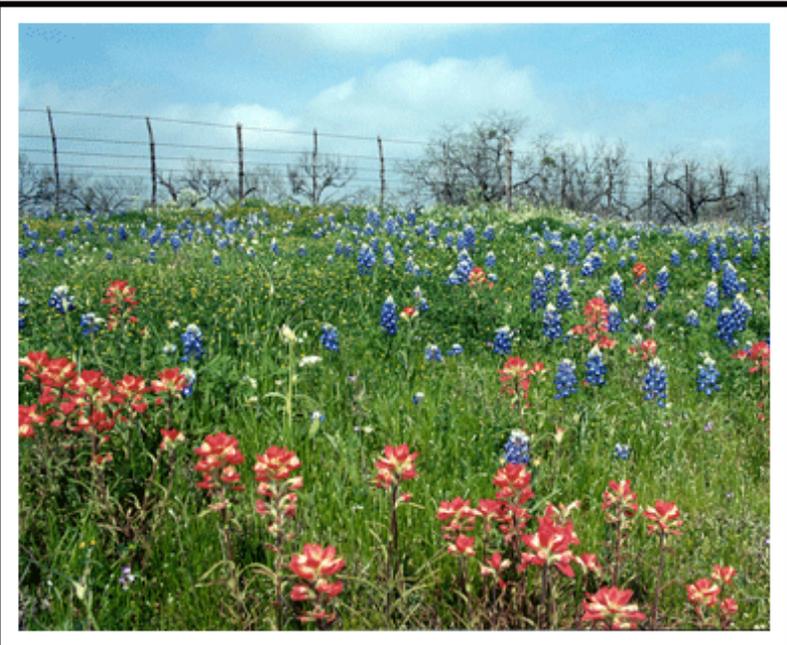


# NCHRP Project 14-16

## National Cooperative Highway Research Project Guidelines for Vegetation Management



# Guidelines for Vegetation Management

---

- ▶ Project Objective
- ▶ Team Members
- ▶ Why the Guidelines are being Developed
- ▶ The Intended Audience for the Guidelines.
- ▶ **Outline of the Guidelines**

# Guidelines for Vegetation Management

---

## Project Objective – NCHRP 14-16

- ▶ Develop vegetation management guidelines that all AASHTO member agencies can use to plan and implement vegetation management programs.

# Guidelines for Vegetation Management

---

## Project Objective – NCHRP 14-16

- ▶ The guidelines must assist agencies in selecting sound vegetation management practices
- ▶ manage their resources efficiently,
- ▶ and promote the benefits of vegetation management practices to decision makers and the general public.

# Meet the Team

Ian Heap  
Project Team Leader

Joe DiTomaso  
Research

John Reynolds  
DOT (NRVMA)

Dave Nelson  
Project DOT Leader



# Why the Guidelines are being Developed

- ▶ To provide a consistent, coordinated, proactive approach to roadside vegetation management.
- ▶ The guidelines are intended to be used as a starting point for a roadside vegetation management program and allow room for variations in State government laws, regulations and guidelines and regional variation in roadside environments.
- ▶ The guidelines do not include specific details on vegetation control practices, such as which specific herbicide to use, or which piece of equipment to purchase.

# The Intended Audience for the Guidelines

- ▶ Any highway authority
- ▶ New Managers - Particularly useful to those just beginning their career and needing to establish or improve their own vegetation management program.
- ▶ The guidelines will provide enough information on vegetation management that new managers will generally understand how the various control methods and management structures work.
- ▶ The guidelines may also be useful in educating engineers and upper management on the necessity and complexity of roadside vegetation management.

# How we approached the project

---

- ▶ Literature Review
- ▶ Internet
- ▶ Contact selected highway agencies, industry organizations, and state governments to collect vegetation management information
- ▶ Survey
- ▶ Review and Advisory Panels

# Guidelines for Vegetation Management

## Project Advisors

- ▶ Advisory Panel consisting of state agency vegetation managers
- ▶ NHCPR Review Panel headed by Chris Hedges



# Survey

## Number of Survey Respondents

- ▶ 50 Surveys sent out
- ▶ 30 Key questions
- ▶ 36 States replied





## 2. Do you have an inventory of your roadside vegetation?

“Yes, we have an inventory of much of our roadside vegetation. We use data from herbicide and fertilizer application reports, GIS collection, and field inspections.”



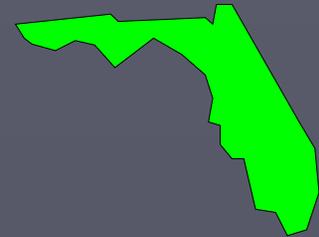
Virginia



69% of responding states have no roadside vegetation management inventory.

### 3. Have you recently done an assessment of your vegetation management program?

“Each of our District’s are required by procedure to develop and maintain a written turf management plan, and to perform quality control checks as well as random sample ratings performed three times a year throughout each district.”



Florida

55% responding states have not recently assessed their vegetation management

## 6. Do you integrate condition assessment and inventory into the zone concept?

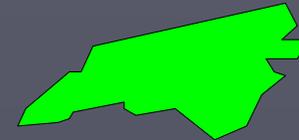
“Yes. Understanding conditions and the vegetation types is key to the manager’s decisions on which management techniques to use.”



New York



“Yes. Our condition assessment survey, which is conducted by independent parties, is a very useful tool to identify areas that require additional focus.”



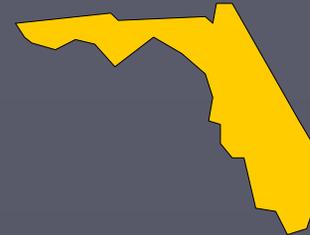
North Carolina



Over half the States do not have a current condition assessment of their vegetation.

# 9. Have you used GPS/GIS methods in vegetation assessment?

“No. The roadways are mapped on straight line diagrams with mile post assigned to the sections.”



Florida



“All eleven regions have GPS units and software, and GIS. Regions and residencies are using GPS and GIS to capture and analyze data for selected vegetation management issues.”

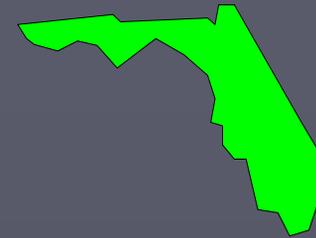


New York



# 10. How do you monitor the performance of your vegetation management program?

“The maintenance rating program performed three times a year rates the random samples and assigns a score for the cost center, district and statewide total.”



Florida

## Other Common Answers

“Lack of complaints.”

“We presently are short staffed and do not have the ability to do this.”

# 13. Do you have a long-term life cycle management plan?

---

86% of responding States have no long-term plan.

72% of responding States have little or no involvement with planning and design of highway projects.

# **Guideline Outline**

## **Guidelines for Vegetation Management**

---

### **NCHRP Project 14-16**

- ▶ 1. CONTENTS**
- ▶ 2. INTRODUCTION**
- ▶ 3. EXECUTIVE SUMMARY OF BENEFITS**
- ▶ 4. SCOPE AND ORGANIZATION OF GUIDELINES**

## 5. Objectives of Roadside Vegetation Management

---

- ▶ a. Safety
- ▶ b. Economics
- ▶ c. Erosion Control
- ▶ d. Environmental
- ▶ e. Legal and Regulatory compliance
- ▶ f. Aesthetics
- ▶ g. Sustainable Transportation
- ▶ h. Other Objectives
- ▶ i. Context Sensitive Solutions (CSS)

## 6. Determining Program Goals and Performance Measures

---

- ▶ a. Mission Statement
- ▶ b. Establish and Prioritize Goals
- ▶ c. Balance Cost and Benefits
- ▶ d. Determine Performance Measures

# 7. Public and Legal Aspects

---

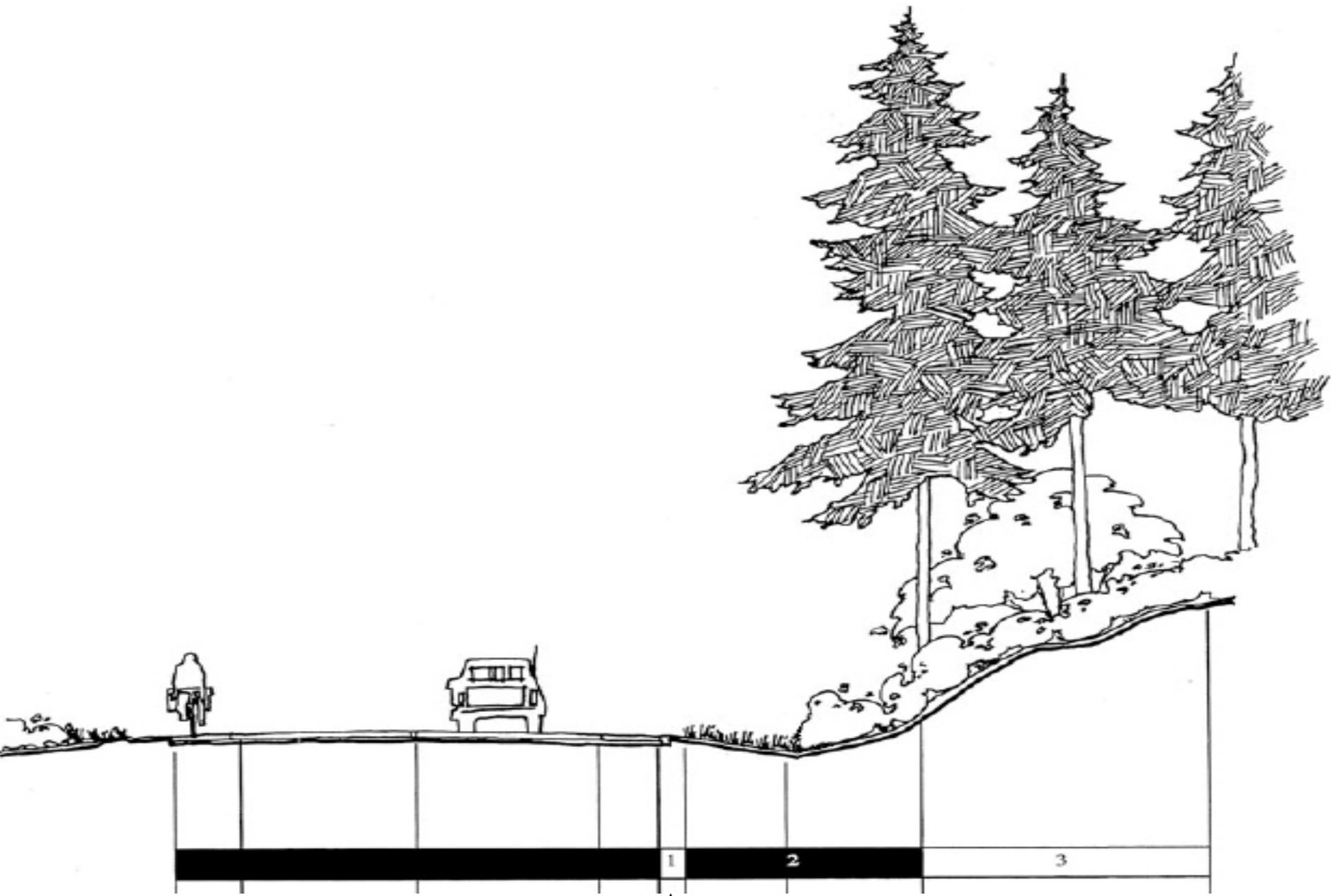
- ▶ a. Laws and Regulations related to Vegetation Management
- ▶ b. Environmental Stewardship
- ▶ c. Tort Liability
- ▶ d. Customer Demands and Expectations
- ▶ e. Public Communication and Involvement
- ▶ f. Partnership/Coordination with Stakeholders

# 8. Incorporating Vegetation Management as a part of project development, delivery and construction

- ▶ a. Planning phase
  - i. Coordination of planning, design, construction, and maintenance
- ▶ b. Design phase
  - i. Design acceptance
- ▶ c. Construction phase
  - i. Design to Construction Integration
  - ii. Integrated Construction and Maintenance Practices
  - iii. Construction Practices to Promote vegetation establishment
  - iv. Project acceptance
- ▶ d. Maintenance acceptance

# 9. Roadside Vegetation Management Zones

- ▶ a. Defining Roadside Vegetation Management Zones
  - i. Zone 1 – vegetation free
  - ii. Zone II – recovery zone
  - iii. Zone IV – natural zone
- ▶ b. Defining linear areas
- ▶ c. Other management areas
  - i. Landscaping
  - ii. Rest areas



1. Vegetation Free Zone



2. Recovery Zone

3. Natural Zone

# 10. ESTABLISHING VEGETATION

---

- ▶ a. Establishing and Maintaining Vegetation
- ▶ b. Establishing Low-Maintenance Vegetation

# 11. BASIC PLANT BIOLOGY

- ▶ a. Integrated Roadside Vegetation Management (IRVM)
- ▶ b. Biology of Weeds
- ▶ c. Weed Classification
- ▶ d. Life cycle
- ▶ e. Growth stages
- ▶ f. Anatomical and morphological structures



# 11. BASIC PLANT BIOLOGY

---

- ▶ Cont.
- ▶ g. Plant Growth and Development
- ▶ h. Environment and Plant Growth
- ▶ i. Factors Influencing Plant Growth
- ▶ j. Factors influencing the movement and persistence of weeds
- ▶ k. Summary

# 12. MECHANICAL CONTROL

- ▶ a. Mowing
- ▶ b. Tree Removal and Brush Control
- ▶ c. String and hand trimming



# 13. PERMANENT VEGETATION CONTROL

---

- ▶ a. Minor Concrete
- ▶ b. Minor Concrete Pavement
- ▶ c. Asphalt Concrete Pavement
- ▶ e. Asphalt Composite
- ▶ f. Stamped Asphalt Paving
- ▶ g. Patterned Concrete Pavement
- ▶ h. Rock Blanket
- ▶ i. Gravel Mulch

# 13. PERMANENT VEGETATION CONTROL

- ▶ **Cont.**
- ▶ j. Aggregate Base
- ▶ k. Rock Slope Protection
- ▶ l. Weed Control Mat (Fiber)
- ▶ m. Herbicidal Geofabric
- ▶ n. Rubber Weed Mat
- ▶ o. Irrigated Ornamental Vegetation
- ▶ p. Native and Non-Irrigated Vegetation
- ▶ q. Organic Mulch

# 14. CHEMICAL CONTROL

- ▶ a. Introduction
- ▶ b. Herbicide Regulations
- ▶ c. General Characteristics of Herbicides for Rights-of-Way Vegetation Management
- ▶ d. Herbicide Classification Systems
- ▶ e. Herbicide Activity
- ▶ f. Toxicology
- ▶ g. Plant Growth Regulators



# 15. TARGET SPECIES

- ▶ a. Noxious and Invasive Weeds
- ▶ b. Aquatic Weeds
- ▶ c. Herbicide-Resistant Weeds



# 16. CULTURAL AND BIOLOGICAL CONTROL

- ▶ a. Cultural
- ▶ c. Biological Control
- ▶ d. Emerging technologies



# 17. ROADSIDE VEGETATION ASSET INVENTORY AND CONDITION

---

- ▶ a. Introduction
- ▶ b. Assessing Existing Conditions
- ▶ c. Methods to collect the inventory data
- ▶ d. Integration of inventory and conditions survey with zone concepts
- ▶ e. Integration of inventory with existing asset management systems and budget

# 18. PROGRAM BUDGETING AND COSTS

---

- ▶ a. Prioritize the Budget Dollars
- ▶ b. Include Overhead and Administration Costs in the Budget
- ▶ c. Prepare an Itemized Budget of Expected Costs
- ▶ d. Make Adjustment as Necessary Based on the Performance of the Program
- ▶ e. Monitor Spending Compared to Budget
- ▶ f. Alternative Funding Sources

# 19. PROGRAM MANAGEMENT

---

- ▶ a. Structure of Vegetation Management Personnel
- ▶ b. Operations (maintenance) Personnel
- ▶ c. Expertise and Credential Requirements (authority and duties of staff)
- ▶ d. Research Services
- ▶ e. Legal Services
- ▶ f. Quality Assurance
- ▶ g. Equipment Resources

# 19. PROGRAM MANAGEMENT

---

- ▶ Cont.
- ▶ h. Facilities
- ▶ i. In-house vs. Contracting Activities
- ▶ j. Long-Term Management Plan
- ▶ k. Performance Monitoring
- ▶ l. Required Documentation
- ▶ m. In-House Activities
- ▶ n. Public Outreach and Public Relations

# 20. CONTRACTS AND PROCUREMENTS

- ▶ a. Contract types and procurement methods
- ▶ b. Purchase Orders
- ▶ c. Prequalification Lists



## 22. Model – Decision Support System

---

- ▶ Organize information for decision situations
- ▶ Interact with decision makers
- ▶ Expand the decision maker's horizons
- ▶ Present information for decision-maker understanding
- ▶ Add structure to decisions
- ▶ Use multiple-criteria decision-making models

# Analytic Hierarchy Processing (AHP)

---

- ▶ Analytic Hierarchy Processing requires decision makers to judge the relative importance of each criteria and indicate their preference regarding the importance of each alternative criteria

# Guidelines for Vegetation Management

## Vegetation Management Objectives

- ▶ Identify program objectives, this may differ from program to program
  - Provide safe, reliable transportation
  - Maintain the investment at its lowest lifecycle cost
  - Support commerce and economic viability
  - Comply with legal mandates
  - Be environmentally and socially responsible
  - Contribute to aesthetics.....etc

# Guidelines for Vegetation Management

## Vegetation Management Activities

- ▶ Then identify activities that may help achieve those objectives
  - Promote long term plant communities, preferably native
  - Erosion control
  - Control noxious weeds
  - High risk brush and grass control
  - Educate public on necessary practices
  - Eliminate danger trees
  - Control nuisance weeds.....etc



# Analytic Hierarchy Processing

- ▶ The three steps in AHP are
- ▶ Determine which alternative is preferred over another and by how much, called a pair-wise comparison
  - Comparing two alternatives to determine which is preferred and by how much
- ▶ Repeat the process for each criteria
- ▶ Rate each of the criteria according to its importance

# FINAL REPORT

- ▶ Final Report will have all necessary supporting documentation and function as a stand-alone document. It will include:
  - An Executive Summary prepared in accordance with NCHRP guidance.
  - A computerized version of the report made available in PDF and HTML formats online.
  - A fact sheet summarizing key elements of the report and identifying the full report's online location, to increase awareness of the report within the roadside vegetation management community. This fact sheet will be distributed at vegetation management meetings.

# Promotion of the Final Product

---

## Feedback from survey respondents

- ▶ Agencies want the guideline to be actively promoted
- ▶ Fear that the document will be shelved and little used if it is not promoted
- ▶ Suggested talks at NRVMA and some regional workshops to launch the guidelines.

