



A Summary of Herbicide Effects to Wildlife

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Overview

- Reviewed and analyzed data on effects of 12 herbicides to terrestrial wildlife
- Results for some herbicides were surprising
- Results can help inform treatment decisions
- Results were used, along with other data, to establish standards for use on National Forests

Analysis

- Analysis conducted to support Invasive Plant Program EIS
- Used Forest Service Risk Assessments as basis for analysis
 - Risk Assessments prepared by SERA, Inc.

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

Analysis

- **12 herbicides**

- **Chlorsulfuron**
- **Clopyralid**
- **Dicamba**
- **Glyphosate**
- **Imazapic**
- **Imazapyr**
- **Metsulfuron methyl**
- **Picloram**
- **Sethoxydim**
- **Sulfometuron methyl**
- **Triclopyr**
- **2,4-D**

Analysis

- “Worst case scenarios” used to quantify dose at typical and high application rates
- Scenarios used species groups: “large herbivorous mammal”, “small insectivorous bird”



Analysis

- Lowered some thresholds to account for rare species in the PNW
- Used most sensitive effect from most sensitive species to set threshold
 - Not lethal doses

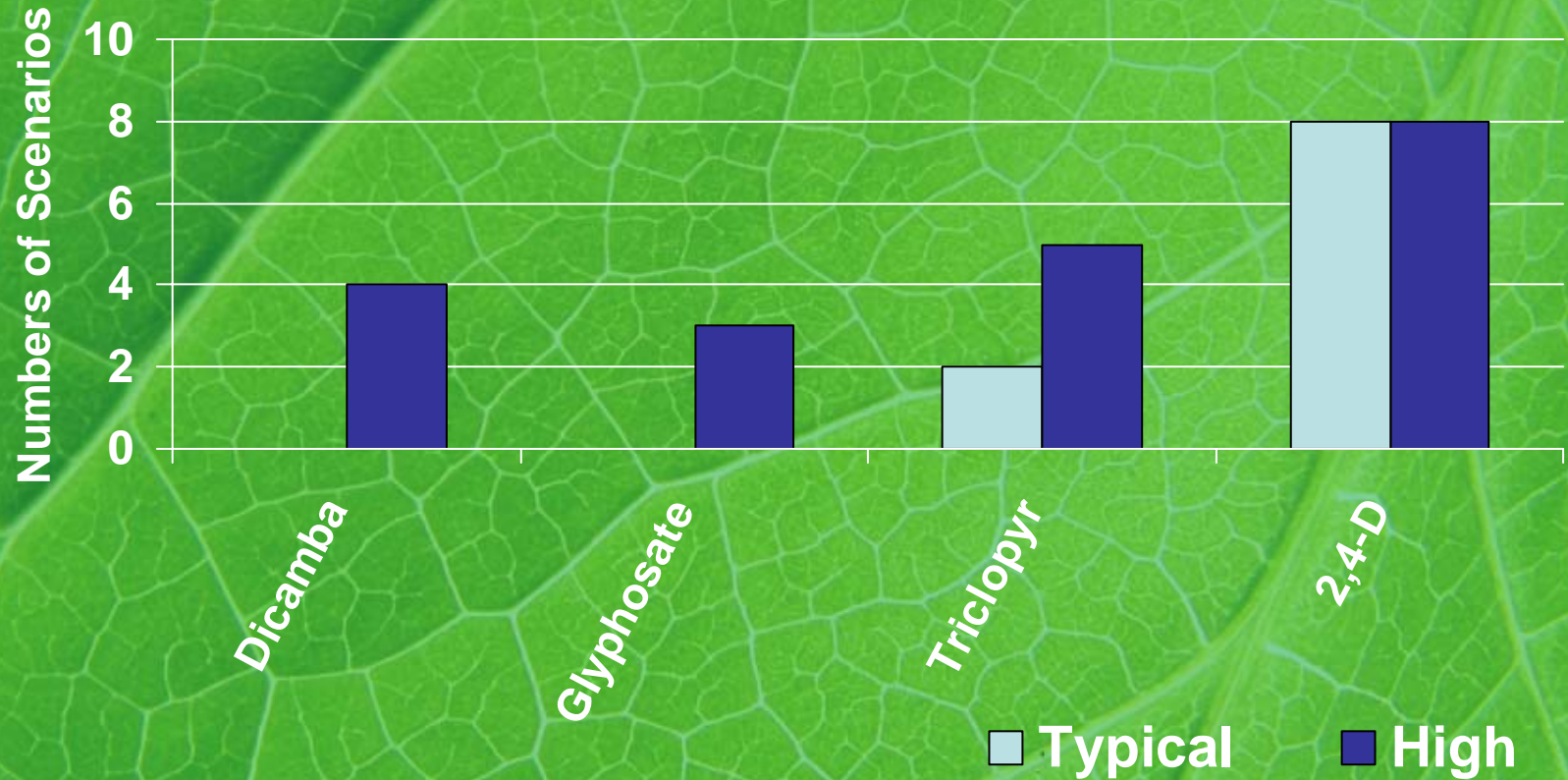


Results

- Focus on effects from acute exposures
- Some herbicides have potential for adverse effects; four were notable:
 - 2,4-D (e.g. Weedone, “Weed ‘n Feed”)
 - Dicamba (e.g. Banvel, Vanquish)
 - Triclopyr (e.g. Garlon, Pathfinder)
 - Glyphosate (e.g. Round Up, Aquamaster)

Results

Number of acute scenarios exceeding thresholds



Results

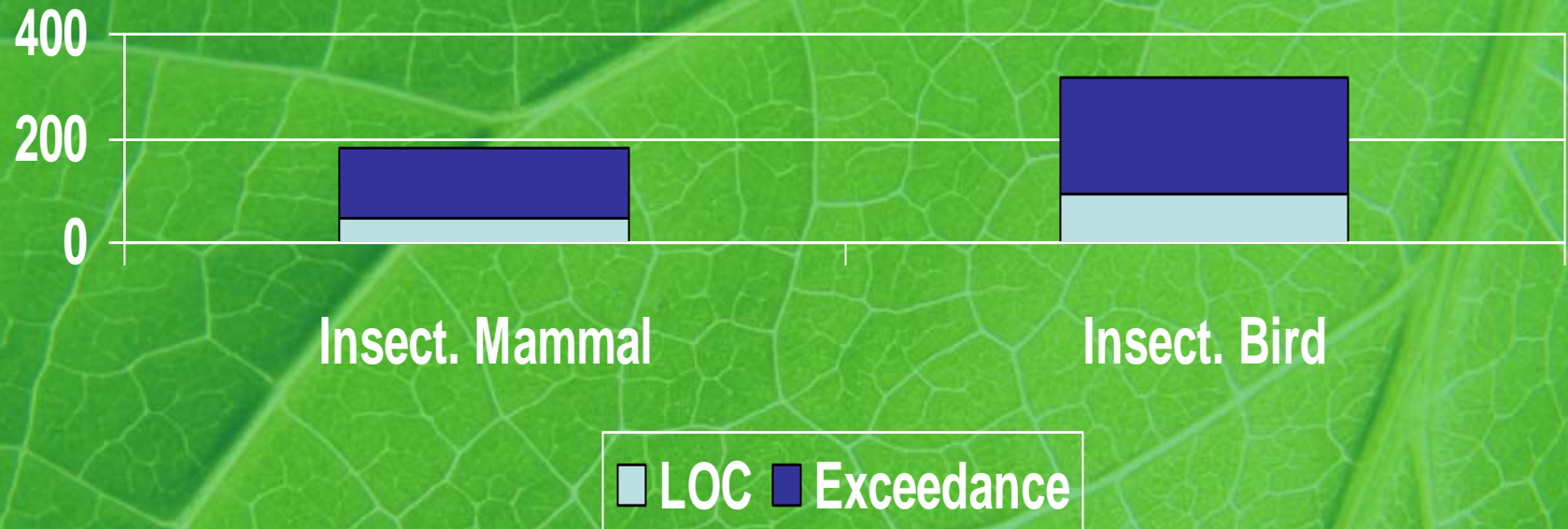
- **2,4-D**
 - **Exceeded thresholds in more scenarios than any other herbicide**
 - **At typical and high application rates, doses to mammals met or exceeded those reported to damage to internal organs**

Results

- **2,4-D continued**
 - Doses exceed 0.1 of LD₅₀ for herbivorous and insectivorous birds
 - No data on sub-lethal effects



Results



- **Dicamba**
 - adverse effects to reproduction are plausible at high rates from treated vegetation or insects

Results

- **Triclopyr**
 - Low risk to mammals at typical rate
 - Dose to birds exceeded 0.1 LD₅₀



Results

- **Triclopyr**
 - **At highest application rates**
 - **malformed fetuses possible for herbivorous and insectivorous mammals**
 - **doses to herbivorous birds exceeded the LD₅₀**

Results

- **Glyphosate**
 - No likely risk to birds or mammals at typical application rates



Results

- **Glyphosate**
 - **At high application rates**
 - **Large herbivore dose equaled that which caused mortality to pregnant rabbits**
 - **Doses to insectivorous birds exceeded the “no-observable-adverse-effect-level” (NOAEL)**

Results

- **Several herbicides did not exceed any thresholds of concern for birds or mammals**



Clopyralid

Chlorsulfuron

Imazapic

Imazapyr

Sulfometuron methyl

Metsulfuron methyl

Results

- **No herbicide tested exceeded any thresholds for fish-eating or mammal-eating birds.**



Results

Herptiles

- Data insufficient for quantitative estimates of risk for other groups of wildlife
- There are practically no data on potential effects to reptiles



Results

Herptiles

- **More data is coming in for amphibians, but is still limited**
- **Glyphosate, picloram, and sethoxydim may pose a risk to amphibians**



Will These Effects Occur?

- **These results are unlikely to actually occur in the field under most circumstances**
 - Highest application rates rarely used
 - Animal behavior and more diverse diets
 - Seasonal presence
 - Requires large area broadcast spray

Will These Effects Occur?



- **However, some situations could create exposures of concern**
 - E.g. Large area broadcast spray over territories held by insectivorous birds

Conclusions

- **Risks to wildlife from herbicide use are not well-recognized**
- **Risk assessments can highlight groups of species at risk and in what situations**

Conclusions

- **Results can be used to modify treatment timing, techniques, or herbicide choice to reduce risk to free-ranging wildlife**

Conclusions

- **Results of this analysis were used to establish standards for invasive plant treatments on National Forests in Oregon and Washington**
 - **No dicamba or 2,4-D**
 - **No broadcast spray of triclopyr**
 - **Projects must have design criteria to reduce risk**

Questions?

