Indirect Effects of Pesticides to Listed Species: Key Statutory and Regulatory Considerations

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Objective

Provide a general overview of:

- key statutory and regulatory considerations when developing analysis plan for consultation
- NMFS Office of Protected Resources approach for evaluating indirect effects for Section 7 consultations
Section 7 Requires:

All federal agencies to consult with the Services (USFWS, NMFS) to insure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat.
Destruction or adverse modification of critical habitat

a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. [50 CFR § 402.02]
Listed Species

- More than 1900 listed under ESA
- USFWS manages terrestrial and freshwater species
- NMFS manages marine and anadromous species.
- NMFS currently has jurisdiction over 67 listed species
Species Under NMFS Jurisdiction

- Marine Mammals (21)
- Marine Turtles (8)
- Marine and Anadromous Fish (34)
- Marine Invertebrates (3)
- Marine Plants (1)
How do the Services address indirect effects of pesticides?

*1998 Endangered Species Consultation Handbook*

- Procedures for Conducting Consultations and Conference Activities Under Section 7 of the Endangered Species Act
- U.S. Fish & Wildlife Service & National Marine Fisheries Service
Action

All activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas. [50 CFR § 402.02]
Federal Action

“Authorization for use or uses described in labeling of a pesticide product containing a particular pesticide active ingredient.”

Understandings reached NMFS-USFWS-USEPA meeting 12/12/2007
Deconstruction of the Action

- Stressors associated with action based on review of EPA authorized labels
  - Active ingredient
    - Metabolites and degradates
  - Other ingredients
  - Recommended tank mixtures (e.g. with other pesticides or adjuvants)
  - Application restrictions/ methods
<table>
<thead>
<tr>
<th>Informal consultations</th>
<th>Formal consultations</th>
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<tbody>
<tr>
<td><strong>Purpose:</strong> Insure no jeopardy / adverse modification</td>
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<tr>
<td><strong>Product:</strong> NLAA concurrence / non-concurrence</td>
<td><strong>Product:</strong> Biological Opinion</td>
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<tr>
<td><strong>Scale:</strong> individual organisms, critical habitat</td>
<td><strong>Scale:</strong> individual organisms, critical habitat, population, species</td>
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<tr>
<td><strong>Screening evaluation:</strong> If NLAA then no jeopardy</td>
<td><strong>Comprehensive evaluation:</strong> includes quantification of amount and extent of take</td>
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Endangered Species Act definitions
ESA Consultation Handbook

- **Not likely to adversely affect (NLAA)** – effects on listed species are expected to be *discountable*, or *insignificant*, or *completely beneficial*.

- **Discountable** – Extremely unlikely to occur... can’t measure or detect

- **Insignificant** – should never reach the scale where *take* occurs.
Endangered Species Act definitions

ESA Consultation Handbook

- **Take** - “to harass, harm, pursue…”

- **Harm** – “any significant habitat modification or degradation that results in death or injury… significantly impairing behavioral patterns such as breeding, feeding, or sheltering”

- **Harass** – “…to significantly disrupt normal behavior patterns which include but are not limited to, breeding, feeding or sheltering”
Conceptual Framework - Risk of to Listed Species

**Action Stressors**
- Pesticide, metabolites, degradates, adjuvants

**Exposure Analysis**
- Co-occurrence: Stressors & listed resources
  - Distribution of individuals
  - Distribution of habitat
  - Exposure Profile

**Response Analysis**
- Effects of Stressors on ESA-listed Species and their habitat
  - Individual responses
  - Habitat responses
  - Response Profile

**Risk Characterization**
Risk Characterization

Effects on individuals

Effects on populations

Effects on species (ESU or DPS)

Can the action agency insure that pesticide actions are not likely to jeopardize the continued existence of the species?

Effects of habitat

Effects on primary constituent elements

Effects on conservation value of designated critical habitat

Can the action agency insure that pesticide actions are not likely to adversely modify or destroy designated critical habitat?
Critical Habitat

- Specific proposed or designated areas that contain Primary Constituent Elements (50 CFR §17 and 226)
Primary Constituent Elements (PCEs)

- Physical and biological features of critical habitat essential to the conservation of the species
- Useful starting point for identifying assessment endpoints for indirect effects
Southern Resident Killer Whales
Primary Constituent Elements

- Water quality – to support growth and development of the orca population
- Prey species – protecting the quality, quantity, and availability of the orca’s food supply
- Passage conditions – ensuring room for migration, resting, and foraging.
Are the orcas starving?

*Seattle Post Intelligencer* - 10/24/2008

Orcas from L pod, usually seen in [Washington ] state waters, surface near Cypress Point, Calif. Scientists suggest the pod may be driven to swim hundreds of miles just to meet minimum nutritional requirements. (Photo: Nancy Black / Monterey Bay Whale Watch)
Are the orcas starving?

Seattle Post Intelligencer - 10/24/2008

- Orcas strong preference for Chinook salmon
- Many of the Chinook runs faltering
- Evidence Orcas starving
- Relationships between declines in orca populations and Chinook populations
Action Area

- The action area includes all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action [50 CFR 402.02].
Analyzed within the context of the Environmental Baseline; the Status of the Species; and Cumulative Effects

Can the action agency insure that pesticide actions are not likely to jeopardize the continued existence of the species?

Can the action agency insure that pesticide actions are not likely to adversely modify or destroy the designated critical habitat?
Environmental Baseline

By regulation, environmental baselines for biological opinions include the past and present impacts of all state, Federal or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR §402.02).
Pesticide Mixtures

- Two or more pesticides are detected in agricultural, urban, and mixed use watersheds more than 90% of the time*
- Monitoring in urban streams across U.S.**
  - Two or more herbicides in 85% samples
  - Two or more insecticides in 54% samples
  - Four or more herbicides were detected in 61% of the water samples.

Source:

Concluding Remarks

- Assessment of indirect effects is required for section 7 consultation
- Regulatory and statutory considerations are necessary when developing assessment plan for ESA consultation
- Risk hypotheses should be based on how the species interacts with its environment
- PCEs are a logical starting point for identification of assessment endpoints for indirect effects analysis
Questions?
Indirect Effects

Those effects that are caused by or will result from the proposed action and are later in time, but are still reasonably certain to occur. [50 CFR §402.02]
What information does NMFS consider in developing and evaluating Risk Hypotheses?

- The data standard for consultation is “Best Scientific and Commercial Data Available”
- Primary and original sources of information
  - Peer-reviewed: Studies published in scientific journals
  - Other:
    - Registrant submitted studies
    - Government reports
    - Dissertations
Use of Best Scientific and Commercial Data

![Diagram]

- **Quality**
  - High quality
  - Low quality
- **Relevance**
  - Low relevance
  - High relevance

- **High quality**
  - High relevance
- **Low quality**
  - Low relevance