Using GIS for Crop Detection and Estimation

Decision Support for Cannabis Eradication

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Purpose

To provide technical support to the National Guard CD efforts and law enforcement in their efforts to eradicate cannabis grown out of doors.
The USFS and DOI are working in conjunction with the White House’s Office of National Drug Control Policy in meeting all of the priorities of the National Drug Control Strategy.

“Disrupting the Market and Attacking the Economic Basis of the Drug Trade.”

“There are five principal illegal drug markets in the United States:”

“1. More than 10,000 metric tons (mt) of domestic marijuana and more than 5,000 mt of marijuana cultivated and harvested in Mexico and Canada, marketed to more than 20 million users.” (Pg 30)
National Threat Assessment

National Drug Threat Assessment 2003
National Drug Intelligence Center

“Much of the outdoor cannabis cultivation in the U.S. occurs on public lands . . . . Consequently, NFS land, as well as lands managed by DOI account for a considerable number of cannabis plants eradicated.” . . . . (pg. 32)

“Smugglers also exploit public lands adjacent to the U.S. – Mexico border to move marijuana and other drugs into the country.” . . . (pg. 34)

ONDCP Marijuana Policy Statement
(August 15, 2002)

“. . . . This administration opposes efforts to legalize marijuana or to marginalize the importance of controlling its trafficking and use. . . . . meaningfully reducing marijuana use is a requisite condition of achieving the President’s National Drug Control Strategy objectives.”
Public Lands

717 million acres or 38% of the United States is federal land
525 million acres or 23% is DOI Land
National Cannabis Eradication Decision Support System (NCEDSS)

- NCEDSS developed as a prototype system
- Its functions were adequate
- Its implementation was problematic
- Too much state to state variability
- The Decision Support System (DSS) is the follow-on
Decision Support System (DSS)

The Decision Support System is the “heart” of CDGRASS.

- Baseline Prototype system: Miss Counterdrug Enforcement Decision Support System (MCEDSS).
  - Purpose: Provide high-probability cueing maps to find and eradicate marijuana.
  - Delivered in Jan 02
  - MCEDSS is now NCEDSS and is being expanded for CD mission support to other 53 States and Territories.
Field Installation
Mississippi Bureau of Narcotics (MBN)

Laptop
GPS
Cell phone
Radio
Moving Map
Cell Phone Connection

Wireless Internet for Doppler Radar
Decision Support System
Decision Support System

• Marijuana Manufacturing Report
• User manual
• Map viewer (Arc Explorer)
• Map folio
  – Cueing layer (selected states)
  – State/county boundaries
  – State/federal highways
  – Rivers
  – City boundaries
• Moving Map
Eradicated Plots
Eradicated Plots + Highways + Cities
Result - Cueing Layer for Entire State

- Based upon 16 rules
- Calculated on a 3 km grid
- Hot colors - likely
- White - random
- Blue - unlikely
- Black dots – 2001 cultivation sites
Marijuana Manufacturing Report

Date
Cultivated/Ditch
Containers/Ground
Eradicated yes/no
Location
# of plants
Maintenance

<table>
<thead>
<tr>
<th>Agent ID</th>
<th>Date of Find</th>
<th>Type of Site</th>
<th>Method of Planting</th>
<th>Eradicated</th>
<th>Location</th>
<th># of plants</th>
<th>Site Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CULTIVATED PLANTS</td>
<td>IN CONTAINERS</td>
<td>YES</td>
<td>DETERMINED BY GPS</td>
<td></td>
<td>GOOD</td>
</tr>
</tbody>
</table>
Why Plot & Predict?

• ID areas that are not being adequately searched

• Pass knowledge to new personnel
MCEDSS Effective?

• “As a minimum, this is at least an 18% increase over the average (marijuana plots found) for the past five years..... This is double the previous maximum for a single year.... MCEDSS was an important part of this year’s increase.”

  Jimmy Saxton, DCE/SP Coordinator, MBN
National Map Project
Map Regions for DSS
Current Initiatives and Operations

Northern Border Drug Task Force

Project North Star

Midwest HIDTA

South Central Task Force

COBIJA & BCI

CA Border Alliance Group (CBAG) SWB HIDTA

C.A.M.P.

National Guard CD-GRASS GIS Applications

Appalachia HIDTA Governor's Task Force

DEA & DCE/SP

Natl. Meth Initiative

AAPC SWB HIDTA

Operation Alliance

National Marijuana Initiative

Midwest HIDTA South Central Task Force
National Marijuana Initiative

The NMI focuses its efforts at disrupting the market by eliminating those organizations that support the production and trafficking of marijuana on public lands.
California Public Lands

- California – 100 million acres
  - 45 million acres managed by Federal Govt

- Of 45% of CA land managed by Federal Govt
  - 20% National Forest Service
  - 15% Bureau of Land Management
  - 8% National Park Service
  - 4% Dept of Defense

- 192M acres of NFS lands in the United States
  - 22M acres of USFS lands in CA

- Bottom Line: Scope for Success
Cannabis Cultivation on CA Public Lands

- Almost one-third (1.2M of 3.1M) of plants eradicated outdoors under DEA’s DCE/SP in 2002 were in CA

- DEA San Francisco has initiated over 350 marijuana cases since 2000
  - 48% domestic cannabis cultivation / 36% indoor grows
  - Surge in outdoor grows (some 50K+ plants) operated by Mexican nationals
  - Most sites located near Fresno in Sierra Nevada mountains
  - Controlled by Mexican nationals

- Post-9/11--Tightened security on Southwest Border
  - Mexican traffickers have turned to cannabis cultivation on CA public lands
  - Eliminates risk of transporting drug over border
  - Traffickers closer to their packaging and distribution networks
“2003—The Most Violent Year on Record”

- Patterns of drug-related violence
  - Booby traps common
  - Armed workers protecting large plots
  - Maintained by Mexican nationals
  - High-power weaponry

- “Significant evidence of International Drug Trafficking Organizations operating on NFS lands”

- Violence escalates during grow season (May-Nov) by workers protecting crops, harvests, and profits

- Signs that crop workers no longer flee when confronted by law enforcement, but resist and even attack

1 Week in CA National Forests (2003) (USFS)

- Sept 13 -- Los Padres NF – Hunter shot at by growers

- Sept 14 – Sierra NF’ – Victim shot near 4,500-plant garden

- Sept 16 – Los Padres NF – FS and County Raid team fired on by growers

- Sept 16 – BLM Public Lands, Shasta Co., CA – CAMP and Shasta County deputies shoot out. Two growers shot and killed.

- Sept 18 – Mendocino NF – FS K9 attacked by growers. Suspects drop assault and high caliber rifles while fleeing

- Sept 19 – Butte County, CA – Butte County SD deputies shoot out, 2 growers shot and killed

- Sept 19 – Mendocino County, CA - 34-year-old hacked to death with machete in marijuana garden
Narrow the Scope

Cannabis Eradication 8 of Top 10 National Forests are in California

2002

- Cleveland: 119,720 plants
- Sequoia: 95,934 plants
- Los Padres: 29,865 plants
- Sierra: 16,048 plants
- Stanislaus: 40,912 plants
- Klamath: 20,020 plants
- Mendocino: 19,647 plants
- San Bernardino: 25,564 plants

2003

- Cleveland: 115,674 plants
- Sequoia: 49,826 plants
- Los Padres: 34,673 plants
- Sierra: 41,775 plants
- Stanislaus: 42,716 plants
- Six Rivers: 23,148 plants
- Mendocino: 24,798 plants
- San Bernardino: 44,286 plants
- National Forest Service
- Bur. Land Management

8 of Top 10 Cannabis Eradication National Forests are in California
5-Phase Methodology

1. Organize and Assess Feasibility
   - Define end-product
   - Seek agency “buy-in”
   - Determine resource needs

2. Pre-Survey Preparation
   - Define scope and methodology
   - Produce Predictive Cueing Layer Model

3. Data Collection and Ground Truthing
   - Acquire all data (imagery, LEA intel, open source info)
   - Plot targeted survey areas
   - Conduct ground truthing in survey areas

4. Data Analysis
   - Incorporate LEA intelligence trend analysis
   - Extrapolate plot surveys
   - Estimate cultivation on all CA federal lands

5. Final Report and Follow-on
Survey Methodology

- The key is NGB-sponsored Predictive Cueing Layer Model

- Determine areas of highest probability for grow sites

- Two track approach
  - Sample areas at 20% - High
  - Survey one entire area

- Verify and validate

- Multiple sources
What drives cultivation locations?
Predictive Cueing Layer Model

- Based on historic data
- Plotted over 400 cannabis grows discovered from 2001-03 in GIS
- Over five dozen influencing factors
- Determines likelihood of cultivation by location
Predictive Cueing Layer Model Variations

Legend
Likelihood of Outdoor Marijuana
- Less Likely than Random
- As Likely as Random
- More Likely than Random
- Cultivation Plots

Breakdown by Area
- 70.0%
- 22.1%
- 7.9%
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Websites

• NGB-CD  http://ngbcdd.org
• NGB-CD Mapping Portal  
  http://dfs.gtri.gatech.edu/dmc/index.jsp
  &  http://ngbcddmaps.org
• Digital Mapping Center (DMC)  
  http://www-cddmi.forscom.army.mil/