



Federal Agencies and Invasive Species

Chemical Applicators Short Course

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Overview

- State & Private branch of Forest Service
- Forest insects & diseases
- Vertebrates
- Invasive plants
 - Analysis requirements prior to treatment
 - Our scariest weeds
- Holding the line....

We Face an Major Challenge

- Over 43 million federal acres in OR & WA
- 25 million acres for National Forests alone
- 100's of invasive species
- Cumbersome regulations
- Complex requirements
- Inadequate funding



Invasive Species in Forestry

- State & Private branch of FS
 - Technical assistance & funding to States, Tribes, private land for forest health protection
 - Grants for prevention/suppression/treatments
 - Funds mostly for non-FS land
- National Forest System branch
 - Funding spent on National Forests

Insects & Diseases

- Help analyze, conduct, and monitor aerial applications done on FS and federal lands
- Advise, technical assistance for treatments on State and private lands and some FS lands



Douglas-fir tussock
moth defoliation

Top Forest Insects or Pathogens

- Most are native – bark beetles, tussock moth, western spruce budworm, dwarf mistletoe
- Invasives
 - SOD, White Pine blister rust, POC
 - Larch case bearer, gypsy moths, balsam woolly adelgid

Forest Pest Treatments



- Current focus is
 - Silvicultural treatments to reduce susceptibility
- Insect treatments
 - primarily biopesticides, like Bt, Verbenone, MCH, tussock moth virus
- Sudden Oak Death
 - herbicide & burn

- VERY difficult to detect forest pests
 - Focus is early detection/rapid response – APHIS, States, and FS coordination
 - ID introduction pathways – prioritize detection surveys
 - Public often the first detectors.... Increase training
 - Identification can be very difficult



Vertebrates



- Handled on a case-by-case basis by each forest
- Primary pesticides used are strychnine, putrid egg solids, and denatonium benzoate
- No feral pigs - yet

Invasive Plants

- IVM required by federal policy for both BLM & FS – manual, herbicide, biocontrols, etc.
- Pesticide Use Permits required



Scotch broom in plantation

NEPA Rules

- No implementation without NEPA first
 - For all federal agencies
 - Slows our response time considerably
- National Environmental Policy Act (NEPA)
 - analyze effects of actions / alternatives before implementing a project
 - Complex analysis when pesticides involved
 - Subject to litigation
 - Very costly and time-consuming
 - \$500,000 and 3 years for one forest....

Recent Efforts

- 2010 BLM Vegetation Treatment EIS
 - Analyzing 18 herbicides, 12 for west side
 - Needed to get out of injunction
 - Final due in July
 - Followed by District EA's prior to implementation



BLM Herbicides

- 2,4-D
 - Dicamba
 - Glyphosate
 - Picloram
 - Bromacil
 - Chlorsulfuron
 - Clopyralid
 - Diquate
- Diuron
Fluridone
Hexazinone
Imazapic
Imazapyr
Metsulfuron methyl
Sulfometuron methyl
Tebuthiuron
- Triclopyr
Diflufenzopyr

FS 2005 EIS

- Invasive Plants only – no aquatics, no natives
- Prevention and treatment
- Included Early Detection / Rapid Response
- Analyzed 12 herbicides, chose 10
- Risk Assessments
 - Basis for effects analysis
 - Human Health / Ecosystems



Risk Assessment

- Identify toxic effects
- Quantify doses – exposure scenarios
 - Human Health
 - Ecological – fish, wildlife, invertebrates, soils
- Compare doses to toxicity levels
- Characterize Risk

**Glyphosate -
Human Health and Ecological Risk Assessment
Final Report**

Exposure Scenarios

- Human Health – worker and public
 - Backpack spray
 - Eating contaminated berries
 - Direct spray of a child
- Wildlife – 10 scenarios
 - E.g. eating a mouse that was directly sprayed
- Designed to give us a “worst case” result



Dose - Response

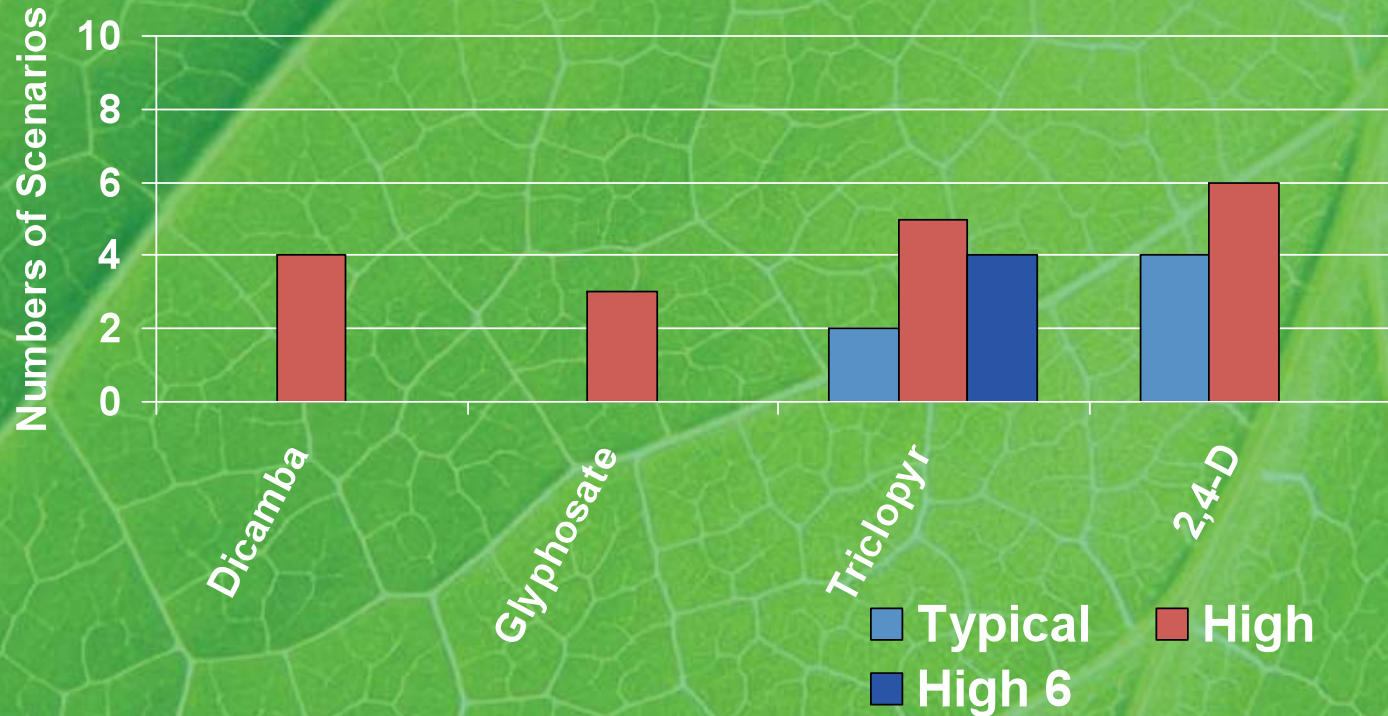
- Results of exposure scenarios are compared to known toxicity levels

$$\frac{\text{Estimated Dose}}{\text{Toxicity Level}} = \text{Hazard Quotient (HQ)}$$

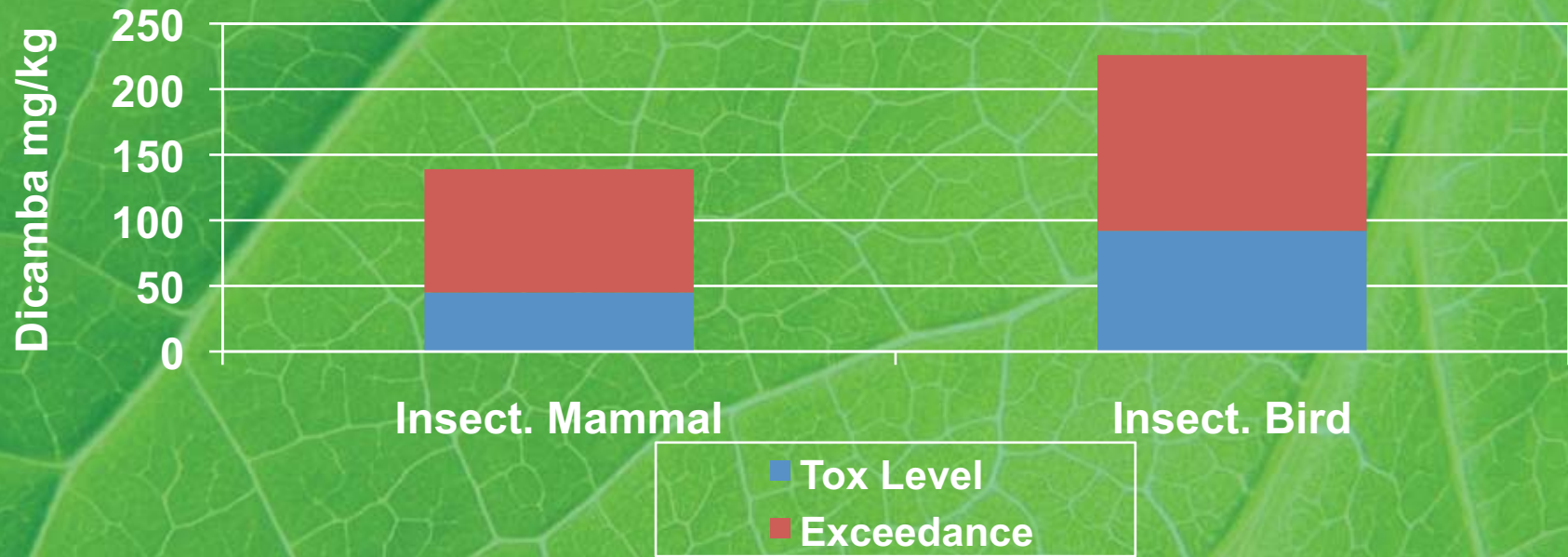
- If Dose > Toxicity Level, HQ > 1.0
- Potential for adverse effects
- Results of this kind of analysis can reveal concerns

Results for Wildlife

Number of acute scenarios exceeding thresholds



Estimated Doses



Human Health

- 2,4-D and Triclopyr
 - had the greatest number of scenarios where worker and public health risks exceed EPA target levels (RfD's).
 - had nearly all scenarios where expected dose exceeds the RfD by greater than one order of magnitude (Hazard Quotient 10).

FS Chose 10 Herbicides

- Chlorsulfuron
- Clopyralid
- Glyphosate
- Imazapic
- Imazapyr
- Metsulfuron methyl
- Picloram
- Sethoxydim
- Sulfometuron methyl
- Triclopyr

Rest of the Process

- Complete analysis
- Make a Decision
- Allow appeals
- Resolve, or not
- Litigation



Only then, can we treat...

- Medusahead, Ventenata
 - difficult to treat, changes ecosystems
- False brome
 - spreading exponentially, forest understory, very adaptable to light levels, moisture, elevation
- Garlic mustard, Herb Robert
 - understory, spreading very rapidly
- Hawkweeds
 - difficult to control, spreading rapidly, meadows



- Riparian – Knotweeds, Canarygrass, Blackberry
- Yellow starthistle, knapweeds, thistles – chewing up acres
- Rush skeleton weed – spreading rapidly
- Dalmatian toadflax – waxy, inaccessible areas, understory
- Sulphur cinquefoil – rampant invasion, in wilderness areas
- Any aquatic weed....



Spread Rate Exceeds Control

- Perhaps 2-3 million acres on National Forests in OR and WA
- @ 10%/year, need to control 300,000 acres / year to stay even
- 2009 FS treated just over 45,000 ac on NFs
- 2010 target is 50-55,000 acres

Conclusion

- Federal agencies have a huge management challenge for invasive species
- Our processes are complex, time consuming, and expensive
- Our response time is too slow
- We have many species that scare us...
- But, we are getting better.....

Questions?

