PROBLEMS CAN NOT BE SOLVED AT THE LEVEL OF AWARENESS THAT CREATED THEM IN THE FIRST PLACE.

– ALBERT EINSTEIN

Environmental Stewardship and Highway Maintenance “A Journey”

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Did We Miss a Turn Somewhere?

Transportation and the Environment – An Historic Overview

- 50's - Interstate Era
- 60's - Environmental movement
- 70's - NEPA
- 80's - Permits
- 90's - Mitigation
- 00's - Streamlining ???
- 10's - Stewardship???
- 20's – ????????
It is the mission of the New York State Department of Transportation to ensure our customers – those who live, work and travel in New York – have a safe, efficient, balanced and environmentally sound transportation system.
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NYSDOT, as the state’s largest public works agency, has an obligation and a responsibility to the people of New York to enhance, improve and protect the environment.

NYSDOT’s Environmental Vision

What does stewardship mean to DOT?
NYSDOT’s Environmental Initiative

Moving from Principle to Practice

- Promote and strengthen an environmental ethic throughout the Department.
- Advance State environmental policies and objectives.
- Strengthen relationships with environmental agencies, groups and local municipalities.
- "IT’S OK TO BE GREEN"

Promote an environmental ethic throughout DOT

- Every DOT employee should look for opportunities to enhance the Department’s environmental performance.
Adjust ROW mowing management practices for habitat enhancement

PIKE SPAWNING

Karner blue butterfly study
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CHAPTER 2: ORGANIZATIONAL ENVIRONMENTAL STEWARDSHIP PRACTICES

- 2.1. Environmental Policies and Strategic Planning
- 2.2. Setting Objectives and Targets & Tracking Environmental Commitments
- 2.3. Environmental Management Systems
- 2.4. Operational Controls, Procedures, and Practices
- 2.5. Measuring Environmental Performance
- 2.6. Environmental Staffing, Roles, and Responsibilities
- 2.7. Environmental Training and Certification
2.1. Environmental Policies and Strategic Planning

- Environmental Policies and Mission Statements
- Methods for Staying Averse to Legal and Other Requirements
- Identifying Environmental Aspects or Impacts of Operations
- Organization-Wide Strategic Planning for the Environment

Environmental Stewardship Policies

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- 2.6. Environmental Staffing, Roles, and Responsibilities
- 2.7. Environmental Training and Certification
Environmental Commitment Tracking Through Construction & Maintenance

- DOT "Green Sheets" and the Emergence of Electronic Commitment Tracking Systems
- New Jersey DOT Environmental Re-evaluation Checklists, Meetings, and Construction Field Reviews
- Kentucky Transportation Cabinet’s Communicating All Promises (CAP)
- New York State DOT Environmental Commitment and Obligations Package for Construction (ECOPAC)
- South Carolina DOT Interdisciplinary Accountability Teams
- Indiana DOT Environmental Compliance Certification
- New York State DOT Environmental Commitment and Obligations Package for Construction (ECOPAC)
- MDSHA Environmental Compliance/Consideration Checklists and Independent Environmental Audits
- DOT Environmental Requirements in Inspections Format
- Texas DOT Environmental Tracking System
- New England Port Authority Environment Commitment Implementation and Lessons Learned

NYSDOT Environmental Audit & Commitment Tracking

- Stormwater Pollution Prevention
- Required Information and Documentation
- Stormwater Pollution Prevention
- Required Information and Documentation

TxDOT Environmental Commitment Checklist

- Stormwater Pollution Prevention
- Required Information and Documentation
- Stormwater Pollution Prevention
- Required Information and Documentation
Chapter Titles

1. Introduction and Research Approach
2. Organizational Environmental Stewardship Practices
3. Designing for Environmental Stewardship in Construction & Maintenance
4. Construction Practices - Environmental Stewardship
5. Pavement, Materials, and Recycling
6. Maintenance Facilities Management
7. Bridge Maintenance
8. Winter Operations and Salt, Sand, and Chemical Management
9. Roadside Vegetation Management
10. Roadside Management and Maintenance: Beyond Vegetation

CHAPTER 3: DESIGNING FOR ENVIRONMENTAL STEWARDSHIP IN CONSTRUCTION & MAINTENANCE

3.1. Beyond Mitigation: Projects to Achieve Environmental Goals
3.2. Context Sensitive Design/Solutions
3.3. Avoiding Impacts to Archaeological or Historic Sites
3.4. Habitat Connectivity and Wildlife Crossings
3.5. Culverts and Fish Passage
3.6. Stream Restoration and Bioengineering
3.7. Design Guidance for Stormwater and Erosion & Sedimentation Control
3.8. Drainage Ditches, Berms, Dikes, and Swales
3.9. Design for Sustainable, Low Maintenance Roadsides
3.10. Designing to Reduce Snow, Ice, and Chemical Accumulation
3.11. Designing to Minimize Air Quality Problems
3.12. Design and Specification for Recycling
3.13. Designing to Minimize Noise
3.14. Lighting Control/Minimization
3.15. Safety Rest Areas, Traveler Services, and Parking Area Design

3.6. Stream Restoration and Bioengineering
Chapter 4: Construction Practices - Environmental Stewardship

4.1 General Construction Site Stewardship Practices
4.2 Preparing Access and Staging Areas
4.3 Construction Sequencing, Timing, and Acceleration
4.4 Discovery of Archeological or Historic Sites in Construction
4.5 Construction in Streams, Wetlands, and Other Environmentally Sensitive Areas
4.6 Erosion and Sedimentation Control
4.7 Noise Minimization
4.8 Materials Storage, Collection, and Spill Prevention on Construction Sites
4.9 Vegetation Management in Construction
4.10 Soil Management in Construction
4.11 Establishing Vegetation at Construction Sites
4.6 Erosion and Sedimentation Control

- Measures to Improve Erosion and Erosion & Sedimentation Control
- Stormwater Management Practices
- Dewatering
- Dewatering and Managing the Watercourse
- Dewatering and Managing the Watercourse
- Infiltration - Sediment Basins and Traps
- Interception
- Dewatering and Managing the Watercourse
- Procedural Management Practices for Sedimentation Control

**Measures to Minimize Impacts to Aquatic Habitat & Species During Dewatering**

- Prior to capturing fish, determine the most appropriate release location
- Have at least two containers and segregate young-of-year (YOY) fish from larger age-classes to avoid predation
- Avoid anesthetizing or measuring fish. If mortality during relocation exceeds 5 percent, stop touching fish
- Minimize handling of aquatic species
- Peri-daily measure air and water temperatures
- Avoid disturbance to the channel and avoid direct mortality of fish and other aquatic vertebrates
- Maintain stream flow to channel below construction site
- Periodically measure air and water temperatures
- Identify listed species within the project site
- Submit relocations to resource agencies
- Inspect adjacent roads
- Interception

**Stormwater Management Practices**

- Rain Water Gardens

**Dewatering**

- Triangular Filter Dike
- Gravel Bag
- Fiber Rolls
- Flow Diversion
- Turbidity Curtains
- Cofferdams
- NHDOT Stormwater Quality Retrofits
- Contractor Disincentive Specs for Erosion Control
- NCDOT Delegated Erosion and Sedimentation Control
- Performance Monitoring Systems and Erosion Control Structure Removal
- MDSHA System for 100 Percent Compliance
- Inadequate/Improper Installation of BMPs
- Combining Recycling and Effective Erosion Control
- Combining Recycling and Effective Erosion Control
- Stabilizing Construction Entrances/Exits
- Maintenance of Sediment Basins and Traps
- Rock Berm
- Sandbag Barrier
- Erosion Control Structure Removal
- Stabilizing Construction Entrances/Exits
- Maintenance of Sediment Basins and Traps
- Rock Berm
- Sandbag Barrier
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5.6. Recycling in Pavement and Roadside Appurtenances

- Recycling in the Aggregate Industry
- Pavement and Roadside Construction
- Recycled Aggregate Pavement (RAP)
- Recycled Concrete (RCCM/RC)
- Recycled Roofing Shingles
- Fly Ash
- Foundry Sand
- Glass Aggregate/Cullet
- Steel Slag
- Scrap Iron Use for Steel Reinforcement
- Wet Bottom Ash and Boiler Slag
- Flue Gas Desulfurization (FGD)
- Waste
- Tire/Rubber Scraps
- Plastics
- Aluminum Sign Recycling and Chromate Coating Elimination
CHAPTER 6: MAINTENANCE FACILITIES MANAGEMENT

6.1 Planning and Prioritizing Environmental Improvements at Maintenance Facilities

6.2 Facility Housekeeping Practices

6.3 Yard and Floor Drain Management

6.4 Under and Above-Ground Storage Tanks

6.2 Facility Housekeeping Practices

General Stormwater Protection Practices at DOT Maintenance Facilities
- Building and Grounds Maintenance
- Vehicle and Equipment Maintenance
- Sediment Control at Maintenance Facilities
- Materials Management at Maintenance Facilities
- Waste Management
- Drum/Container Management
- Spills and Leaks
- Ventilation and Exhaust Systems at Maintenance Facilities
- Facility Inspection and Reinspection to Achieve Environmental Goals and Continuous Improvement

Materials Management and Runoff Prevention
- Sized for loader & truck
- Sealed and patched
- Clean
- Runoff to sediment trap
- Containment for 110% capacity
- Impervious pad
- Properly signed
- Drain closed
- No standing water
CHAPTER 7: BRIDGE MAINTENANCE

7.1. Preventative Bridge Maintenance Practices

7.2. Avoiding and Minimizing Impacts to Fish and Wildlife And Enhancing Habitat


7.2. Avoiding and Minimizing Impacts to Fish and Wildlife And Enhancing Habitat

- Scheduling Maintenance and Repair
- Using Pre-Fabricated Bridges to Help Accommodate Stream/Fish Timing Restrictions
- Reducing the Space Needed for Large Equipment Access
- Bird and Bat Roosts in Bridges

“Oregon Wedge” Daytime Bat Roost
Texas Bat-Abodes, Modified for a Steel I-Beam Bridge, Have Been Used to Attract Bats

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CHAPTER 8: WINTER OPERATIONS & SAND, SALT, & CHEMICAL MANAGEMENT

8.1: Selecting Snow and Ice Control Materials to Mitigate Environmental Impacts
8.2: Reducing Sand Usage
8.3: Strategic Planning for Reduced Salt Usage
8.4: Stewardship Practices for Reducing Salt and Other Chemical Usage
8.5: Winter Operations Facilities Management
8.6: Training for Salt Management and Winter Operations
8.3. Strategic Planning for Reduced Salt Usage

- Caltrans Salt Reduction Policy and Implementation
- NYSDOT’s Salt Reduction Strategy
- PENNDOT District 10 Salt Management Plan Strategies and Annual Update to Salt Management Plan
- Ohio DOT Pretreatment, Screening, Information, and Reporting System
- Transportation Association of Canada Recommended Practices for Developing Salt Management Plans

8.4. Stewardship Practices for Reducing Salt and Other Chemical Usage

- Shifting to Anti-Icing
  - Environmental Benefits and Cost Savings of Shifting to Anti-Icing
  - Stewardship Practices for Minimizing Anti-Icing Material Application
    - Road Weather Information Systems (RWIS)
  - Precision Application for Minimizing and Avoiding Chemical Applications
    - Spreader, Spread Patterns, and Spreader Controls
    - Pre-Wetting of Solid Materials to Minimize Bounce
    - Fixed Automated Spray Technology (FAST)
- Calibration
- Operational Support Equipment
- Monitoring, Snow-Reading, and Decision Support in Maintenance Management Systems
  - Evaluation Treatment Effectiveness
    - Environmental Performance Measures for Winter Operations
    - Environmental and Sustainability Monitoring for Winter Maintenance
    - Bringing It All Together: Michigan Vehicle Retrofit and Management System

Annual Inspection, Calibration, and Training

- Annual Inspection
- Calibration
- Training
9.5. Reduced Mowing Policies and Other Mechanical Vegetation Stewardship Practices

- Developing a Mowing Policy
- Mn/DOT’s Mowing Policy and Practices
- Nebraska Department of Roads: Mowing Policy
- Wisconsin Department of Transportation Mowing Policy
- NCDOT Mowing Program
- Modifications to Appropriate Wildlife
  Using the Prairie Wildlife
- NYSDOT Stewardship Mowing Practices
- Mowing Management in Southern Alberta
- Oregon DOT’s Mowing and Brush Removal Practices
- Other DOT Brush Control BMPs

Mowing—“Quality Not Quantity”

Other names:
- Planned mowing
- Orchestrated mowing
- Precision mowing
- Mowing as part of IRVM

One mower width cuts save habitat and dollars

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CHAPTER 10: ROADSIDE MANAGEMENT BEYOND VEGETATION

10.1 Environmental Enhancement Practices & Partnerships
- Water Quality Retrofit
- Wetland Enhancement
- Terrestrial Habitat Enhancement
- Identifying and Implementing Aquatic Connectivity Goals
- Passenger Improvement
- Installation/Improvement of Public Fishing Access
- Extending Highway Maintenance Activities to Bicycle Trails

10.2 Protection of Cultural and Historic Resources

10.3 Maintenance in Wetlands

10.4 Maintenance Near Waterbodies

10.5 Maintenance of Structures for Wildlife

10.6 Maintenance of Stormwater Facilities

10.7 Maintenance of Roadsides, Public Facilities, Drainage Systems, and Roadway Appurtenances

10.8 Maintenance of Public Access Facilities, Traffic Control Devices, and Bridge Scuppers

10.9 Maintenance and Stewardship Practices for Slopes, Drainage Ditches, Swales, and Diversions

10.10 Erosion and Sediment Control in Maintenance

10.11 Recycling in Roadside Maintenance Operations

10.12 Painting Operation Stormwater BMPs

10.13 Road Waste Management

10.14 Fishing Access Enhancement

10.15 Emergency Actions

10.16 Field Review of Roadside Maintenance Operations

NYSDOT Fishing Access Enhancement
Mn/DOT Hydraulic Structure Inspection, Location, & Repair System (HYDRINFRA)

Facilities Compliance Tracking

Product

“Encyclopedic” inventory of environmental stewardship construction & maintenance practices in use across the country, by:

- Functional areas within construction and maintenance
- Environmental areas, such as air, noise, wetlands & water quality, cultural resources, fish & wildlife
- Links to examples or resources at state DOTs, research results, implementation tips, pictures, and performance measures in use
Implementation Concepts
Technical

- Compendium to supported through AASHTO Center for Environmental Excellence
- Live on-line resource:
  - Environmental Stewardship – How to do it better
  - Innovation - What’s being done, what works
  - Benchmarking - How are we doing?
  - Sharing ideas and experience
- Source for updating State DOT policies, performance targets, manuals, bulletins, specs and tailgate sessions

Implementation Concepts
Institutional
(ARTBA & AGC Join AASHTO)

- Joint Committee Statement adopted Sept 7, 2003
- Contractors embrace environmental stewardship
- Training workshops for contractor employees

“SYSTEMATIZATION” ?.... Green Highways
Survey tool
- Lists all possible stewardship opportunities
- Location info supplemented with
  - mile markers or
  - GPS

NYSDOT Green and Blue Highways Initiative
- Regional staff undertake survey
- Need
  - Driver
  - Observer
- Surveys take 1-2 hrs
  - Traffic/safety concerns
  - length of segment
  - Opportunities
NYSDOT Green and Blue Highways Initiative

Opportunities and Issues found in Survey

Water quality and vegetation:
- Erosion/ditching
- Vegetation

Invasives
- Can tackle small patches on right of way (ROW)
- Large infestations off ROW affect control efforts
NYSDOT Green and Blue Highways Initiative

- **Signs**
  - River Road, a local scenic byway: Partner with Town government to sign byway?
  - Partner with historic sites to improve markers?

NYSDOT Green and Blue Highways Initiative

- **Improve access to natural resources**
  - Help State fisheries agency with fishing access?
  - Upgrade pull-offs for access to views?

NYSDOT Green and Blue Highways Initiative

- **Wildlife:**
  - Several deer crossings in survey segment
  - Depending on site/traffic, deer reflectors might help reduce deer-vehicle accidents.
NYSDOT Green and Blue Highways Initiative

Next Steps

- Regions/Residencies to undertake surveys
- Regions/Residencies to plan/undertake work
- Work will advance in balance with available staff/financial resources
  - work plans for core functions (bridge, pavement, safety, drainage)
- Main Office/Regions/Residencies to survey work accomplishments in fall
- All to evaluate process, revise and resume Spring '06

MOTIVATION IS KEY.

ALL ELSE IS MECHANICS.

Mgt. 101
Steps to Instituting NYSDOT Environmental Initiative

- Mission statement – “environmentally sound”
- Environmental Guidance and Procedures
  - Incl. FHWA guidance on eligibility of federal-aid for environmental initiative activities
- Environmental Policy
- Environmental Accomplishments publication
- Website (www.dot.state.ny.us/eab/envinit.html)
- Environmental Awards
- Environmental staff in Maintenance and Construction