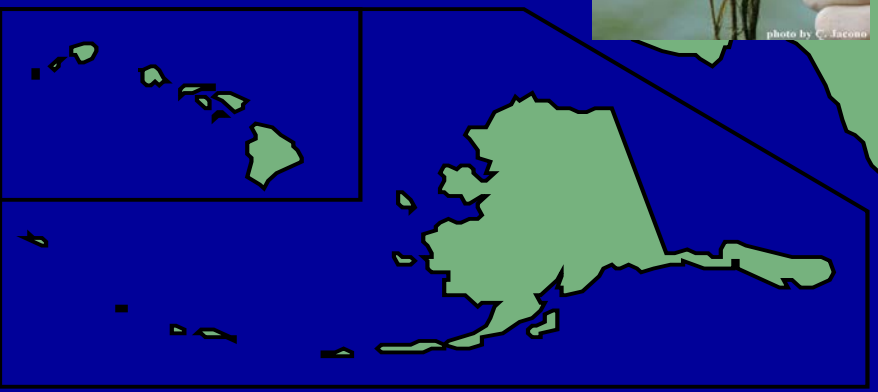
Richard Orr

August 23, 2005

ANS Task Force

Dedicated to the prevention and control of aquatic nuisance species

Aquatic Invasive Species



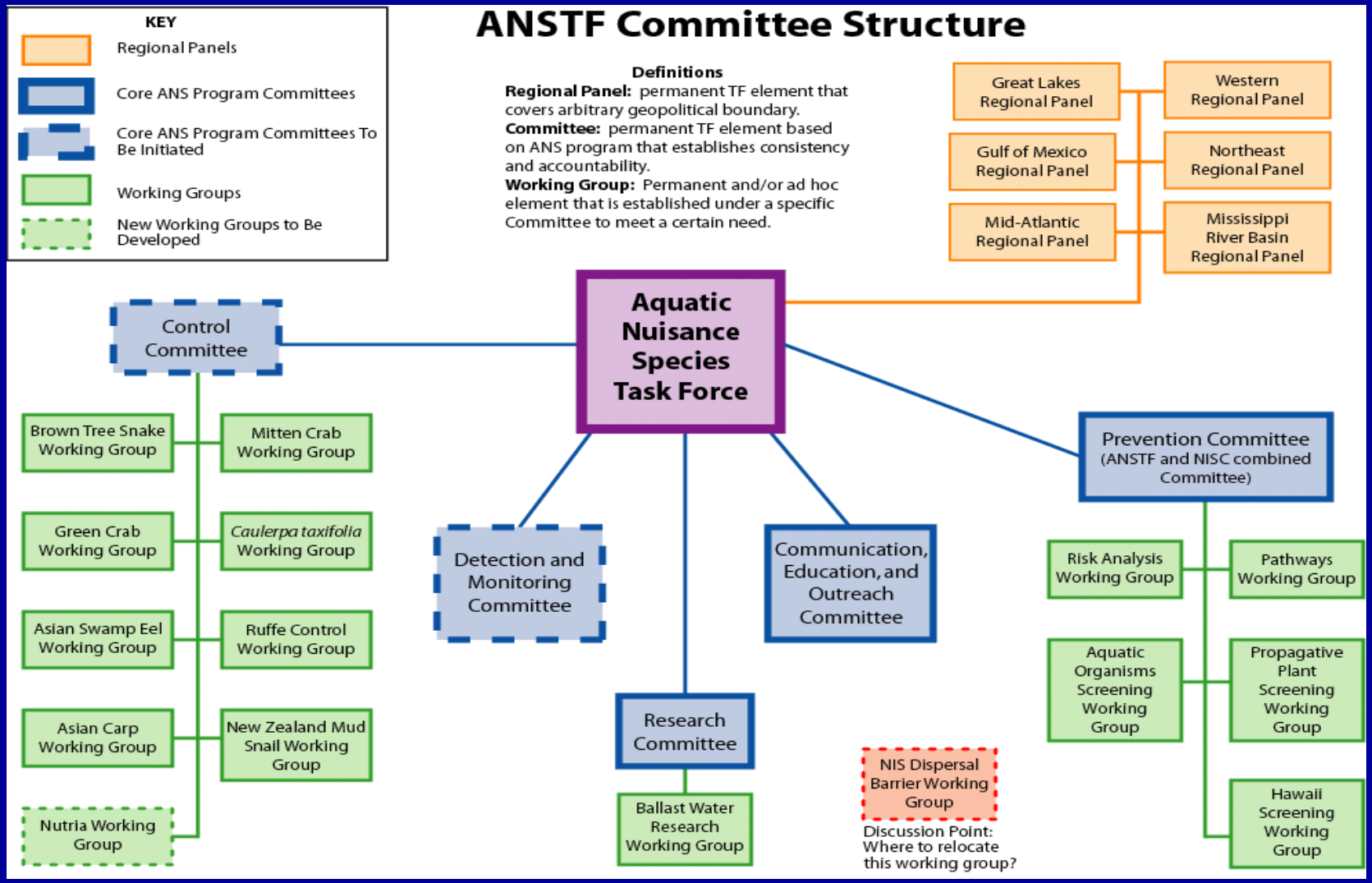


Figure 1. ANS Task Force Structure

ANS Task Force
Risk Assessment and Management

- Develop a workable risk analysis process
- Screening process for aquatic invasives
- Review selected risk assessments
- Pathway evaluation

RISK ASSESSMENT -- Develop a process that can be used to:

a. evaluate recently established nonindigenous organisms

b. Evaluate the risk associated with individual species not yet present (i.e., ballast water, aquaculture, aquarium trade, fish stocking, etc.)

c. individual pathways (i.e., ballast water, aquaculture, aquarium trade, fish stocking, etc.)

RISK MANAGEMENT -- Develop a practical operational approach to maximize a balance between protection and the available resources for:

a. reducing the probability of unintentional introductions

b. reducing the risk associated with intentional introductions

REPORT TO THE AQUATIC NUISANCE SPECIES TASK FORCE

Generic Nonindigenous Aquatic Organisms Risk Analysis Review Process

(For Estimating Risk
Associated with the Introduction
of Nonindigenous Aquatic Organisms
and How to Manage for that Risk)

Risk Assessment and Management Committee
Aquatic Nuisance Species Task Force

October 21, 1996

Former Members of the Risk Assessment and Risk Management Committee

Walter Blogoslawski
NOAA, National Marine Fisheries Service

Richard E. Bohn
National Aquaculture Association

Joseph McCraren
National Aquaculture Association

Sharon Gross
U.S. Fish and Wildlife Service

Richard Guadiosi
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NOAA National Marine Fisheries Service

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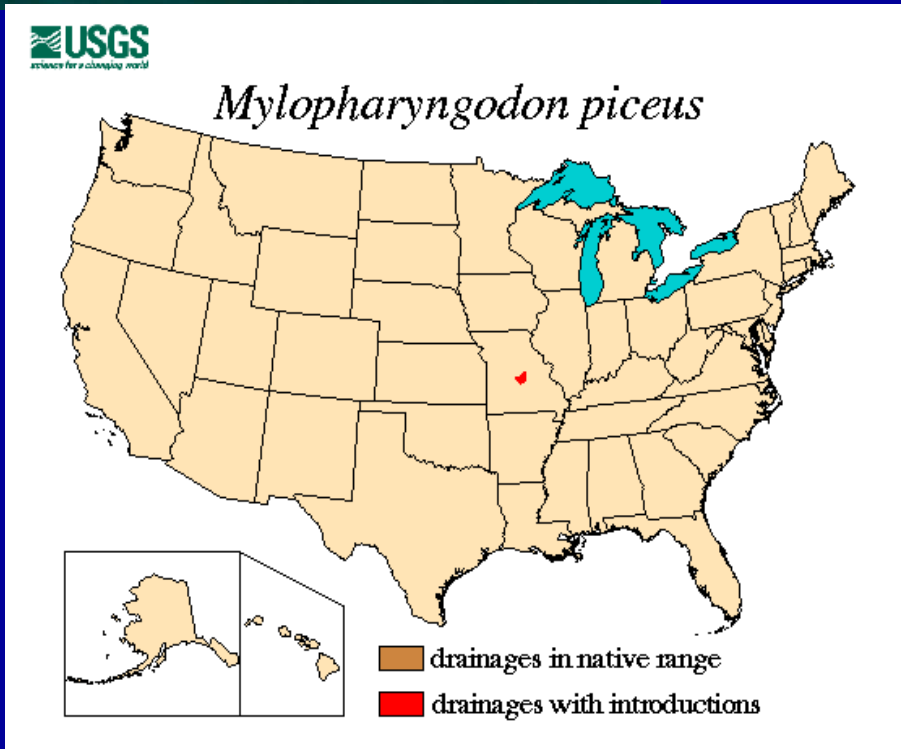
Black carp


USGS
Mylopharyngodon piceus
drainages in native range
drainages with introductions

Asian Swamp Eel

Shrimp viruses

Taura syndrome virus

Yellow head virus

White spot syndrome virus

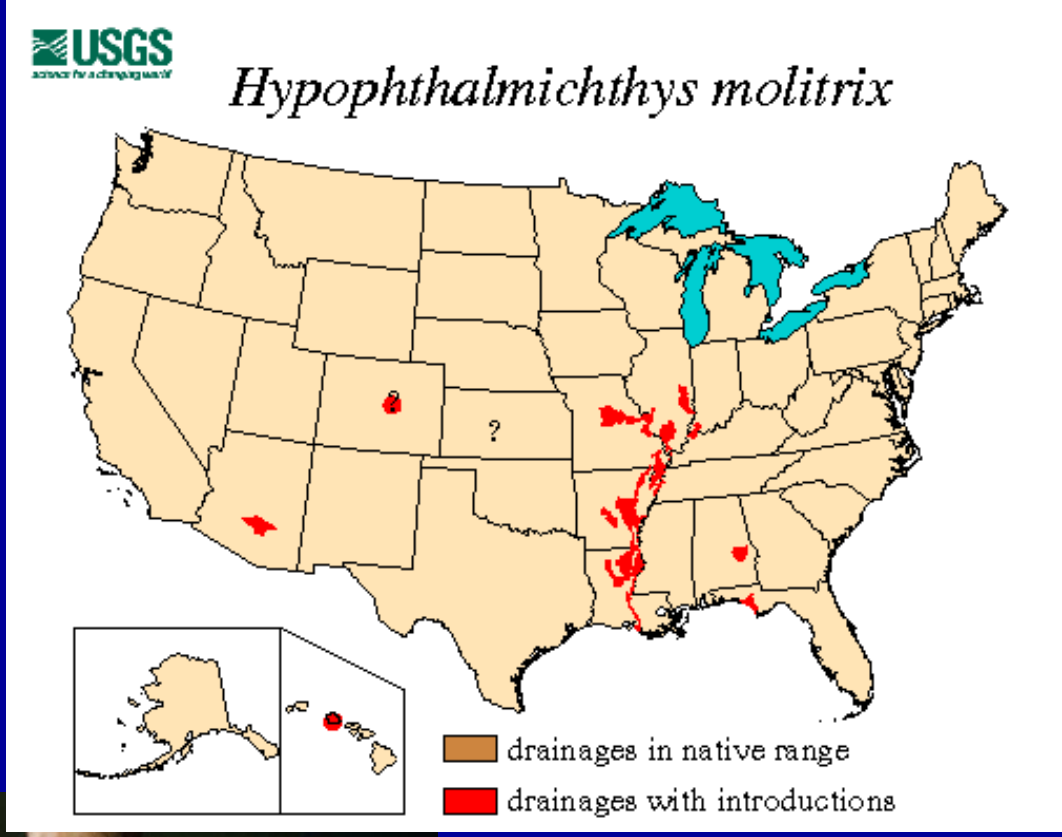
Infectious hypodermal and hematpoietic virus

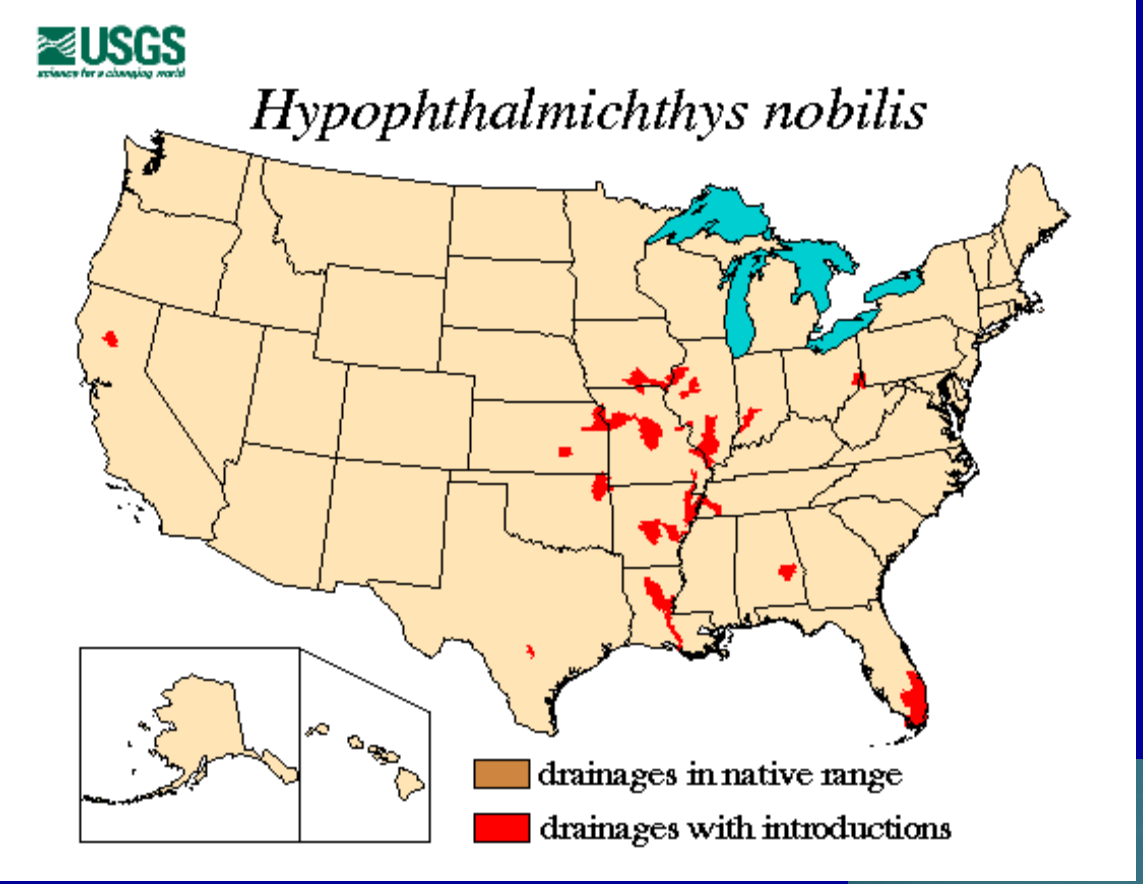
Snakehead Fishes (*Channidae*)

Image by: Baird, Ian

Lao Community Fisheries and Dolphin Prot

Silver carp


USGS
Hypophthalmichthys molitrix
?
drainages in native range
drainages with introductions



Bighead carp

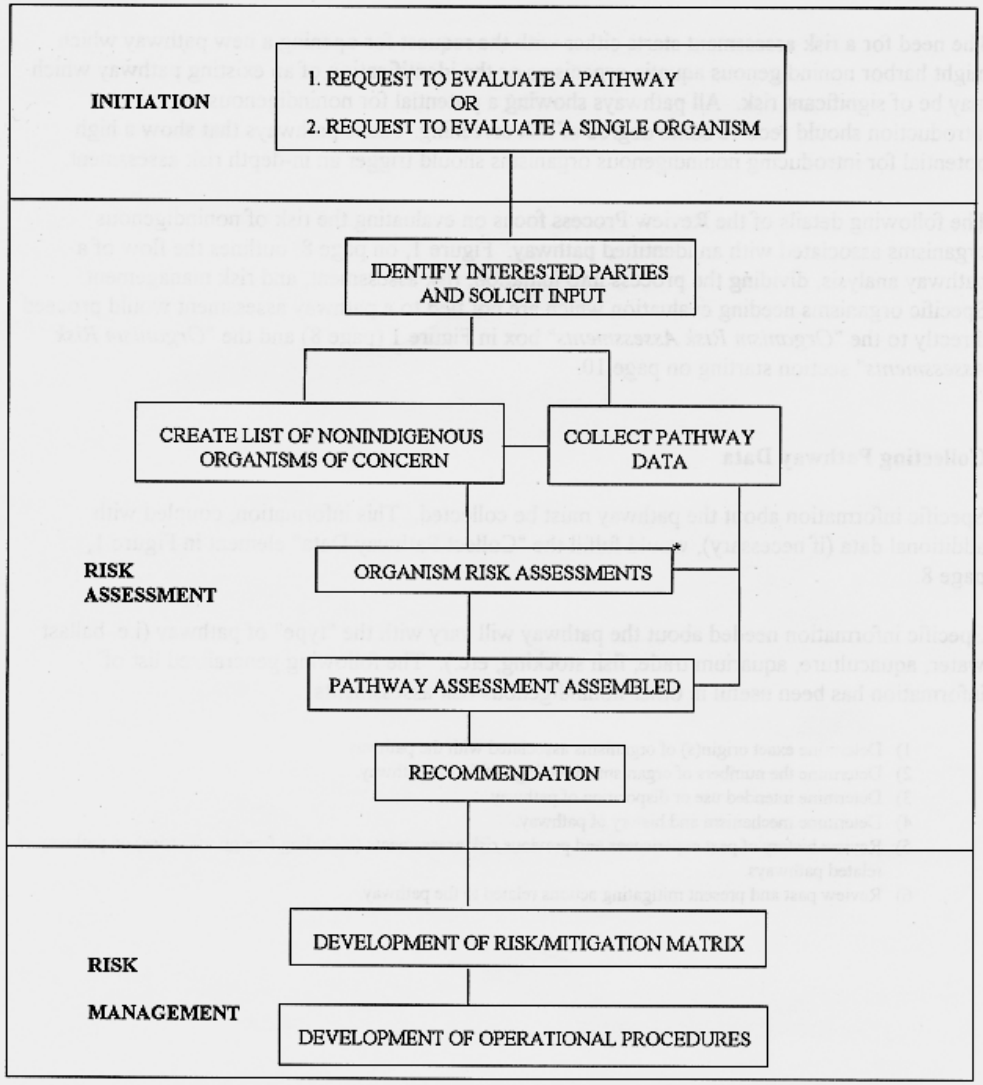
Definitions:

- **Risk – Is the likelihood and magnitude of an adverse event**
- **Risk Assessment – the estimation of risk**
- **Risk Management – the pragmatic decision making process concerned with what to do about the risk**
- **Risk Analysis – process that includes both risk assessment and risk management**
- **Risk Communication – the act or process of exchanging risk analysis information**

ASSESSMENT CRITERIA

- Relevant
- Comprehensive
- Logically & scientifically sound
- Practical
- Open to evaluation

FIGURE 1. Pathway Analysis: Flow Chart showing the Initiation, Risk Assessment and Risk Management for a pathway.



* = For details on the Organism Risk Assessment see Figure 2 "Risk Assessment Model", page 11. Pathways that show a high potential for introducing nonindigenous aquatic organisms should trigger detailed risk analyses.

Collecting Pathway Data

1) Determine exact origin(s) of organisms associated with the pathway.

2) Determine the numbers of organisms traveling within the pathway.

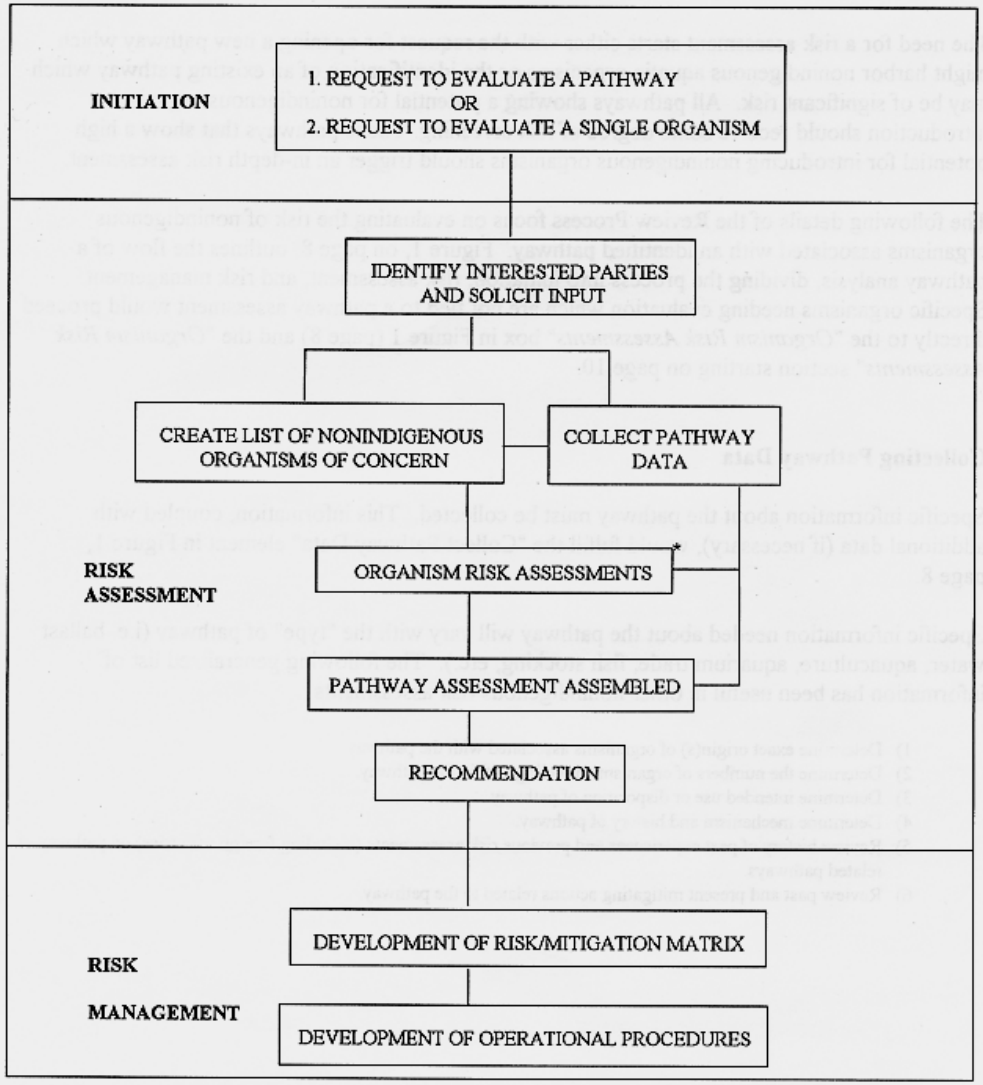
3) Determine intended use or disposition of pathway.

4) Determine mechanism and history of pathway.

5) Review history of past experiences and previous risk assessments (including foreign countries) on pathway or related pathways.

6) Review past and present mitigating actions related to the pathway.

FIGURE 1. Pathway Analysis: Flow Chart showing the Initiation, Risk Assessment and Risk Management for a pathway.



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Creating a List of Nonindigenous Aquatic Organisms of Concern

STEP: 1) Determine what organisms are associated with the pathway.
2) Determine which of these organisms qualify for further evaluation using the table below.

Category	Organism Characteristics	Concern
1a	species nonindigenous not present in country (United States)	yes
1b	species nonindigenous, in country and capable of further expansion	yes
1c	species nonindigenous, in country and reached probable limits of range, but genetically different enough to warrant concern and/or able to harbor another nonindigenous pest	yes
1d	species nonindigenous, in country and reached probable limits of range and not exhibiting any of the other characteristics of 1c	no
2a	species indigenous, but genetically different enough to warrant concern and/or able to harbor another non-indigenous pest, and/or capable of further expansion	yes
2b	species indigenous and not exhibiting any of the characteristics of 2a	no

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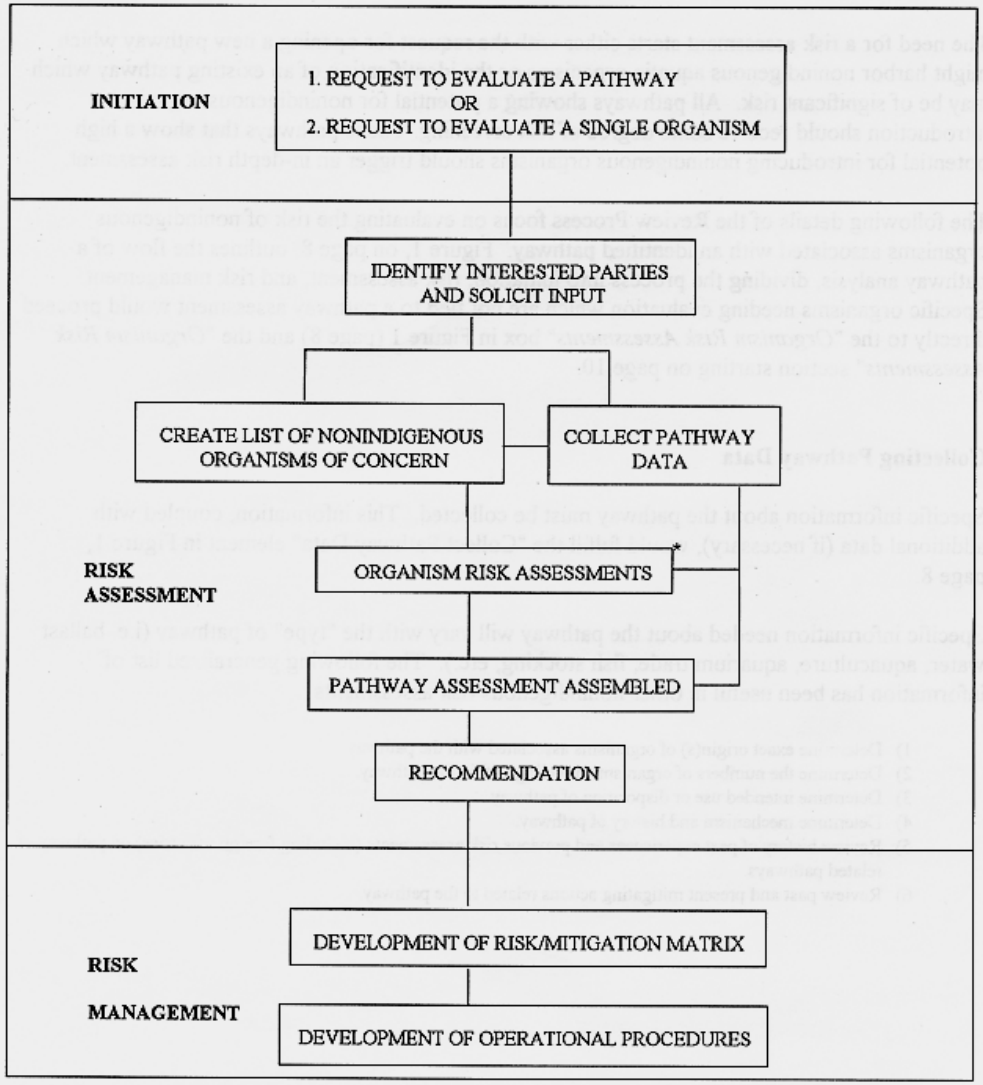

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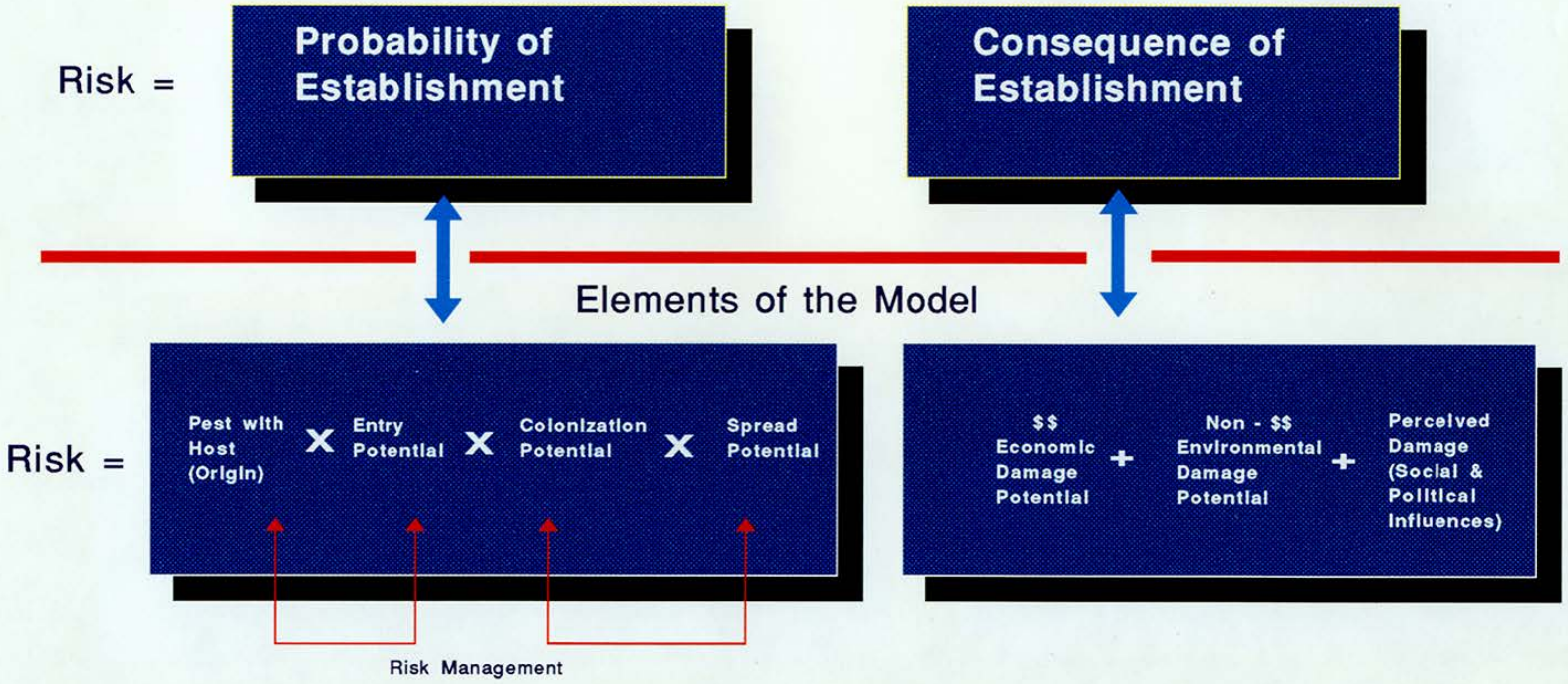
Pest Risk Assessment Model

Standard Risk Formula



- For model simplification the various elements are depicted as being independent of one another
- The order of the elements in the model does not necessarily reflect the order of calculation.

A. Elements -- Group 1: Assess Probability of Organism Establishment

1. Nonindigenous Aquatic Organisms Associated with Pathway (At Origin) -- Estimate probability of the organism being on, with, or in the pathway.
The major characteristic of this element is: Does the organism show a convincing temporal and spatial association with the pathway.

2. Entry Potential -- Estimate probability of the organism surviving in transit.
Some of the characteristics of this element include: the organism's hitchhiking ability in commerce, ability to survive during transit, stage of life cycle during transit, number of individuals expected to be associated with the pathway- or whether it is deliberately introduced (e.g. biocontrol agent or fish stocking).

3. Colonization Potential -- Estimate probability of the organism colonizing and maintaining a population.
Some of the characteristics of this element include: the organism coming in contact with an adequate food resource, encountering appreciable abiotic and biotic environmental resistance, and the ability to reproduce in the new environment.

4. Spread Potential -- Estimate probability of the organism spreading beyond the colonized area.
Some of the characteristics of this element include: ability for natural dispersal, ability to use human activity for dispersal, ability to readily develop races or strains, and the estimated range of probable spread.

B. Elements – Group II: Assess Consequence of Establishment

5. Economic Impact Potential -- Estimate economic impact if established. Some of the characteristics of this element include: economic importance of hosts, damage to crop or natural resources, effects to subsidiary industries, exports, and control costs.

6. Environmental Impact Potential -- Estimate environmental impact if established. Some of the characteristics of this element include: ecosystem destabilization, reduction in biodiversity, reduction or elimination of keystone species, reduction or elimination of endangered/threatened species, and effects of control measures. If appropriate, impacts on the human environment (e.g. human parasites or pathogens) would also be captured under this element.

7. Perceived Impact (Social & Political Influences) -- Estimate impact from social and/or political influences.

   Some of the characteristics of this element include: aesthetic damage, consumer concerns, and political repercussions.

CAPTURING THE DEGREE OF UNCERTAINTY

1. UNCERTAINTY OF THE PROCESS (methodology)

2. UNCERTAINTY OF THE ASSESSOR(S) (human error)

3. UNCERTAINTY ABOUT THE BIOLOGY (species and receiving ecosystem unknowns)

REFERENCE CODES TO ANSWERED QUESTIONS

Reference Code	Reference Type
(G)	General Knowledge, no specific source
(J)	Judgmental Evaluation
(E)	Extrapolation; information specific to pest not available; however information available on similar organisms applied
(Author, Year)	Literature Cited

UNCERTAINTY CODES TO INDIVIDUAL ELEMENTS

Uncertainty Code	Symbol	Description
Very Certain	VC	As certain as I am going to get
Reasonably Certain	RC	Reasonably certain
Moderately Certain	MC	More certain than not
Reasonably Uncertain	RU	Reasonably uncertain
Very Uncertain	VU	A guess

Definition of Ratings used for Organism Risk Potential and Pathway Risk Potential:

Low = acceptable risk - organism(s) of little concern (does not justify mitigation)

Medium = unacceptable risk - organisms(s) of moderate concern (mitigation is justified)

High = unacceptable risk - organisms(s) of major concern (mitigation is justified)

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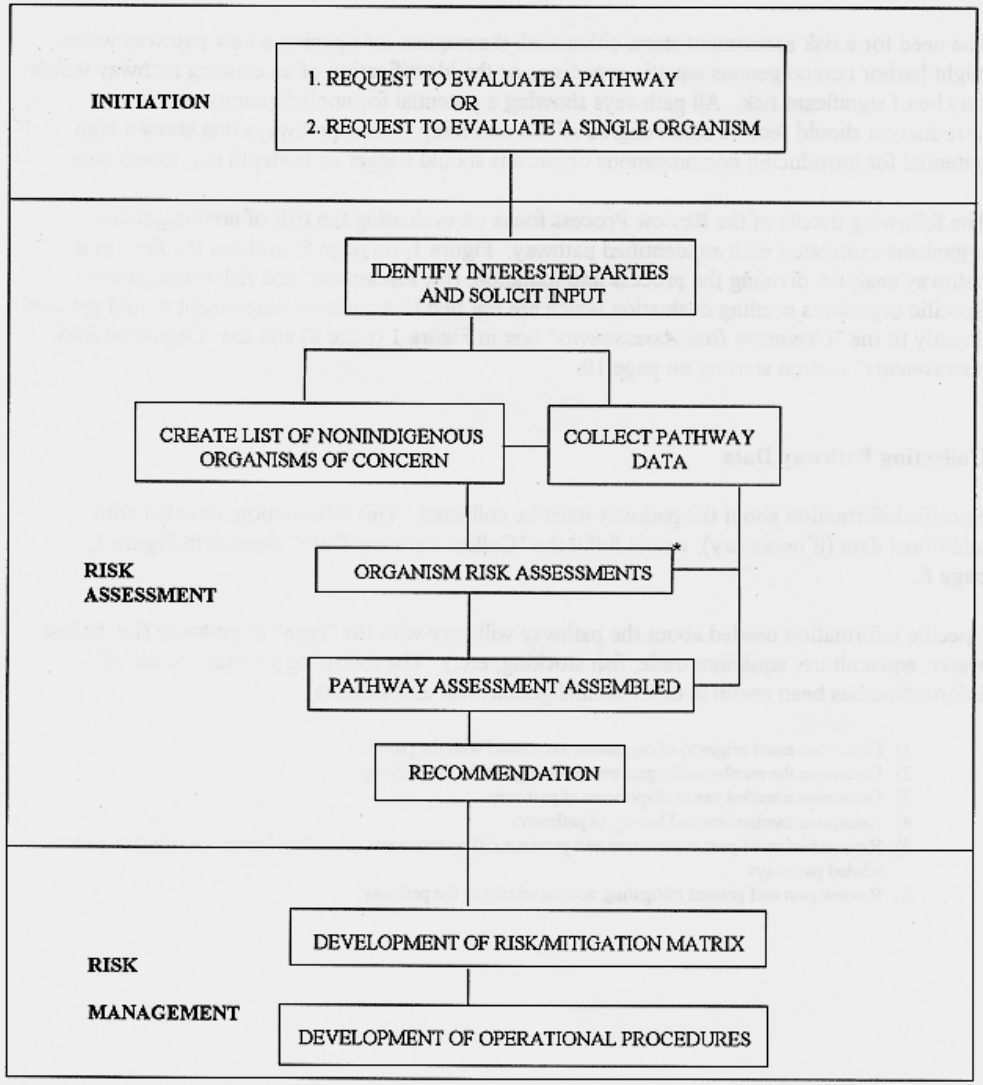

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MITIGATION MATRIX
Pinus radiata logs from New Zealand
(Pathogens & Plant Feeding Insects vs. Mitigation)

Mitigation Procedures in **NEW ZEALAND**					In **USA**	
ORGANISM	30 DAY LIMIT	SAWLOG QUALITY ONLY	DE-BARKING	MB FUMI-GATION	AGENCY ENTRY REQ.	HEAT PROCESS SAWMILL
Bark Beetles	S	S	E	T	S	T
Platypus spp.	S	S	S	T	S	T
Sirex/ Fungus	S	E	S	E	S	T
Lepto-Graphium	S	E	S	E	S	T
Kalotermes	S	E	S	T	S	T
Huhu beetles	S	E	S	E	S	T
Hitch hikers	S	S	E	T	S	T
Unknown Pests	S	S	S	E	S	T

Key:
(S)ome reduction of pest risk expected (less than 95%)
(E)xtensive reduction (95 percent or more) of pest risk expected
(T)otal (100 percent or nearly 100 percent) reduction of pest risk expected

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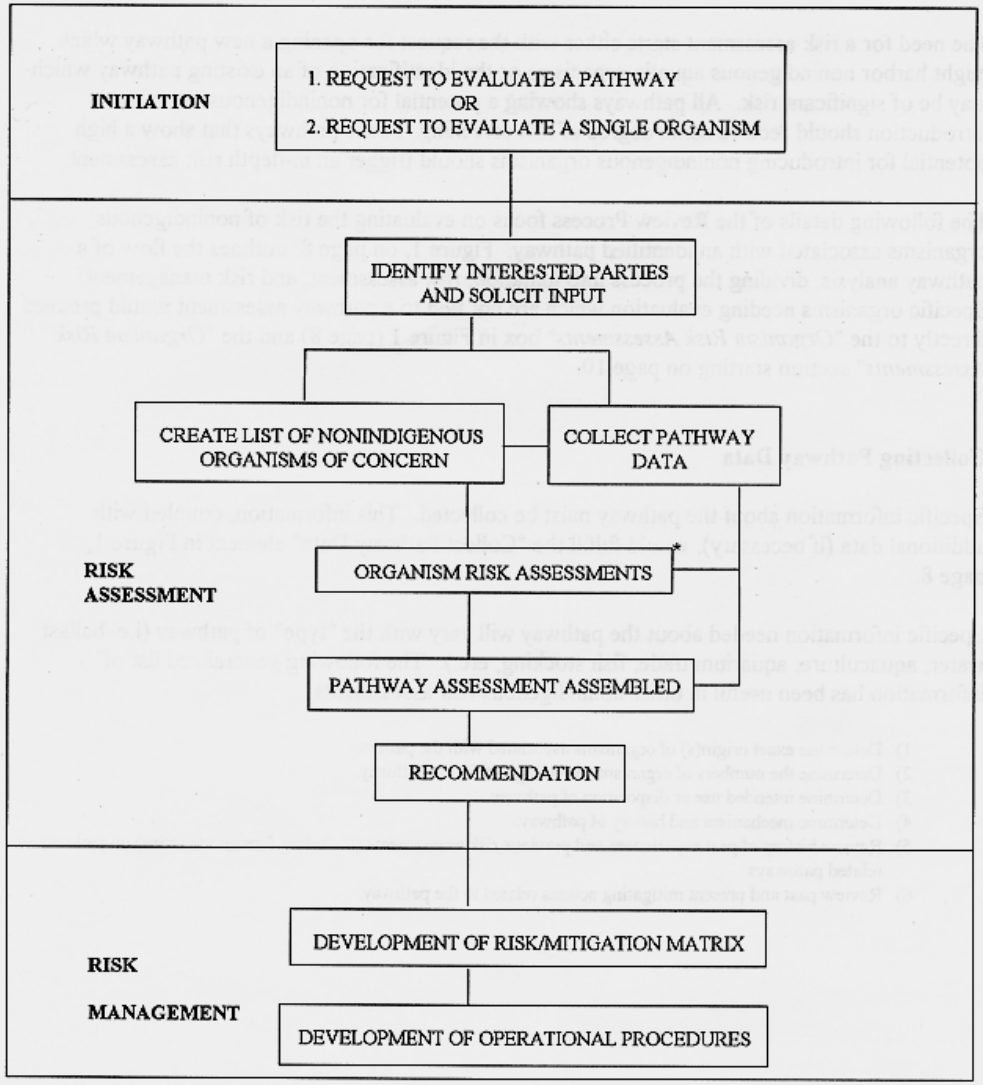

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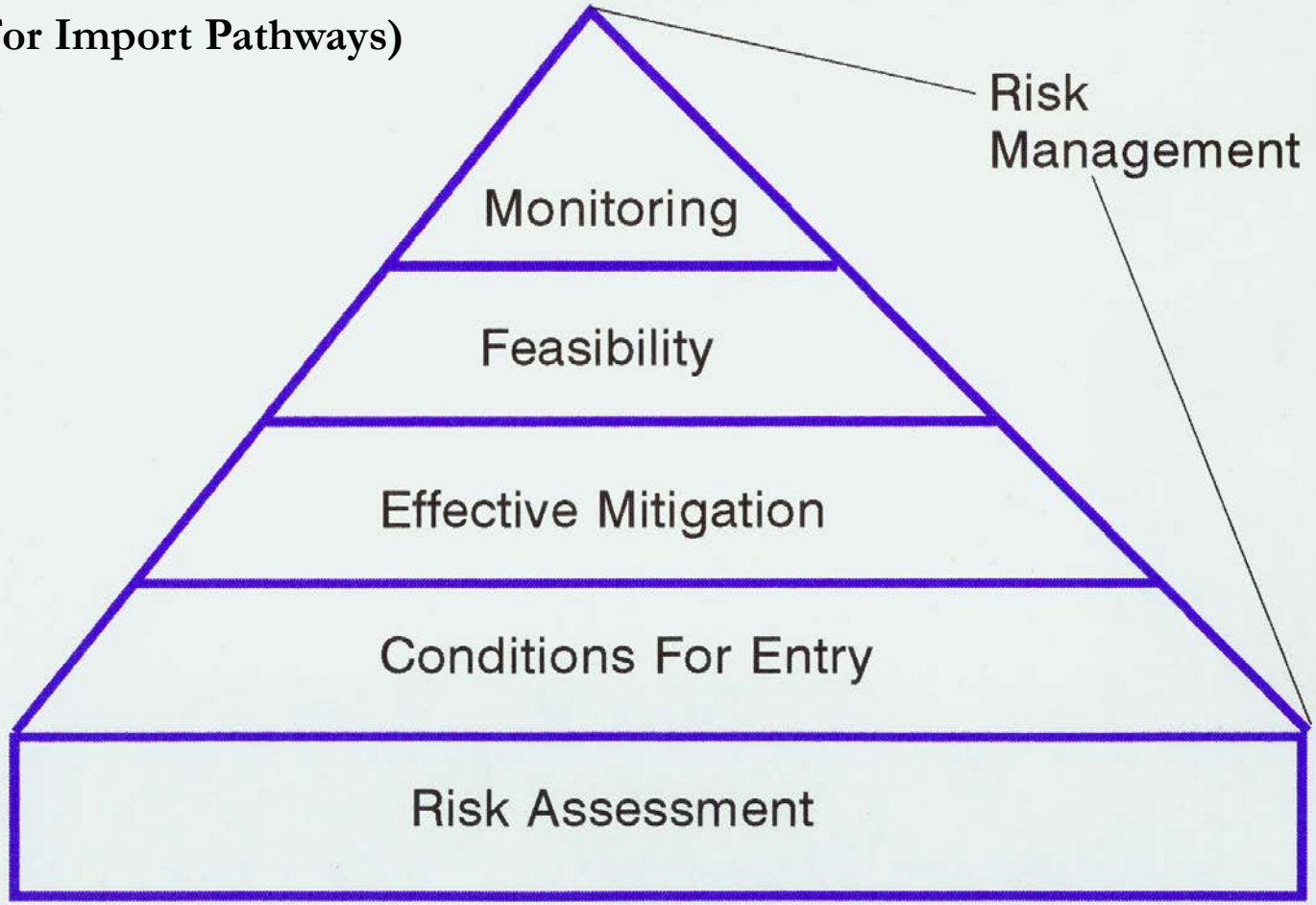
Management Procedure

(For Import Pathways)



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